2015/16 Assessment of ASX Clearing and Settlement Facilities

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Contents

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1. Introduction and Executive Summary

In accordance with its responsibilities under the *Corporations Act 2001*, the Reserve Bank of Australia (the Bank) carries out periodic assessments of how well each clearing and settlement (CS) facility licensee is complying with applicable Financial Stability Standards (FSS) determined by the Bank and the licensee's more general obligation to do all other things necessary to reduce systemic risk.[1] The FSS are aligned with the Principles in the *Principles for Financial Market Infrastructures* (the PFMI), published by the Committee on Payments and Market Infrastructures (CPMI) and the Technical Committee of the International Organization of Securities Commissions (IOSCO) in 2012, that address matters relevant to financial stability.[2,3]

This report presents the Bank's Assessment of the four licensed CS facilities in the ASX Group (ASX) – the two central counterparties (CCPs), ASX Clear Pty Limited (ASX Clear) and ASX Clear (Futures) Pty Limited (ASX Clear (Futures)); and the two securities settlement facilities (SSFs), ASX Settlement Pty Limited (ASX Settlement) and Austraclear Limited (Austraclear) – for the year ending 30 June 2016 (the Assessment period).[4] In accordance with the governance arrangements for the Bank's oversight and supervision activities, this report has been reviewed and approved by the Payments System Board.

All four facilities have made substantial progress towards addressing the recommendations and regulatory priorities identified in the Bank's *2014/15 Assessment of ASX Clearing and Settlement Facilities*.[5] Many of these recommendations and priorities have been fully addressed. Important actions include the modification of plans to replenish financial resources in response to a drawdown following a participant default, enhancement of risk and default management arrangements to reflect experiences gained in light of the default of BBY Limited (BBY), and ongoing refinement of stress test models.

It is the Bank's assessment that all four facilities have observed almost all relevant requirements under the FSS in the Assessment period (Section 2 and Appendix A); in a small number of areas, the facilities have broadly observed the relevant requirements.[6] The Bank therefore concludes that the facilities have conducted their affairs in a way that causes or promotes overall stability in the Australian financial system.

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1 The Bank has clarified in a policy statement that it intends to carry out assessments of the ASX CS facility licensees on an annual basis; see <http://www.rba.gov.au/payments-and-infrastructure/payments-system-regulation/frequency-of-assessments.html>.

2 The Principles and related *Disclosure framework and assessment methodology* are available at <http://www.bis.org/cpmi/publ/d106.htm>.

3 The alignment of regulatory standards applicable to central counterparties and securities settlement facilities to the Principles has recently been confirmed by the CPMI-IOSCO in a recent assessment of the Australian regulatory regime, available at <http://www.bis.org/cpmi/publ/d140.htm>.

4 In this report, the terms CS facility and CS facility licensee are used interchangeably.

5 The Bank's 2014/15 Assessment may be found at <http://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2014-2015/>.

6 The Bank's Assessment applies the rating system used in the assessment methodology that supports the Principles.

The Bank has nevertheless made a number of recommendations to further strengthen the ASX facilities' observance of requirements under the FSS. These include recommendations to encourage continuous improvement, even where relevant requirements have been observed. Such improvement contributes to the ASX CS facilities' ongoing compliance with the obligation to do all other things necessary to reduce systemic risk. The recommendations and regulatory priorities cover a number of areas, including to encourage:

- further enhancements to the ASX CCPs' financial risk management arrangements, reflecting the conclusions of recent implementation monitoring by CPMI and IOSCO, as well as forthcoming guidance to the Principles
- continued dialogue with the Bank and the Australian Securities and Investments Commission (ASIC) on cyber resilience, framed by new guidance from CPMI and IOSCO
- finalisation of measures arising from experiences gained in the management of the default of BBY
- completion of ASX's transition to a new treasury investment policy
- improvements in ASX's documentation of its risk models, and similar enhancements to documentation in the areas of recovery planning and default management
- continued investment in the ongoing maintenance and smooth functioning of the Clearing House Electronic Sub-register System (CHESS) in the transition to its replacement system.

The Bank is obliged under the Corporations Act to report its findings to the relevant Minister and ASIC. Consistent with established policy, Assessment reports are also published on the Bank's website. The Bank's Assessment also forms the basis for formal assessments of the ASX CS facilities against the Principles, carried out jointly with ASIC. The Bank and ASIC have committed to carrying out these assessments periodically, with the first published in September 2014.[7]

1.1 Overview of Activity in the ASX Clearing and Settlement Facilities

Activity in the ASX CS facilities increased for the most part. The daily average number of trades in cash equities cleared by ASX Clear and futures contracts cleared by ASX Clear (Futures) increased in 2015/16, by 24 per cent and 8 per cent, respectively. The notional value outstanding of over-the-counter (OTC) interest rate derivatives (IRD) positions cleared by ASX Clear (Futures) increased significantly, to $1 600 billion at the end of June 2016 from $441 billion at the end of the previous period. By contrast, the average daily number of equity options contracts cleared by ASX Clear declined by a further 16 per cent in 2015/16.

In 2015/16, average price volatility in the equities market increased compared to the previous year to be above the 10-year average. Consistent with this increase, margin rates for positions in equity-related products were higher on average over the period. By contrast, volatility on the interest rate futures market edged down slightly in the Assessment period. Nevertheless, average margin rates in these products were higher than in 2014/15, primarily resulting from elevated margin rates in the second half of 2015; this, in turn, reflected higher volatility in those contracts in June and July 2015.

7 The first assessment against the Principles is available at <http://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/principles/assessment-against-principles/asx/2014/index.html>.

The ASX CCPs' total margin collected increased in 2015/16 by 15 per cent. This increase was mainly driven by higher initial margin held against derivatives positions at both CCPs, resulting from a combination of larger open positions and higher margin rates. Average daily initial margin held by ASX Clear against unsettled cash equity transactions in 2015/16 was around the same as in the previous year, despite the increase in trading activity and higher volatility. This is partly explained by the transition to a shorter cash equity settlement cycle in March 2016, with the average daily initial margin held after the transition being 4 per cent lower than in 2014/15.

Key operational targets were met in the Assessment period. All key systems recorded availability at or above 99.9 per cent, while peak usage was below the target of 50 per cent of all systems, ensuring adequate capacity headroom.

1.2 Review of Regulatory Priorities and Key Recommendations

The principal focus of the 2015/16 Assessment has been the ASX CS facilities' progress towards meeting the recommendations and regulatory priorities identified in the Bank's 2014/15 Assessment. These include recommendations related to experiences gained from the default of BBY, recovery planning (in particular, arrangements for the replenishment of the CCPs' prefunded financial resources) and the CCPs' stress test frameworks. Prompted in part by the BBY default, the Bank conducted a 'deep dive' review of ASX's default management arrangements during the Assessment period; this is summarised in Section 4 of the Assessment report. ASX has made considerable progress in all of the areas identified and has fully addressed most of the Bank's recommendations and priorities.

Some of the key actions taken by ASX are summarised below, along with related core recommendations and priorities for the 2016/17 Assessment period.

1.2.1 Recovery planning

The Bank's 2014/15 Assessment recommended that ASX carry out further work to enhance its arrangements for the replenishment of the CCPs' financial resources in the event that these were drawn down following a participant default. Following market consultation, ASX implemented enhancements to these arrangements in June 2016. The enhancements aim to provide for the CCPs to promptly return to full financial cover following a participant default while also mitigating the potential for procyclicality. The Bank has also considered the reliability of ASX's arrangements to fund its own replenishment obligations in stressed circumstances.

Consistent with the Bank's recommendations, ASX has also taken steps to update the documentation of its Recovery Plans. The update reflects the expanded set of recovery tools introduced in October 2015, as well as the new replenishment arrangements. Alongside this update, ASX has developed some information management tools to support decision-making in a recovery scenario. ASX has also integrated the testing and review of the Recovery Plan into its broader framework for testing and review of risk and default management policies and processes. The first test of ASX's enhanced recovery arrangements took place in June 2016, in the context of ASX's default management fire drill for exchange-traded products.

The Recovery Plan identifies scenarios that could threaten the ASX CS facilities' ongoing provision of critical services, describes events that would trigger the activation of the Recovery Plan, and sets out how ASX would respond to such scenarios. It also describes the suite of tools available to the CS facilities in recovery and details the governance arrangements both for the use of these tools and for review of the recovery planning framework. The Bank has identified a number of aspects of the Plan that could usefully be elaborated to better support its practical application in a stressed scenario. These are refinements that ASX is encouraged to take up in the normal course of its business. The Bank will continue to monitor the development of the Plan over the coming Assessment period.

1.2.2 Experiences gained from the default of BBY Limited

In line with the Bank's 2014/15 recommendations, ASX completed a detailed review of the experiences gained from the default of BBY – an ASX Clear, ASX Settlement and Austraclear participants – with a particular emphasis on the default management actions taken by ASX Clear. Based on the review, ASX set out a plan for implementing a number of enhancements to its risk management and default management arrangements. This plan includes:

- changes to ASX Clear's participant core capital and liquidity risk management requirements
- a review of how the CCPs' margin and stress test models could better take into account liquidity, spread and concentration risks
- changes to improve portability arrangements and the close-out process
- education and communication initiatives, including updates to participant disclosures on ASX's default management arrangements.

ASX intends to implement the elements of the plan during 2016/17.

1.2.3 Default management

Prompted in part by the default of BBY, the Bank conducted a detailed assessment of the ASX CS facilities' default management arrangements against the relevant requirements in the FSS.

ASX has a well-established framework for managing the default of a participant, which it has continued to enhance over recent years through its testing and review process. Accordingly, the Bank has assessed that all the CS facilities observed the standard on default management rules and procedures. The Bank has nevertheless made a number of recommendations outlining some additional steps the ASX CS facilities should take to fully meet expectations, particularly in relation to documentation and disclosure, as well as recommendations to enhance their approaches in the spirit of continuous improvement.

Many of the Bank's recommendations are consistent with ASX's plans to implement further refinements to its default management framework (DMF). The Bank expects ASX's DMF to continue to evolve over the coming period, largely to incorporate further refinements identified during ASX's review of experiences gained from the BBY default.

1.2.4 Stress test framework and model validations

Consistent with the Bank's 2014/15 recommendations, ASX has continued to enhance its stress test framework during 2015/16. Enhancements include the addition of a number of 'for-information' scenarios that extend beyond ASX's interpretation of 'extreme but plausible'. These scenarios are used by ASX management alongside the results of reverse stress test analysis as an input into the sizing of the CCPs' financial resources. ASX has also modified the CCPs' stress test framework to incorporate peak intraday price changes, and has carried out additional sensitivity analysis on the assumed shape of the yield curve in its stress test scenarios for ASX Clear (Futures). A few elements of the Bank's 2014/15 recommendations nevertheless remain outstanding. These are expected to be implemented in conjunction with enhancements to ASX's risk management system (see below). In the meantime, ASX has put in place interim arrangements to partly address the outstanding recommendations.

During 2015/16, consistent with the FSS, ASX continued to conduct annual validations of its key risk management models. A common theme in ASX's recent independent risk model validation exercises has been that there is scope for improvement in ASX's documentation of its risk models. This is consistent with the Bank's own observations. In its recommendations for 2016/17, the Bank encourages ASX to continue enhancing the documentation of the key elements of its financial risk management framework. This will better support the governance of decision-making and reduce key-person risk. It will also provide a sound basis for ASX's disclosures to both participants and regulators. Indeed, as part of this, ASX is encouraged to ensure that it clearly articulates to participants and regulators (and, where appropriate, the public) the analytical basis and rationale for the choice and calibration of key model parameters and assumptions.

1.2.5 Treasury investment policy

The Bank has engaged extensively with ASX in recent years to address the concern that the ASX CCPs' treasury investment policy allowed relatively large and concentrated unsecured exposures to the four large domestic banks. The 2014/15 Assessment clarified the Bank's expectations for the credit and liquidity risk profile of ASX's treasury investments, with an implementation date of end June 2017. In May 2016, ASX endorsed further changes to its treasury investment policy for the 2016/17 financial year to meet the Bank's expectations.

Once the changes are implemented, individual unsecured exposures to non-government-related issuers or counterparties will be limited to the level of business risk capital held across the two CCPs (currently $75 million). In the highly unlikely event that investment losses were incurred that exceeded this amount, ASX's enhanced recovery arrangements provide for the allocation of these losses to participants. In April 2016, ASX published guidance for participants on how to calculate their contingent exposure to the allocation of investment losses in excess of the CCPs' business risk capital. The Assessment recommends that ASX complete the implementation of the planned changes to its treasury investment policy by end June 2017.

1.2.6 Cyber resilience

In light of the growing threat of cyber attacks, the Bank has made cyber resilience a key priority in its supervision of ASX's CS facilities, as well as other financial market infrastructures (FMIs). Consistent with recommendations in its 2014/15 Assessment, the Bank, in collaboration with ASIC, has continued a dialogue with ASX on cyber resilience matters during the Assessment period.

Separately, CPMI and IOSCO published guidance on cyber resilience for FMIs in late June. Subsequently, the Bank formally adopted this guidance to support its assessments against relevant requirements in the FSS. While most aspects of the guidance apply with immediate effect, the guidance recognises that it may take time for FMIs to meet the expectation that they be able to recover critical operations within two hours following an extreme cyber attack. Consistent with the guidance, the Assessment recommends that ASX develop concrete plans to improve its capabilities to meet this requirement by end June 2017.

1.3 Other Material Developments

In addition to changes to policies and processes in response to recommendations and priorities in the Bank's 2014/15 Assessment, there were a number of additional material developments during the period.

1.3.1 Change in ASX CEO

On 21 March, ASX announced that its Managing Director and Chief Executive Officer (CEO), Elmer Funke Kupper, had resigned. ASX announced in August that a new Managing Director and CEO, Dominic Stevens, had been appointed. During the interim period, the ASX Chairman, Rick Holliday-Smith provided oversight and board-level input to the Deputy CEO and Group General Counsel, who together had assumed the day-to-day running of the company. Under these interim arrangements, the Chairman did not have day-to-day responsibilities within ASX, but served as a point of contact for senior external stakeholders, including regulators. Before the new CEO was appointed, the Bank discussed the effectiveness of the interim governance arrangements with the Chairman, including to understand how conflicts of interest are managed.

1.3.2 Risk management system renewal

ASX continued to progress its group-wide technology transformation project during the Assessment period. This project aims to upgrade all of ASX's major trading and post-trading systems and rationalise its core technology onto a single services platform.

A particular area of focus for the Bank has been planned enhancements to ASX's risk management systems. Initial phases of this project, completed in 2015/16, included enhancements to ASX's OTC derivatives default management capabilities and the development of functionality to optimise margin requirements for clearing participants holding both OTC derivatives and futures positions.

ASX is working with its technology vendor to finalise the business requirements for a replacement risk management system that would deliver improved stress test and margining capabilities, including the ability to calculate exposures and margin requirements in close to real time. Once these changes are implemented, the project will move on to: enhancing and automating the CCPs' default management capabilities for exchange-traded products; creating a global view of all ASX exposures; and harmonising pre- and post-trade risk management capabilities. ASX is encouraged to continue to progress planned enhancements to the CCPs' risk management systems, including the ability to calculate margin and stress test exposures on a near real-time basis.

1.3.3 Distributed ledger technology

Another important component of the technology transformation project is the replacement of the CHESS clearing and settlement system. This replacement is an important element of ensuring that ASX's core clearing and settlement infrastructure for cash equities meets international best practice, and that its performance, resilience, security and functionality continue to meet the needs of its users. ASX announced in January 2016 that it had selected a vendor, Digital Asset Holdings (DAH), to develop a potential CHESS replacement based on a permissioned, private distributed ledger technology (DLT) system. As part of the partnership, ASX initially acquired a 5 per cent equity interest in DAH, increasing this to 8.5 per cent in June 2016.

Working with DAH, ASX has developed a working prototype of the DLT system. This prototype will be developed further over the coming 12–18 months, in consultation with stakeholders. ASX intends to make a final decision on whether to implement the replacement system towards the end of 2017. The Bank encourages ASX to continue to invest in the ongoing maintenance and smooth functioning of the CHESS system in the transition to its replacement system, ensuring that it continues to meet the needs of users and that it continues to support stability in the financial system. ASX is also encouraged to invest in appropriate contingency arrangements, to ensure the timely implementation of an alternative CHESS replacement system should the decision be taken not to proceed with the DLT solution.

1.3.4 International work on CCP resilience and recovery

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, in August, CPMI-IOSCO published a report setting out an assessment of consistency in the outcomes of CCPs' implementation of the Principles with respect to their financial risk management and recovery practices. This assessment covered 10 CCPs internationally that provide clearing services for derivatives, including ASX Clear (Futures).

Overall, the assessment found that CCPs had made important and meaningful progress in implementing arrangements consistent with the standards of the Principles. The assessment, however, also identified some gaps and shortcomings. Most relevant to the ASX CCPs, the report identified a number of shortcomings in relation to liquidity stress testing, including that some CCPs did not include sufficient liquidity-specific scenarios in their stress test scenarios. Following discussions with the Bank, ASX has produced a range of liquidity-specific stress test scenarios to improve its ability to assess the adequacy of the CCPs' liquid assets. ASX has also indicated its intention to refine elements of the CCPs' liquidity stress test framework regarding ASX Clear, to better align the framework with its strategy for managing liquidity obligations in a default scenario. This would involve maintaining resources to cover a pre-specified value of stressed liquidity exposures arising from cash market transactions. The Bank encourages ASX to implement its plans to expand and refine the liquidity-specific stress test scenarios it has developed and formally integrate these scenarios into the CCPs' liquidity stress test framework. The Bank also recommends that ASX complete the refinements to ASX Clear's liquidity risk management framework.

In August, CPMI-IOSCO also published for public comment draft guidance on the Principles in the area of resilience and recovery for CCPs. The draft guidance, informed by the implementation monitoring exercise, provides more detailed interpretation of the requirements in the Principles in relation to key aspects of a CCP's financial risk management framework. The proposed additional guidance will inform the Bank's dialogue with ASX on these matters in the coming period.

The remainder of this report is structured as follows. Section 2 summarises in tabular form each CS facility's progress towards meeting the recommendations and regulatory priorities from the Bank's 2014/15 Assessment, as well as conclusions and recommendations arising from the 2015/16 Assessment. Section 3 draws out material developments during the Assessment period and discusses the considerations informing each recommendation. Section 4 presents a 'special topic' on the ASX CS facilities' default management arrangements, which were enhanced during the period in light of the experience gained from the default of BBY. Appendix A concludes with an overview of the Bank's supplementary interpretation of the FSS for CCPs, a description of the corporate structure of the ASX Group and the detailed assessments against the FSS for each CS facility.

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

2. Summary and Review of Regulatory Priorities

This Section summarises actions taken by the ASX CS facilities during 2015/16 in relation to regulatory priorities identified in the 2014/15 Assessment, and summarises the recommendations and other priorities identified by the Bank in its 2015/16 Assessment of the facilities against the *Financial Stability Standards for Central Counterparties* (CCP Standards) and the *Financial Stability Standards for Securities Settlement Facilities* (SSF Standards).

2.1 Progress against 2014/15 Recommendations and Other Priorities

The Bank's 2014/15 Assessment set out a number of recommendations for the ASX CS facilities to address areas of concern identified in respect of various standards, or to support continuous improvement. The 2014/15 Assessment also noted several developments that the Bank would continue to monitor and other matters that the Bank wished to discuss further with ASX. Together these matters formed the Bank's regulatory priorities for the 2015/16 Assessment period.

The following table summarises the recommendations and other regulatory priorities made in the 2014/15 Assessment, and actions taken by the ASX CS facilities in relation to these recommendations during the 2015/16 Assessment period.

Table 1: Summary of Progress against 2014/15 Recommendations and Other Priorities

Recommendation/Priority	Standard	Facility	Actions
Recommendations to address areas of concern			
Recovery planning, loss and liquidity allocation. Complete planned updates to the documentation of recovery plans, and integrate review of recovery plans into the broader risk management and default management framework. Periodically review arrangements for allocating uncovered credit losses and addressing liquidity shortfalls, and for allocating investment-related losses, to ensure that these remain consistent with international guidance on recovery planning. Develop additional participant disclosures regarding contingent exposure to loss allocation tools.	CCP Standards 3, 4, 7 and 14, SSF Standards 3 and 12	All facilities	Mostly addressed. Expected to be fully addressed by end 2016. ASX has updated the facilities' recovery plans, taking into account the CCPs' expanded suite of recovery tools. ASX has also set out the framework for review of the plans and recovery tools, and developed information management tools to support decision-making in recovery scenarios. ASX also tested the use of recovery assessments in its most recent fire drill for exchange-traded products. ASX has developed aggregate quarterly disclosures on participants' contingent exposures to recovery assessments in both CCPs, and plans on developing similar disclosures on payments haircutting in ASX Clear (Futures) by end 2016.

Recommendation/Priority	Standard	Facility	Actions
Replenishment and recapitalisation arrangements. Further refine the CCPs' replenishment arrangements to ensure a more timely return to the required level of cover, while minimising the potential for procyclicality. Review the CCPs' capacity to replenish their own contributions to the default fund following a participant default, and ASX's capacity to raise additional equity to replenish business risk capital in respect of all facilities.	CCP Standards 4 and 14, SSF Standard 12	All facilities	Fully addressed. ASX has implemented enhancements to its CCPs' arrangements to support a prompt return to the target level of financial cover following a participant default while mitigating the potential for procyclicality. ASX has established a framework for review of its capacity to replenish its own contribution to the CCPs' default fund. As part of this, ASX presented its recapitalisation plans to the Bank in late 2015.
Account structure. Complete implementation of client segregation arrangements that support the lodgement of excess client cash collateral against derivatives positions. Consider implications for portability arrangements arising from the management of the BBY default.	CCP Standard 13	ASX Clear	Fully addressed. ASX Clear has introduced enhancements to client segregation arrangements to support the lodgement of excess client cash collateral against derivatives positions. As part of its review of experiences gained from the BBY default, ASX has continued to consider how account structures and transfer arrangements could be enhanced to facilitate porting.
Investment risk. Implement plans to transition to a treasury investment portfolio that meets the Bank's expectations for the credit and liquidity risk profile of ASX Clearing Corporation's treasury investment policy by 2016/17.	CCP Standard 15	Both CCPs	Partly addressed. Expected to be fully addressed by end June 2017. ASX has further reduced the concentration of unsecured exposures to the large domestic banks. In early May, the CS Boards approved proposed further changes to the CCPs' investment mandate over 2016/17 so that the Bank's expectations can be met by end June 2017.
Resolution planning. Review operational arrangements in light of the proposed establishment of a special resolution regime for FMIs in Australia.	CCP Standard 16, SSF Standard 14	All facilities	Ongoing. The Australian special resolution regime for FMIs in Australia is not yet in place, so there has been no progress.
Disclosure. Implement plans to regularly publish risk and activity data in accordance with international quantitative disclosure standards for CCPs.	CCP Standard 20	Both CCPs	Fully addressed. In December, the CCPs began to publish risk and activity data in accordance with international quantitative disclosure standards.

Recommendation/Priority	Standard	Facility	Actions
Recommendations to support continuous improvement			
Capital stress testing. Continue to review the interpretation of 'extreme but plausible' market conditions in light of evolving international best practice. Implement planned second-phase enhancements to the CCPs' stress test models. Continue to monitor the use, review and validation of stress test models, and the impact of absolute versus relative yield shocks in ASX Clear (Futures).	CCP Standard 4	Both CCPs	Ongoing. In February 2016, the CCPs enhanced their stress test frameworks to incorporate intraday rather than close-to-close price movements. ASX is also considering adjusting its stress test framework to better account for spread, liquidity, and concentration risks. This recommendation has been carried over to the forthcoming Assessment period reflecting that CPMI-IOSCO issued draft guidance on CCP resilience and recovery only in August, with the final guidance expected to be published only in early 2017.
Margining. Review the CCPs' margining approach in light of the external validation of its margin models, evolving international best practice and, for ASX Clear, experience gained from the BBY default. The review should examine key parameter assumptions, including the holding and look-back periods.	CCP Standard 6	Both CCPs	Ongoing. ASX is considering introducing add-ons within its margin models to account for spread, liquidity and concentration risk. This recommendation has been carried over to the forthcoming Assessment period reflecting that CPMI-IOSCO issued draft guidance on CCP resilience and recovery only in August, with the final guidance expected to be published only in early 2017.
Liquidity stress testing. Continue to review the liquidity stress test approach in light of the external validation of the CCPs' liquidity stress test models and evolving international best practice.	CCP Standard 7	Both CCPs	Ongoing. In light of the findings of the recent CPMI-IOSCO implementation monitoring exercise and following discussions with the Bank, ASX has produced a range of liquidity-specific stress test scenarios to improve its ability to assess the adequacy of the CCPs' liquid assets. This recommendation has been carried over to the forthcoming Assessment period reflecting that CPMI-IOSCO issued draft guidance on CCP resilience and recovery in August; the final guidance is expected to be published only in early 2017.

Recommendation/Priority	Standard	Facility	Actions
Liquidity risk. Continue to refine sensitivity analysis and reverse stress test, and integrate these into ASX Clear's broader stress test and liquidity management processes. Further consider how ASX Clear models its reliance on offsetting transaction arrangements, and implement planned participant disclosures regarding their contingent exposure to offsetting transaction arrangements. Carry out plans to develop disclosures to settlement participants.	CCP Standard 7, SSF Standard 6	ASX Clear, ASX Settlement	Mostly addressed. ASX has split out the derivatives and cash market components of its liquidity stress test exposure in its management reporting, which has allowed management to further consider the degree of ASX's reliance on offsetting transaction arrangements in ASX Clear. ASX has also enhanced the analysis of the priming assumption underlying its liquidity stress test model. In addition, ASX Clear has developed additional disclosures to assist participants in understanding their contingent exposures to offsetting transaction arrangements in an extreme but plausible scenario. These disclosures will be distributed to participants on a monthly basis.
Default management. Complete the review of experiences gained from the BBY default, and update default management and risk management arrangements as appropriate.	CCP Standards 4, 12 and 17	ASX Clear	Partly addressed. ASX has carried out a comprehensive review of experiences gained from the BBY default and set out a plan for further refining its risk and default management arrangements. ASX also started work to update its DMF documentation to reflect the experiences gained from the BBY default; this update is expected to be finalised in 2016/17.
Cyber security. Continue engagement with the Bank on cyber risk management and governance arrangements, and review these arrangements in light of forthcoming international guidance on cyber resilience for FMIs.	CCP Standard 16, SSF Standard 14	All facilities	Ongoing. ASX has continued its dialogue with the Bank on the cyber risk management arrangements of its CS facilities. The CPMI-IOSCO guidance on cyber resilience for FMIs was published on 30 June 2016; this recommendation will therefore be carried over to the forthcoming Assessment period.
Other regulatory priorities – matters for further consideration by the Bank			
User governance. Monitor the effectiveness of user governance arrangements.	CCP Standard 2, SSF Standard 2	All CS facilities	The Bank has continued to monitor user governance arrangements through the review of minutes of meetings and ongoing engagement with ASX.
Collateral concentration. Continue discussion on approach to monitoring collateral concentration risks.	CCP Standard 5	Both CCPs	The Bank has continued to monitor collateral concentration risk, including by reviewing data measuring this risk.
Engagement with Payment Providers. Monitor interaction with the Australian Payments Clearing Association standing sub-committee for Payment Providers.	CCP Standard 9, SSF Standard 8	ASX Clear, ASX Settlement	The Bank met with ASX to discuss its interaction with the Australian Payments Clearing Association standing sub-committee for Payment Providers.

Recommendation/Priority	Standard	Facility	Actions
Default management review and testing. Continue to monitor the review of default management procedures for OTC derivatives.	CCP Standard 12	ASX Clear (Futures)	As part of the special topic on the CS facilities default management arrangements, the Bank reviewed ASX's OTC default management procedures. The Bank also monitored ASX's default management fire drills.
Commingled pooled resources. Monitor ASX Clear (Futures)' annual review of its use of commingled pooled financial resources for OTC and exchange-traded derivatives, as well as the adequacy of those resources.	CCP Standard 12	ASX Clear (Futures)	The Bank will monitor the outcomes of the next annual review of ASX Clear (Futures)' use of its commingled pooled financial resources, planned to be completed in August.
Disclosure of investment risk. Discuss disclosure of investment risks to participants in light of plans to allocate investment losses in excess of $75 million to participants.	CCP Standard 15	Both CCPs	ASX has introduced additional disclosures to support participants in quantifying their contingent liquidity risk to investment losses in excess of $75 million.
Major projects. Monitor prioritisation decisions, resourcing challenges, interdependencies with regular processes, and potential change-management issues associated with the technology transformation project. This includes the prioritisation of investment in the replacement of CHESS.	CCP Standard 16, SSF Standard 14	All CS facilities	The Bank has monitored ASX's technology transformation project through quarterly updates. The Bank has also received updates on the replacement of CHESS through monthly workshops involving ASX, a service provider and other regulators.
Critical service providers. Discuss the application of international oversight expectations in managing relationships with external providers of critical services.	CCP Standard 16, SSF Standard 14	All CS facilities	During the 2015/16, the Bank met with ASX to discuss its arrangements to manage the risks arising from critical service providers, and how it applies the CPMI-IOSCO Assessment Methodology.
Concentration in tiering. Continue to monitor the operation of ASX's approach to monitoring concentration risks in tiered participation.	CCP Standard 18	Both CCPs	The Bank has continued its discussion on ASX's approach to monitoring concentration risks in tiered participation.

2.2 2015/16 Ratings and Recommendations

In undertaking its Assessment, the Bank has applied the rating system used in the *Principles for Financial Market Infrastructures: Disclosure framework and assessment methodology* produced by CPMI and IOSCO in December 2012. Under this rating system, a facility's observance of a standard may be rated as:

- *Observed* – Any identified gaps and shortcomings are not issues of concern and are minor, manageable and of a nature that the facility could consider taking them up in the normal course of its business.
- *Broadly observed* – The assessment has identified one or more issues of concern that the facility should address and follow up on in a defined timeline.
- *Partly observed* – The assessment has identified one or more issues of concern that could become serious if not addressed promptly. The facility should accord a high priority to addressing these issues.
- *Not observed* – The assessment has identified one or more serious issues of concern that warrant immediate action. Therefore, the facility should accord the highest priority to addressing these issues.

- *Not applicable* – The standard does not apply to the type of facility being assessed because of the particular legal, institutional, structural or other characteristics of the facility.

Section 821A(aa) of the Corporations Act requires that a CS facility licensee, to the extent reasonably practicable to do so, comply with the FSS and do all other things necessary to reduce systemic risk. The Bank has assessed how well each CS facility has complied with each CCP or SSF Standard, and applied a single overall rating to each standard, reflecting this assessment.

It is the Bank's assessment that all four facilities have observed almost all relevant requirements under the FSS in the Assessment period. The only exception is CCP Standard 15: Custody and Investment Risk, for which the two ASX CCPs have broadly observed the relevant requirements. The Bank therefore concludes that the facilities have conducted their affairs in a way that causes or promotes overall stability in the Australian financial system.

The Bank has nevertheless made a number of recommendations to address areas of concern and to further strengthen the ASX facilities' observance of requirements under the FSS:

- Table 2 summarises the recommendations that the CS facilities should address to observe or continue observing relevant requirements in the FSS.
- Table 3 summarises the recommendations to encourage continuous improvement. Such improvement contributes to the ASX CS facilities' ongoing compliance with the obligation to do all other things necessary to reduce systemic risk.
- Table 4 lists other matters identified in the course of conducting the Assessment that the Bank will continue to monitor or discuss with ASX. These include areas in which ongoing review is required to ensure that emerging new risks are adequately controlled.

The recommendations and other matters in Tables 2 to 4 will form the basis for the Bank's regulatory priorities in 2016/17, and are discussed in more detail in Sections 3 and 4; Appendix A sets out the Bank's ratings and recommendations against each Standard for each facility.

Table 2: Recommendations to Observe or Continue Observing the FSS

Recommendation	Facility	Standard
Liquidity stress testing. In order to continue to observe CCP Standard 7, ASX Clear and ASX Clear (Futures) should implement plans to expand and refine their liquidity-specific stress scenarios and integrate these into their liquidity stress test frameworks. For ASX Clear (Futures), the expanded scenarios should include stress tests of non-Australian dollar liquidity exposures. ASX Clear should continue to refine and enhance the sensitivity analysis of its liquidity stress test model. This includes examining further the sensitivity of outcomes to certain underlying assumptions, such as the level of priming of securities. ASX Clear should ensure that its liquidity stress test framework is aligned with a clearly defined strategy for managing liquidity obligations in a default scenario. ASX Clear should implement plans to maintain sufficient liquid resources to cover a pre-specified value of stressed liquidity exposures arising from cash market transactions, while continuing to maintain sufficient liquid resources to cover stressed liquidity exposures arising from derivatives transactions. For both ASX Clear and ASX Clear (Futures), processes should be in place to respond promptly to any breaches of target liquidity coverage; these processes should be clearly documented.	Both CCPs	CCP Standard 7

Recommendation	Facility	Standard
Liquidity risk management. In order to continue to observe CCP Standard 7, ASX Clear should conduct appropriate due diligence on its participants' ability to understand, quantify and manage any contingent liquidity obligations under its Rules. ASX Clear should ensure that its disclosures remain consistent with its liquidity risk management framework and assist participants in understanding their contingent exposure to the use of tools to address a liquidity shortfall. ASX Clear should enhance and formalise its processes for conducting due diligence on the ability of its committed liquidity providers to perform as required under those commitments.	ASX Clear	CCP Standard 7
CCP default management. In order to continue to observe CCP Standard 12, ASX Clear and ASX Clear (Futures) should continue enhancing their approach to the testing and review of their default management arrangements. Such enhancements should include increasing the complexity and scope of their default management fire drills. Both CCPs should also ensure that these fire drills involve all relevant internal and external stakeholders and committees, and test the interaction between all relevant stakeholders. ASX Clear and ASX Clear (Futures) should more prominently involve their default brokers in the testing of default management arrangements for exchange-traded products. On an annual basis, both CCPs should engage with their default brokers on the default brokers' proposed method for closing out the hypothetical portfolio used in the fire drill, including expected close-out prices and timeframes. ASX Clear and ASX Clear (Futures) should also involve the Risk Consultative Committees and other clearing participants in future default management fire drills that test the CCPs' recovery arrangements. As part of their annual review of the DMF, ASX Clear and ASX Clear (Futures) should assess the potential implications of any changes to the resolution regimes that govern their participants. This includes the resolution regimes of any offshore-based participants. ASX Clear and ASX Clear (Futures) should also review their DMF in light of the proposed establishment of a special resolution regime for FMIs in Australia, once the regime has been finalised. ASX Clear (Futures) should validate through its testing and review processes its expectation that its default management arrangements take appropriate account of stability interests in other jurisdictions in which it has material activity, most notably in New Zealand.	Both CCPs	CCP Standard 12

Recommendation	Facility	Standard
SSF default management. In order to continue to observe SSF Standard 11, ASX should carry out further work to enhance the DMF documentation for its SSFs, including the documents that set out the specific procedures to be followed in the event of default of an Austraclear participant, ASX Settlement participant, Participating Bank, or Payment Provider. In particular, these documents should provide guidance on the discretionary decisions that may need to be taken by the Participant Incident Response Committee and other relevant parties, including elaborating on relevant factors for consideration in making these decisions. ASX Settlement and Austraclear should formalise the review of their default management procedures within ASX's broader framework for testing and review of the DMF. ASX Settlement and Austraclear should carry out their plans to enhance participant and client education and communication regarding their default management arrangements. As part of this: • ASX Settlement should extend the scope of its Guidance Note on the suspension and termination of ASX Settlement participants to explain the potential implications of the default of a participant or Payment Provider on other ASX participants, and develop an accessible information note on the ASX Settlement back-out algorithm. • Austraclear should complete its planned updates of participant disclosures on the key aspects of its default management arrangements, including releasing a Guidance Note on the suspension and termination of Austraclear participants which explains the potential implications of the default of a participant or Participating Bank on other ASX CS facilities. Any disclosures should be easily accessible, preferably in a centralised location. In developing its new system for clearing and settlement of cash market securities, ASX Settlement should ensure that any default management processes are clearly documented, and that the effectiveness of these processes can be tested and reviewed on an ongoing basis. ASX Settlement and Austraclear should continue enhancing their approach to the testing and review of their default management arrangements. Such enhancements should include increasing the complexity and scope of the ASX default management fire drills. ASX Settlement and Austraclear should also ensure that these fire drills involve all relevant internal stakeholders and committees, and test the interaction between all relevant stakeholders. As part of the annual ASX default management fire drills, consideration should be given to the implications of the default of an Austraclear participant, ASX Settlement participant, participating bank or Payment Provider for other ASX CS facilities.	Both SSFs	SSF Standard 11
Investment risk. In order to fully observe CCP Standard 15, ASX Clear and ASX Clear (Futures) should implement plans to: • limit unsecured exposures to individual non-government investment counterparties/issuers to the level of capital set aside for non-participant-default or general business risk losses • ensure that other investments are with government-related obligors or secured by assets issued by government-related or other highly creditworthy obligors, subject to prudent concentration limits • ensure that ASX Clear and ASX Clear (Futures)' minimum liquid resource requirement (under CCP Standard 7.3) is invested in or secured by government/semi-government securities or cash. Other investments should be able to address effectively any additional liquidity shortfalls (e.g. be investments in, or secured by, securities eligible for repo with the Bank).	Both CCPs	CCP Standard 15

Recommendation	Facility	Standard
Cyber resilience. In order to continue to observe CCP Standard 16 and SSF Standard 14, the CS facilities should review their cyber risk management arrangements in light of CPMI-IOSCO guidance on cyber resilience for FMIs. As part of this review, the CS facilities should: • consider developing participant requirements in the area of cyber resilience, liaising as appropriate with the Bank and other relevant authorities • develop concrete plans to improve their capabilities to meet the two-hour recovery time objective following an extreme cyber attack.	All facilities	CCP Standard 16, SSF Standard 14
Resolution planning. In order to continue to observe CCP Standard 16 and SSF Standard 14, the CS facilities will need to review their operational arrangements in light of the proposed special resolution regime for FMIs in Australia, once the regime has been finalised. In particular, the CS facilities will need to ensure that their operations are organised in such a way as to facilitate effective crisis management actions under that regime.	All facilities	CCP Standard 16, SSF Standard 14

Table 3: Recommendations to Support Continuous Improvement

Recommendation	Facility	Standard
Documentation. ASX Clear and ASX Clear (Futures) are encouraged to continue enhancing the documentation of the key elements of their financial risk management frameworks, including clear articulation to participants and regulators (and where appropriate the public) of the analytical basis and rationale for the choice and calibration of key margin and stress test model parameters and assumptions.	Both CCPs	CCP Standard 2
CCP guidance on resilience and recovery. ASX Clear and ASX Clear (Futures) are encouraged to review the following aspects of their risk management arrangements in light of forthcoming CPMI-IOSCO guidance on resilience and recovery of CCPs: • governance arrangements • framework for credit stress testing, including the interpretation of ‘extreme but plausible’ market conditions and the CCPs’ frameworks for determining the adequacy of their prefunded financial resources • margin models • framework for liquidity stress testing and determining the adequacy of the CCPs’ liquid resources.	Both CCPs	CCP Standards 2, 4, 5 and 7
Recovery planning. The CS facilities are encouraged to continue to refine the documentation of their recovery plans, including considering further elaborating: stress scenarios; communications procedures; the methodology for determining critical services; how structural weaknesses are identified and addressed; and links to other FMIs.	All facilities	CCP Standard 3, SSF Standard 3
Credit stress testing. ASX Clear (Futures) is encouraged to review the assumptions it makes regarding the value of its prefunded financial resources in extreme but plausible market conditions, in light of any changes to its collateral haircuts.	ASX Clear (Futures)	CCP Standard 4
Liquidity, concentration and spread risks. ASX Clear and ASX Clear (Futures) are encouraged to complete their review of spread, concentration and liquidity add-ons for their margin and credit stress-testing models and incorporate these add-ons as appropriate.	Both CCPs	CCP Standards 4 and 6

Recommendation	Facility	Standard
Risk management system enhancements. ASX Clear and ASX Clear (Futures) are encouraged to continue to progress planned enhancements to their risk management systems, including to deliver the capability to calculate on a near real-time basis: • credit stress test exposures • liquidity stress test exposures • margin requirements, using a range of models and parameters.	Both CCPs	CCP Standards 4, 6 and 7
Liquidity risk management. ASX Clear and ASX Clear (Futures) are encouraged to regularly test their procedures for accessing their liquid resources, including the on-market liquidation or repo of non-cash collateral and collateral investments, drawdown of ASX Clear's committed liquidity facilities and potential repo of eligible securities at the Bank.	Both CCPs	CCP Standard 7
CCP default management. ASX Clear and ASX Clear (Futures) are encouraged to complete their reviews of the DMF and finalise planned enhancements to the relevant documents. ASX Clear is encouraged to implement its plans for enhancing the effectiveness of its default management arrangements, including improvements to portability and the close-out process for exchange-traded options, and finalise its policy on dealing with 'specific cover' exposures. ASX Clear and ASX Clear (Futures) are encouraged to continue examining ways in which their new risk management system could be used to facilitate, and mitigate risks arising in, the default management process. The CCPs are encouraged to continue developing the system functionality over time, integrating learnings from fire drills and other enhancements identified by the Default Management Steering Group. In the meantime, the CCPs are encouraged to continue to explore options to improve the effectiveness of the default management process within their existing systems. ASX Clear and ASX Clear (Futures) are encouraged to carry out plans to sign on an additional default broker for the markets that they clear for (i.e. ASX and Chi-X markets for ASX Clear, and ASX 24 for ASX Clear (Futures)). ASX Clear and ASX Clear (Futures) are encouraged to carry out their plans to enhance participant and client education and communication regarding the CCPs' default management arrangements. As part of this, the CCPs are encouraged to complete their planned updates of existing participant disclosures on the key aspects of their default management arrangements. For ASX Clear, this should include the development of an ASX Clear Client Fact Sheet. Any disclosures should be easily accessible, preferably in a centralised location.	Both CCPs	CCP Standard 12
Timeliness and reliability of insurance payments. The CS facilities are encouraged to review their assumptions in respect of the reliability and timeliness of payments under their insurance policies in calculating their general business risk capital.	All facilities	CCP Standard 14 and SSF Standard 12
Commercial settlement banks. ASX Clear (Futures) is encouraged to review its risk management arrangements applicable to commercial settlement banks, and consider establishing a formal framework for the management of these risks.	ASX Clear (Futures)	CCP Standard 15
Replacement of cash equities clearing and settlement system. ASX Settlement is encouraged to continue to invest in the ongoing maintenance and smooth functioning of the CHESS system in the transition to its replacement system, ensuring that it continues to meet the needs of users and that it continues to support stability in the financial system. ASX is also encouraged to invest in appropriate contingency arrangements, to ensure the timely implementation of an alternative CHESS replacement system should the decision be taken not to proceed with the DLT solution.	ASX Settlement	SSF Standard 14
Participant core capital requirements. ASX Clear is encouraged to complete enhancements to participant minimum core capital requirements.	ASX Clear	CCP Standard 17

Recommendation	Facility	Standard
Concentration in tiered participation. ASX Clear and ASX Clear (Futures) are encouraged to review their approach to monitoring concentration risks in tiered participation, including triggers for further investigation and actions, and processes for ongoing review of concentration risk.	Both CCPs	CCP Standard 18

Table 4: Other Regulatory Priorities

Priority	Facilities	
The Bank will continue to monitor the effectiveness of arrangements for stakeholder engagement in each of the ASX CS facilities, including the Risk Consultative Committee, Business Committee, Technical Committee and Exchange-traded Options Advisory Committee.	All facilities	CCP Standard 2, SSF Standard 2
The Bank will monitor the annual review of the CCPs' prefunded financial resources, including consideration of the adequacy of those resources and whether the commingling of pooled resources for OTC and exchange-traded derivatives in ASX Clear (Futures) remains appropriate.	Both CCPs	CCP Standard 4
The Bank will continue to discuss with ASX its approach to monitoring collateral concentration risks.	Both CCPs	CCP Standard 5
The Bank will continue to monitor ASX Clear (Futures)' approach to portfolio margining of futures and OTC derivatives, particularly in light of ASX's launch of the margin optimiser service.	ASX Clear (Futures)	CCP Standard 6
The Bank will monitor ASX's project to implement a DLT solution for the clearing and settlement of equities, including the governance arrangements supporting the project.	ASX Settlement	SSF Standard 14
The Bank will continue to monitor prioritisation decisions, resourcing challenges, interdependencies with day-to-day business-as-usual processes, and potential change-management issues associated with ASX's technology transformation project.	All facilities	CCP Standard 16, SSF Standard 14
The Bank will continue to engage with ASX on its approach to managing its relationship with external providers of critical services, including its application of the oversight expectations in the PFMI and associated Assessment Methodology.	All facilities	CCP Standard 16, SSF Standard 14

3. Assessment of Clearing and Settlement Facilities against the Financial Stability Standards

3.1 Introduction to the ASX Clearing and Settlement Facilities

The ASX Group operates four CS facilities: two CCPs and two SSFs. Each of these facilities holds a CS facility licence, and each is required under the Corporations Act to comply with applicable FSS determined by the Bank and to do all other things necessary to reduce systemic risk.

3.1.1 Central counterparties

A CCP acts as the buyer to every seller, and the seller to every buyer in a market. It does so by interposing itself as the legal counterparty to all purchases and sales via a process known as novation. These arrangements provide substantial benefits to participants in terms of counterparty 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 participant defaults on its obligations to the CCP, since the CCP must continue to meet its obligations to all of the non-defaulting participants. Accordingly, it is critical that the CCP identifies and properly controls risks arising from its operations and conducts its affairs in accordance with the CCP Standards. Primary responsibility for the design and operation of a CCP in accordance with the CCP Standards lies with a CCP's board and senior management.

The ASX Group includes two CCPs that are required to observe the CCP Standards:

- ASX Clear provides CCP services for ASX-quoted cash equities, debt products and warrants traded on the ASX and Chi-X Australia Pty Ltd (Chi-X) markets, and equity-related derivatives traded on the ASX market.
- ASX Clear (Futures) provides CCP services for futures and options on interest rate, equity, energy and commodity products traded on the ASX 24 market, as well as Australian dollar-denominated (AUD-denominated) OTC IRD.

3.1.2 Securities settlement facilities

An SSF provides for the final settlement of securities transactions. Settlement involves transfer of the title to the security, as well as the transfer of cash. These functions are linked via appropriate delivery-versus-payment (DvP) arrangements incorporated within the settlement process. SSFs are systemically important FMIs that are essential to the smooth functioning of the financial system. Accordingly, it is critical that each SSF identifies and properly controls risks arising from its operations and conducts its affairs in accordance with the SSF Standards. Primary responsibility for the design and operation of an SSF in accordance with the SSF Standards lies with a CS facility licensee's board and senior management.

The ASX Group includes two SSFs that are required to observe the SSF Standards:

- ASX Settlement provides SSF services for ASX-listed cash equities, debt products and warrants traded on the ASX and Chi-X markets; ASX Settlement also provides SSF services for non-ASX listed securities quoted on the National Stock Exchange of Australia (NSX), SIM Venture Securities Exchange Limited (SIM) and the Sydney Stock Exchange Limited (SSX).
- Austraclear provides SSF services for trades in debt securities, including government bonds and repurchase agreements.

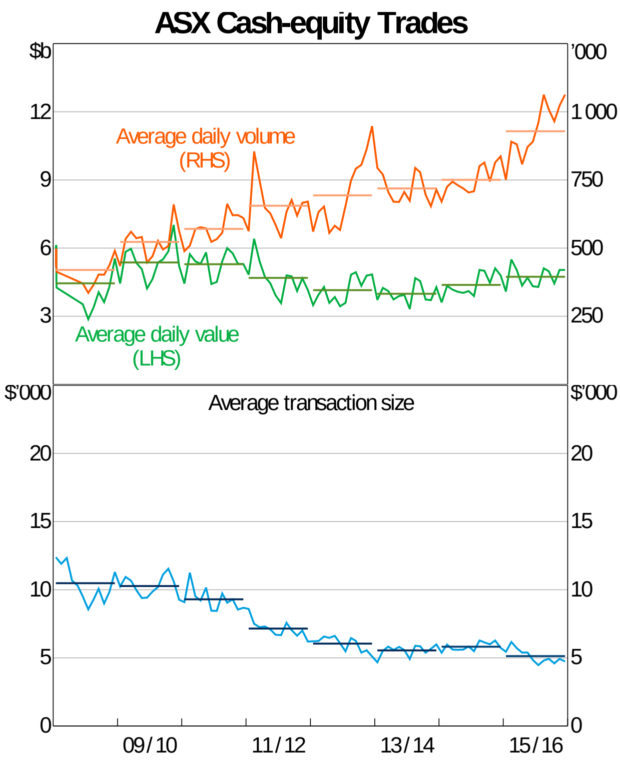
3.2 Activity in the ASX Clearing and Settlement Facilities

As in the previous year, the average volume of trading in cash equities cleared by ASX Clear grew strongly, while the volume of trades in equity options declined significantly in 2015/16. Both the average daily volume of futures contracts and the notional value of OTC IRD cleared by ASX Clear (Futures) increased in the Assessment period. The daily average value of debt securities settled in Austraclear also increased compared with the previous year. Average price volatility in the equities market increased compared with the previous year to be above the 10-year average. Volatility in the interest rate futures market, however, edged down during the Assessment period.

3.2.1 Cash equities

The daily average value and volume of cash equity trades increased by 8 per cent and 24 per cent, respectively, in 2015/16 (Graph 1, top panel). As a result, the average transaction size decreased by 13 per cent in 2015/16, consistent with the long-term trend prior to 2014/15, which has been partly driven by growth in algorithmic trading (Graph 1, bottom panel).

Graph 1



Source: ASX

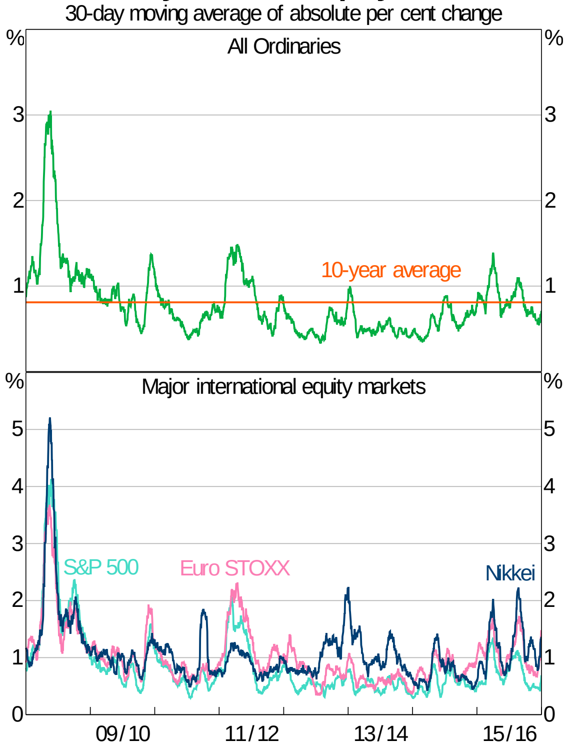
The daily average value of cash equity settlements in ASX Settlement increased by 6 per cent in 2015/16 to $9 billion. This increase was consistent with the growth in trading activity, albeit trends in net settlement values can deviate from trends in gross trading values, since the latter do not include non-market transactions and netting efficiency can change over time.

The average volatility in equity prices, as measured by the average of absolute daily percentage changes in the S&P ASX All Ordinaries Index, increased by 0.3 percentage points in 2015/16, to be above the 10-year average of 0.8 per cent (Graph 2, top panel). This primarily reflected three periods of heighted volatility: in August to September 2015; January to February 2016; and late June 2016. High volatility in the first two periods was caused by a combination of falls in commodity prices and concerns about China's economy, while high volatility in the last period was driven by the United Kingdom (UK) referendum on European Union (EU) membership. Volatility also continued to move closely with trends in major international equity markets (Graph 2, bottom panel)

Graph 2

Volatility of Global Equity Markets

30-day moving average of absolute per cent change



Source: Bloomberg

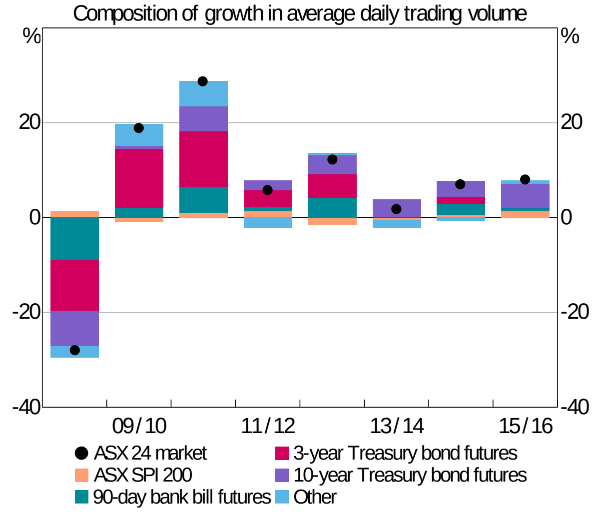
3.2.2 Derivatives

The average daily trading volume on the ASX 24 market increased by 8 per cent in 2015/16, to around 530 000 trades per day (Graph 3). This was driven by strong growth in the average turnover of 10-year Treasury bond futures, which increased by 22 per cent. Increases in the average turnover of SPI 200 equity index futures and 90-day bank bill futures of 17 per cent and 3 per cent, respectively, also contributed to overall growth. Trading volumes in the most actively traded New Zealand dollar-denominated (NZD-denominated) contract (90-day bank bill futures) continued to increase in 2015/16, by 37 per cent. However, overall volumes in NZD futures, together with agricultural and energy contracts, represented less than 2 per cent of all contracts traded on the ASX 24 market in 2015/16.

Graph 3

ASX 24 Derivatives Trades

Composition of growth in average daily trading volume



Source: ASX

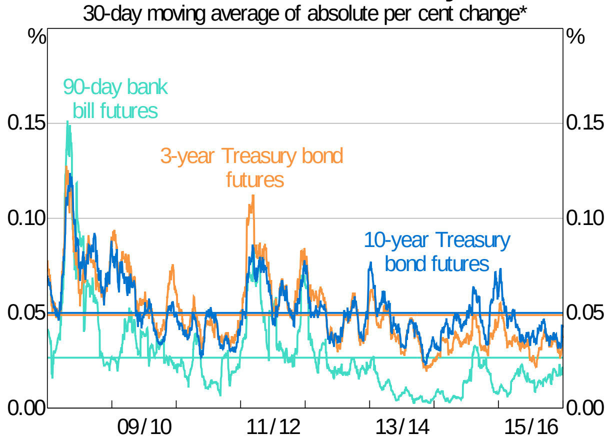
The average daily number of equity options contracts traded on the ASX market declined significantly in 2015/16, by 16 per cent. The decrease is consistent with the longer term trend, although the magnitude of the decreases in previous years was smaller. In response to these declining volumes, ASX has continued to broaden the range of exchange-traded options (ETOs) products, in consultation with an advisory panel comprising participants and end users (see Section 3.5.6).

Average volatility in the prices of interest rate derivatives contracts edged down in 2015/16 compared with the period before (Graph 4). Volatility remained around or below the 10-year average for most of the period, except for spikes in early July 2015, which were associated with the developments in Greece and the Chinese equity market. Evidently, volatility in equity derivatives contracts broadly reflected activities in the underlying equity market (see Section 3.2.1).

Graph 4

ASX 24 Market Volatility

30-day moving average of absolute per cent change*



* Horizontal lines indicate the 10-year average for each series

Source: Bloomberg

3.2.3 Debt securities

In 2015/16, the average daily value of debt securities settled in Austraclear increased by 7 per cent, to $43 billion. This includes the value of securities settled under repurchase agreements (other than intraday repurchase agreements with the Bank). There has been no material migration of settlement activity in Australian Government securities from Austraclear to ASX Settlement since the 2013 launch of a service that allows retail investors to directly trade, clear and settle interest in these securities.

3.3 Risk Management in the ASX Central Counterparties

CCPs are exposed to both credit and liquidity risks, primarily following the default of one or more participants. Credit risk is the risk that one or more counterparties will not fulfil their obligations to the CCP, resulting in a financial loss, while liquidity risk arises where the CCP is unable to meet its payments obligations at the time that they are due, even if it has the ability to do so in the future. ASX Clear and ASX Clear (Futures) manage the risks arising from a potential default in a number of ways, including through participation requirements, margin collection, the maintenance of prefunded pooled financial resources, recovery tools, and risk monitoring and compliance activities.

3.3.1 Participation requirements

Participants in each CCP must meet minimum capital requirements. While capital is only a proxy for the overall financial standing of a participant, minimum capital requirements offer comfort that a participant has adequate resources to withstand an unexpected shock, perhaps arising from operational or risk-control failings.

- ASX Clear requires direct participants that clear cash equities or derivatives to maintain at least $5 million in capital. 'General participants', which are able to clear on behalf of third-party participants, are subject to tiered capital requirements. A general participant must maintain $5 million in capital to support its own clearing activity and $5 million to support each third-party clearing relationship, up to a maximum of $20 million. In June 2016, ASX proposed changes to capital requirements to better recognise the complexity and breadth of participants' business models (see Section 3.5.8).
- ASX Clear (Futures) requires participants that clear futures only to hold at least $5 million in net tangible assets (NTA). Participants using the OTC derivatives clearing service must meet a higher minimum NTA (or Tier 1 Capital) requirement of $50 million.

3.3.2 Margin collection

The CCPs cover their credit and liquidity exposures to their participants by collecting several types of margin.

- *Variation margin*. Variation (or 'mark-to-market') margin is collected at least daily from participants with mark-to-market losses and, in the case of futures and OTC derivatives, paid out to the participants with mark-to-market gains.
- *Initial margin*. Both CCPs routinely collect initial margin from participants to mitigate credit risk arising from potential changes in the market value of a defaulting participant's open positions between the last settlement of variation margin and the close out of these positions by the CCP.
- *Intraday margin*. Both CCPs monitor participants' portfolios intraday, to take account of changes in both prices and positions. Intraday margin calculations are carried out routinely in ASX Clear (Futures), and in response to large price changes at both CCPs. Intraday margin calls may be made where there is significant erosion in the margin cover provided by individual participants for derivatives positions. Both CCPs may also make margin calls on an ad hoc basis.

- *Additional initial margin (AIM)*. The CCPs may also make calls for AIM when exceptionally large or concentrated exposures are identified through stress tests, or when predefined limits on the ratio of positions to capital are exceeded.

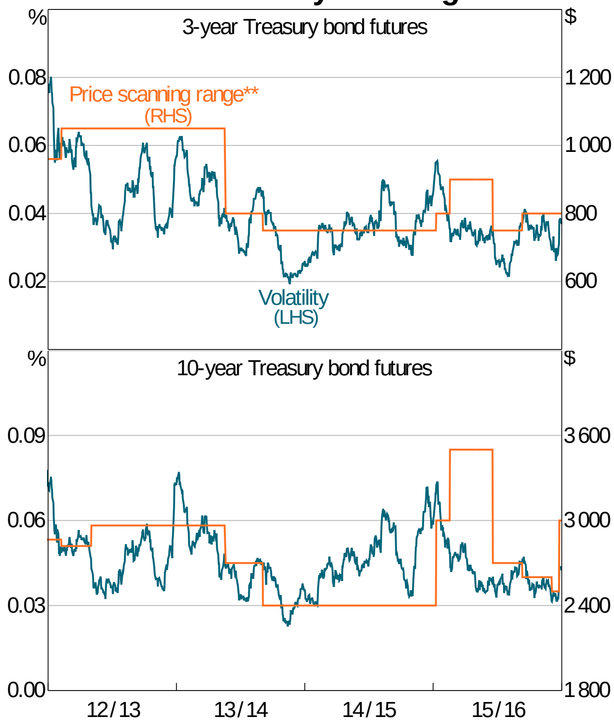
ASX requires that margin be posted in the form of cash or securities that ASX would be able to rapidly and reliably liquidate in the event of the participant's default. ASX applies haircuts to non-cash and foreign currency collateral to cover market risk on the liquidation of those assets. Much of the margin posted across the two CCPs in 2015/16 took the form of cash; an average of 53 per cent of margin requirements in ASX Clear and 95 per cent of AUD-denominated margin requirements in ASX Clear (Futures) were met in cash during the Assessment period. Clients of participants in ASX Clear commonly post non-cash collateral in excess of margin requirements for equity derivatives. In 2015/16, on average 82 per cent of the value of non-cash collateral posted against derivatives positions in ASX Clear was in excess of margin obligations.

The CCPs conduct regular and ad hoc margin reviews to ensure that margin rates are set at levels appropriate to the prevailing risk environment. Margin rates in the cash equities market and applied to equity-related derivatives (including the SPI 200 equity index futures contract) were generally higher during the Assessment period than 2014/15, reflecting higher average volatility. Despite lower volatility in the interest rate futures market, average margin rates in these contracts were slightly higher during 2015/16. This was primarily driven by elevated margin rates in the second half of 2015, which in turn reflected high volatility in the prices of the contracts in June and July 2015 (Graph 5). However, margin rates were lowered for most of the first half of 2016, reflecting that fact that volatility in these contracts subsided.

On 24 June, the day of the UK referendum on EU membership, ASX increased the price scanning ranges (the key parameter that drives initial margin requirements) on the SPI 200 equity index futures and the 10-year Treasury bond futures contracts. The decision to increase margin rates reflected the observation that by early afternoon, a 'Leave' vote seemed to be likely – ASX considered it prudent to increase collateral held to cover forward-looking volatility ahead of the European and United States (US) trading days. In light of the outcome of the vote, the higher initial margin requirements were retained by the ASX CCPs, as a precaution, in the week following the vote. Since 30 June, ASX has reviewed the CCPs' margin rates, in light of the uncertainty caused by the UK referendum. As a result of this review, ASX has increased the margin rates on most of the CCPs' derivatives contracts, but has pared earlier increases to the SPI 200 and 10-year Treasury bond futures contracts (see below).

Graph 5

Futures Price Volatility and Margin Rates*



* Volatility measured as 30-day moving average of absolute per cent change

** Price scanning range is a key input parameter for margin rates

Sources: ASX; Bloomberg

To validate their margin rate settings, the CCPs perform regular backtesting and sensitivity analysis of their margin models. Backtesting uses observed historical data to assess the performance of a model over a given time period. Daily backtesting against actual dynamic portfolios compares the initial margin calculated on the portfolio of a participant or client to the variation margin calculated on that portfolio (representing the change in its value over the assumed holding period). ASX also uses backtesting based on static portfolios which abstract from changes in portfolio composition. Under both types of backtesting, when variation margin exceeds initial margin coverage, an exception is recorded.

ASX undertakes further analysis when an exception is recorded, both to investigate model performance and to determine whether any follow-up actions are required. In addition, ASX performs more comprehensive periodic backtesting reviews to examine the model in more detail; this provides a basis for recommending changes to the model or further analysis. Results from the periodic backtesting of ASX's margin models based on static portfolios during the Assessment period indicated that the observed number of exceptions were within expected levels (Table 5).

Table 5: ASX Margin Model Backtesting Results for 2015/16

Facility	Margin Model	Target Coverage (per cent)	Actual Coverage (per cent)
ASX Clear	Cash Market Margining	99.7	99.75
ASX Clear	Standard Portfolio Analysis of Risk	99.7	99.9
ASX Clear (Futures)	Standard Portfolio Analysis of Risk	99.7	100
ASX Clear (Futures)	OTC IRD Filtered Historical Simulation Value at Risk	99.7	99.99

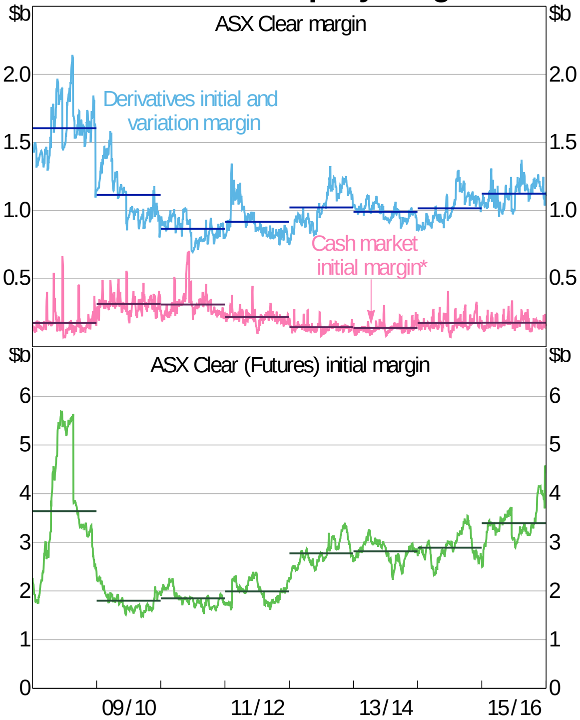
ASX also carries out monthly sensitivity analysis to test the performance of its margin models beyond the boundaries of existing assumptions. ASX varies three main assumptions when conducting sensitivity analysis: the confidence interval; holding period; and look-back period.

As measured by margin requirements, the CCPs' total credit exposure increased in 2015/16, compared with the previous year.

- Average daily margin held by ASX Clear against equity derivatives was 11 per cent higher in 2015/16. This increase was due to higher margin rates, but was partly offset by lower open interest. By contrast, average daily initial margin held by ASX Clear against unsettled cash equity transactions in 2015/16 was little changed from the previous year despite the increase in trading activity and higher volatility (Graph 6, top panel). This is partly explained by the transition to a shorter settlement cycle in March 2016 (see Section 3.5.7); the average daily initial margin held after the transition was 4 per cent lower than in 2014/15.
- Average daily initial margin held by ASX Clear (Futures) rose by 17 per cent in 2015/16 (Graph 6, bottom panel). This reflects increases in average margin rates across three of the four major futures contracts, as well as an increase in participants' open positions in the same contracts.

Graph 6

Central Counterparty Margin



* Notional amount until 7 June 2013; Real Risk methodology used until 18 July 2012, Cash Market Margining used thereafter

Source: ASX

The CCPs call margin on an intraday basis when exposures due to changes in market value and the opening of new positions exceed predefined limits. Intraday margin calls for both CCPs would equal the total shortfall in initial and variation margin if triggered.

- ASX Clear calculates intraday margin requirements when there is a significant market movement. Margin is called from participants if the calculated call amount represents an erosion of initial margin of 40 per cent or greater and the call amount exceeds $100 000.

- ASX Clear (Futures) calculates intraday margin at 8.05 am, 11.10 am and 1.30 pm, and at other times if there are significant movements in the prices of individual contracts. The afternoon intraday margin run was introduced by ASX Clear (Futures) in August 2015. Intraday margin is called if a participant's margin balance is eroded by more than a predefined percentage threshold or by more than a predefined dollar value threshold, and the call amount exceeds $1 million. The percentage erosion threshold is 25 per cent for participants that clear exchange-traded products only, 10 per cent for participants that clear OTC derivatives products only and 20 per cent for participants clearing both OTC and exchange-traded products. The dollar value threshold varies depending on the ASX's Internal Credit Rating (ICR) of the participant; it also varies across a participants' house and client positions. It is currently set at $15 million for the house accounts of A- and B-rated participants, and $35 million for the client accounts of these participants. For C-rated participants, this threshold is set at $6 million for house accounts and $14 million for client accounts.

  As part of the changes to intraday margin processes implemented in August 2015, ASX Clear (Futures) returns collateral that has been collected as part of an earlier intraday call, if the positions to which the earlier call was related had since decreased. In addition to the three routine intraday margin runs, ASX Clear (Futures) also performs 'for-information' margin calculations on an hourly basis to inform its intraday risk management policy.

During the Assessment period, there were 261 intraday margin calls at ASX Clear totalling $662 million, and 1 829 AUD-denominated calls at ASX Clear (Futures) totalling $27 billion. A large number of intraday calls at ASX Clear (Futures) across the period reflected margin calls on house accounts due to client trades that had not yet been allocated to client accounts at the time of the margin run.[8] During the Assessment period, there were 307 intraday margin returns at ASX Clear (Futures) totalling $1.4 billion.

Intraday margin calls reflect not only intraday changes in prices, but also intraday changes in participants' positions. Particularly large and frequent intraday margin calls could nevertheless indicate that initial margin did not adequately cover intraday exposures. ASX has investigated the size and frequency of intraday margin calls on ASX Clear (Futures) and has concluded that it does not indicate inadequate margin cover. Indeed, the average daily amount of intraday margin called for ASX Clear and ASX Clear (Futures) was around $3 million and $105 million, respectively, or less than 1 per cent of average daily initial margin called at ASX Clear and around 3 per cent at ASX Clear (Futures). This view is also supported by the results of backtesting (see above).

The largest intraday margin call over the period was in response to the result of the UK referendum. On 24 June, the ASX CCPs called more than $900 million intraday margin, driven primarily by large price changes in the 10-year Treasury bond futures contract. The ASX CCPs also made AIM calls that afternoon from participants with particularly large positions, and, as discussed above, increased the margin rates for two of its most actively traded derivative products.

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8 This would most commonly occur where the clearing and allocation of an executed trade was in progress during an intraday margin run. In general, some orders cannot be fully allocated or cleared until the order is filled, which may take place progressively through a trading session. For these yet-to-be-allocated trades, the call is on the house account.

3.3.3 The maintenance of prefunded pooled financial resources

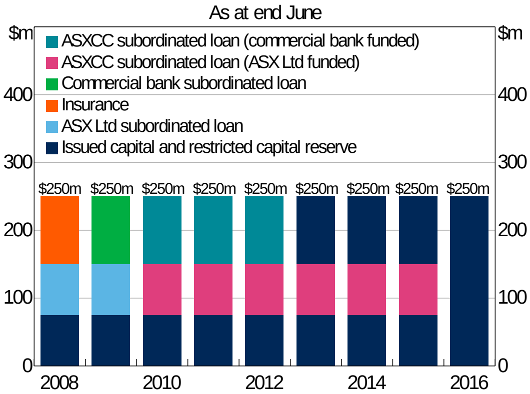
The margin and other collateral posted by a participant would be drawn on first in the event of that participant's default.[9] Should this prove insufficient to meet the CCP's obligations, the CCP may draw on a fixed quantity of prefunded pooled financial resources (from now referred to as the CCP's 'default fund').

- During the Assessment period, ASX Clear's default fund totalled $250 million (Graph 7). This comprised $103.5 million of own equity, $71.5 million paid into a restricted capital reserve from the National Guarantee Fund in 2005, and fully drawn-down subordinated loans totalling $75 million provided by ASX Clearing Corporation Limited (ASXCC), the CCPs' parent company. On 30 June 2016, the subordinated loans from ASXCC were converted to ASX Clear's own equity.
- During the Assessment period, ASX Clear (Futures)' default fund totalled $650 million (Graph 8). This included $360 million of ASX capital, $200 million of contributions from participants and a $90 million subordinated loan from ASXCC. On 30 June 2016, the subordinated loan from ASXCC was converted to ASX Clear (Futures)' own equity.

Graph 7

ASX Clear: Prefunded Pooled Financial Resources*

As at end June



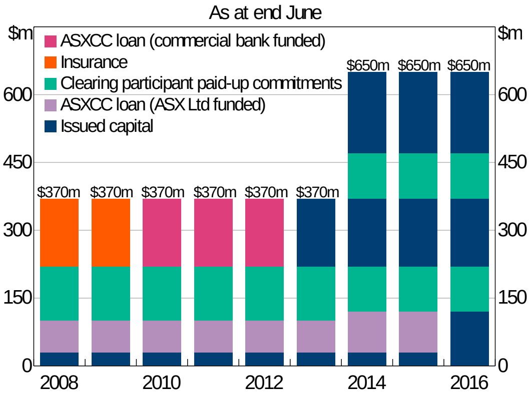
* The order of the bars reflects the order of application, starting from the bottom and working upward

Source: ASX

Graph 8

ASX Clear (Futures): Prefunded Pooled Financial Resources*

As at end June



* The order of the bars reflects the order of application, starting from the bottom and working upward

Source: ASX

3.3.4 Credit risk management

In order to assess the adequacy of its financial resources to cover its current and potential future credit exposures, the CCPs perform daily credit stress tests.[10] These tests compare each CCP's available prefunded resources against the largest potential loss in the event of the joint default of two participants and their affiliates under a range of extreme but plausible scenarios (Cover 2 target). The requirement to meet the Cover 2 target reflects the Bank's supplementary interpretation of the FSS, under which both CCPs are deemed to be systemically important in multiple jurisdictions; one relevant factor in this regard being that they have been granted regulatory recognition in the EU.

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9 For ASX Clear (Futures) the other collateral would include the defaulted participant's contributions to the CCP's prefunded pooled financial resources.

10 For more detail on the CCPs' credit stress test framework see Chapter 5 in the *2014/15 Assessment of ASX CS Facilities*.

- ASX Clear's maximum projected stress test losses exceeded the total default fund for four days in 2015/16 (Graph 9). These excesses were primarily driven by large cash and derivatives positions held by two participants. To cover this exposure, ASX called AIM from these participants (see below). Since the stress test excesses were largely isolated to individual participants and were covered by AIM, an increase in the default fund was not considered necessary.
- ASX Clear (Futures)' maximum projected stress test losses remained well below the default fund during 2015/16 (Graph 10).

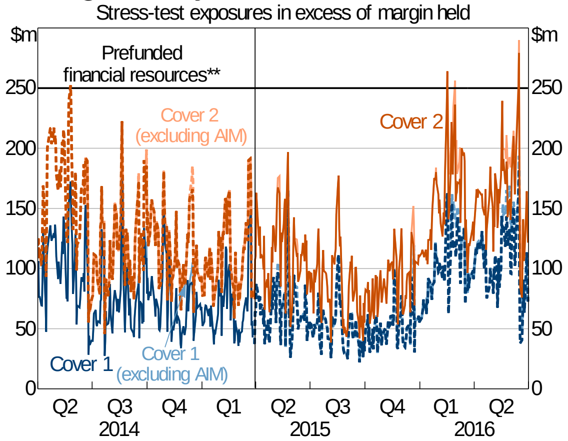
The CCPs call AIM when credit stress test results are in excess of stress test exposure limits (STELs), ensuring that any excess is fully covered. These limits are based on ASX's ICRs of participants. AIM can be called even when stress test exposures do not exceed total resources: A-rated participants have STELs that are half of the total default fund of each CCP, and lower rated participants have lower STELs.

During the Assessment period, ASX Clear made STEL AIM calls on 48 days against six participants, with the largest totalling $68.4 million. ASX Clear (Futures) made no STEL AIM calls.

Graph 9

ASX Clear: Highest Projected Stress-test Losses*

Stress-test exposures in excess of margin held



* Highest projected stress-test loss from the default of one/two participants

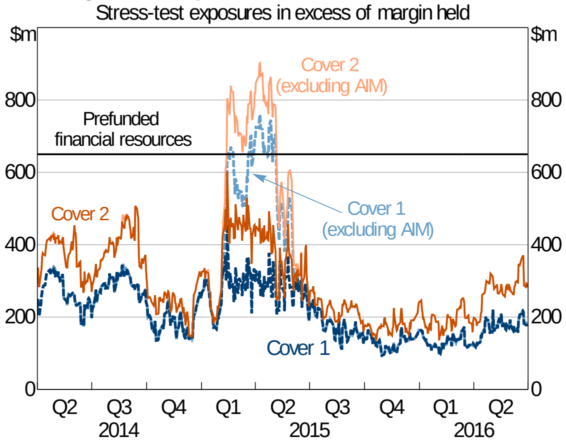
** From March 2015, ASX Clear's prefunded resources have been calibrated to cover the default of two participants (Cover 2)

Source: ASX

Graph 10

ASX Clear (Futures): Highest Projected Stress-test Losses*

Stress-test exposures in excess of margin held



* Highest projected stress-test loss from the default of one/two participants

Source: ASX

3.3.5 Liquidity risk management

Credit exposures faced by the CCPs from a participant default would also create liquidity exposures. The CCPs may also face default liquidity exposures in excess of their credit exposures, even in the absence of a participant default. These additional exposures may be particularly large for ASX Clear, given that it novates equity trades with delivery obligations. If a participant with net equity delivery obligations were to default, ASX Clear's liquidity exposure would include the cost of purchasing the securities to meet the delivery obligations of the defaulted participant. By contrast, ASX Clear's credit exposure would be limited to the change in price in the securities between the defaulting participant's last variation margin payment and the time the CCP executes an offsetting securities trade. ASX Clear also faces liquidity exposures from its acceptance of equity collateral against derivative positions. Specifically, if ASX Clear were to liquidate its equity collateral, it would likely have to wait two days to receive the proceeds of the sale.

The ASX CCPs perform daily liquidity stress tests to assess the adequacy of the CCPs' prefunded financial resources to cover the largest potential liquidity exposure arising from the joint default of two participants and their affiliates under a range of extreme but plausible scenarios (Cover 2 liquidity target). ASX Clear's liquidity stress test framework is based on the price movements from its credit stress test scenarios, but recognises several liquidity-specific risks faced by the CCP. Separate models are used for the cash equities and derivatives market to recognise the distinct liquidity risks that arise in each of those markets. To assess the adequacy of its financial resources, ASX Clear compares the results of its liquidity stress tests in excess of the margin posted by the two participants' generating the Cover 2 liquidity target against its Available Financial Resources (AFR). ASX Clear's AFR is comprised of its pooled prefunded resources, as well as a $150 million committed liquidity facility secured from ASX Limited.[11] However, a stress test result in excess of the AFR is considered a breach only where the excess is solely due to derivatives transactions. This reflects the CCP's ability to use offsetting transaction arrangements (OTAs) to mitigate the liquidity obligations arising from cash market transactions. During the Assessment period, liquidity stress test results at ASX Clear exceeded the AFR for 152 days. However, since none of these were the result of derivatives transactions, no breaches were recorded.

ASX Clear (Futures)' liquidity stress test framework is also based on its credit stress test scenarios. Since the CCP does not accept equity collateral or guarantee delivery, it does not recognise these risks in the liquidity stress test framework.[12] ASX Clear (Futures) recorded no breaches of its prefunded liquid resources during the Assessment period.

Both ASX Clear and ASX Clear (Futures) also face liquidity risk from the reinvestment of pooled prefunded resources and the portion of margin posted by participants in the form of cash. These assets are reinvested and held by ASXCC, the holding company for the two CCPs, according to a defined treasury investment policy and investment mandate. Liquidity risk arises since ASXCC would have to convert its assets into cash to meet any obligations arising from a participant default or for day-to-day liquidity requirements, such as the return of cash margin to participants. To manage this risk, ASXCC's investment mandate requires that it maintains liquid assets readily available to meet the Cover 2 liquidity target as well as meet day-to-day liquidity requirements, across both CCPs.[13]

In July 2016, ASX initiated enhancements to its liquidity stress test framework (see Section 3.5.1).

3.3.6 Recovery tools

In a highly unlikely scenario that involves more than two large participant defaults or market conditions that are beyond 'extreme but plausible', it is possible that prefunded pooled or other liquid financial resources could be insufficient to fully absorb default-related losses or meet payment obligations. In such circumstances, the CCP may be left with an uncovered credit loss or liquidity shortfall. In October 2015, ASX implemented enhanced recovery arrangements to address such a threat to its ongoing viability. Under the new arrangements, each CCP's approach for allocating an

11 $100 million of this facility is backed by a commercial bank liquidity facility secured by ASX Limited.

12 While ASX Clear (Futures) novates derivatives with associated delivery obligations, it does not guarantee settlement of those obligations. If a participant were to default, the CCP's exposure would only be the replacement cost risk arising from the defaulted participant's obligations.

13 In ASXCC's Investment Mandate, liquid assets comprise: cash available for use within two hours; and securities traded in a liquid market which can be sold for same day value with settlement proceeds available within two hours, and which are eligible for repurchase with the Bank.

uncovered credit loss or liquidity shortfall following a participant default relies on a number of tools (see 2014/15 Assessment).

- *Recovery Assessments*. The power to call for additional cash contributions from participants to meet uncovered losses and fund payment obligations, in proportion to the risk associated with positions held by the CCP's participants prior to the default. Recovery Assessments are capped at $300 million in ASX Clear and $600 million in ASX Clear (Futures) (or $200 million for a single default).
- *Payment haircutting.* A tool, available to ASX Clear (Futures) only, allowing the CCP to reduce (haircut) outgoing payments to participants in order to allocate losses or a liquidity shortfall arising from a defaulting participant's portfolio. There is no cap on the use of this tool.
- *Complete termination*. A reserve power that could be used to allocate losses or a liquidity shortfall if the above tools were insufficient. Complete termination would involve tearing up all open contracts at the CCP and settling them at their current market value. Any residual losses or liquidity obligations of the CCP could be allocated by haircutting settlement payments to participants. Use of this tool would have a highly disruptive effect on the markets served by the CCP, so would be considered only as a last resort.

In addition, ASX Clear can address a liquidity shortfall relating to the settlement of securities transactions via the use of OTAs with participants due to receive funds in the settlement batch.[14] Both CCPs also have the powers to restore a matched book via partial or complete termination of contracts if normal close-out processes cannot be carried out.

In June 2016, the ASX CCPs implemented further enhancements to their replenishment arrangements, in order to allow the CCPs to promptly return to full financial cover following a participant default while mitigating the potential for procyclicality (see Section 3.5.1 and Box A).

3.3.7 Risk monitoring and compliance

The two CCPs actively monitor their exposure to financial risk. This includes monitoring of day-to-day developments regarding, among other things, participants' financial requirements, risk profiles, open positions and settlement obligations to the CCPs. The CCPs carry out a range of participant monitoring spot checks and other examinations designed to validate the accuracy of the information that participants are required to submit to the CCPs. The CCPs also determine and review participants' ICRs, drawing in part on information provided by participants in their regular capital returns to ASX, and maintain a 'watch list' of participants deemed to warrant more intensive monitoring.

Monitoring of key risk indicators focuses on the participant's capital-based position limit (CBPL, which places an upper bound on participant exposures relative to capital), STEL (see Section 3.3.3), and measures of concentration risk in particular products. Each of these metrics is used, respectively, by ASX to ensure that a large position established by a participant or its clients does not lead to an unacceptable increase in the probability of a default, the potential loss given default, or the degree of difficulty in closing out a concentrated position in a default. While concentration triggers were not

14 Under the first leg of the OTA, ASX Clear would, in effect, re-deliver the stock to the relevant non-defaulting participant in return for a payment equal to the amount of the payment obligation of ASX Clear to that participant. Under these arrangements, ASX Clear would agree to repurchase the stock the next business day under the second and final leg of the transaction. If this transaction was unable to be settled on the next business day, OTAs would be entered into on a daily basis until the settlement of on-market close-out trades had taken place.

breached in 2015/16, ASX has initiated work to better take into account concentration and liquidity risks in its margin and stress test models (see Sections 3.5.1).

The CCPs also have wide-ranging powers to sanction participants in order to preserve their financial and operational integrity. For example, the CCPs may suspend or terminate a participant's authority to clear some or all market transactions in the event of a default, or in the event of a breach of the CCP's Operating Rules and Procedures that could have an adverse impact on the CCP. The action taken in the event of a breach will depend on a number of factors, including the participant's history of compliance and whether the breach implies negligence, incompetence or dishonesty. Where a breach has been identified and the participant has taken appropriate steps to rectify it, the CCPs will typically continue to monitor the participant closely for a period of time. These powers were used during the Assessment period.

3.4 Operational Performance of the ASX CS Facilities

ASX manages its operational risks in the context of its group-wide Enterprise Risk Management Framework, applying consistent operational risk controls across all of its CS facilities. Key operational objectives are minimum availability of 99.8 per cent (99.9 per cent for Austraclear) and peak capacity utilisation of 50 per cent. These objectives were met during the Assessment period (Table 6). System availability was equal to or above 99.9 per cent for all systems, while peak usage was below the target of 50 per cent for all systems.

Table 6: ASX CS Facility System Availability and Usage Statistics for 2015/16

Facility	Core system	Availability (per cent)	Peak Usage (per cent)	Average Usage (per cent)
ASX Clear	Derivatives Clearing System	100	20	9
ASX Clear / ASX Settlement	CHESS	100	24	18
ASX Clear (Futures)	Genium	100	16	9
ASX Clear (Futures)	Calypso	100	29	17
Austraclear	EXIGO	99.9	35	24

3.4.1 Incidents

The four ASX CS facilities experienced several operational incidents during 2015/16. A high-level description of these incidents is summarised in Table 7.

Table 7: Incidents in ASX CS Facilities in 2015/16

Facility	Date	Incident	Root Cause	Follow Up
ASX Clear	1 March 2016	The settlement price for a June expiry equity index option was incorrect.	Manual error during end-of-day validation processing.	Participants notified of the issue and price corrected the same morning. ASX has amended operational procedures to mitigate the risk of the error reoccurring.
ASX Clear	18 March 2016	Cash market margin was not collected for 24 securities. The issue had a relatively minor effect, impacting less than 1 per cent of the total margin called on the day.	Overnight processing issues in CHESS.	ASX notified the participants via a market notice and resolved the issue on the day.
ASX Clear (Futures)	7 January and 5 April 2016	Incorrect prices were used to settle open positions for several New Zealand electricity futures contracts.	Incorrect pricing data provided by vendor.	ASX disseminated the correct settlement prices via market notices and effected manual cash adjustments for affected participants.
ASX Settlement	18 November 2015	One participant's trades on the ASX market were allocated to the incorrect clearing participant and its transactions on the Chi-X market were rejected.	Unsuccessful application of the necessary adjustments within CHESS after the participant outsourced its post-trade administration functions to a third party.	Issue corrected in CHESS, and several changes made in response to the incident, including enhancements to the documentation and testing of participant transition processes.
ASX Settlement	17 March 2016	CHESS start-of-day process delayed by 40 minutes (until 6.40 am).	Overnight data transfer issue in one of CHESS's upstream systems, which was caused by a defect introduced during a system update in January.	Review carried out on the overnight data-processing procedures and system dependencies.
Austraclear	17 September 2015	Settlement instructions were not processed for slightly more than two hours (other than free-of-payment instructions), and collateral optimisation was consequently disrupted.	Failure of communication link between the Bank's real time gross settlement system and Austraclear.	Real time gross settlement feeder connectivity re-established, followed by the recommencement of processing in Austraclear. The end of day sub-session was also extended by 90 minutes to ensure that participants had sufficient time to process any additional instructions.
Austraclear	23-24 November 2015	Ineligible securities were used as collateral against the repurchase agreements of an ASX Collateral customer.	A technical issue in ASX Collateral, triggered by a system change by vendor.	Incident was resolved shortly after the customer notified ASX of the problem. ASX also took steps in a number of areas to prevent future reoccurrence of this incident.

3.4.2 EXIGO insourcing

EXIGO is the core system used by Austraclear. In November 2015, Austraclear completed an insourcing project to take over EXIGO's third-level operational and software support (requiring expert knowledge of the core system), which had previously been provided by a service provider. Insourcing third-level support has reduced operational risk by giving ASX control over future development of the system, both in terms of the nature and the timing of system enhancements. The insourcing project has also significantly simplified the system architecture through the removal of legacy components, which was expected to improve operational and recovery procedures.

The EXIGO insourcing project, which commenced during 2011/12, required ASX to manage the transition process and adequately resource third-level support for Austraclear. ASX recruited dedicated developers for this project, with a senior developer from the service provider seconded to Sydney during the development phase. In addition, ASX staff spent time at the vendor's offices to acquire the specialist knowledge required to provide advanced support for EXIGO. While carrying out the insourcing project, ASX retained the option to extend third-level support arrangements for as long as required. This option was utilised to accommodate delays without compromising support for EXIGO, including delays created by the resource requirements of other projects and to provide additional time for clients to update their systems. ASX also retained third-level support from the service provider for a further two months following the completion of the project.

3.4.3 Participation in the ASX CS facilities

Table 8 provides summary information on participation levels in the ASX CS facilities. These were little changed during the Assessment period. Changes to participation requirements and the effect of participation structures on operational risk management are discussed in Section 3.5.8.

Table 8: ASX CS Facility Participation Levels

Facility	End June 2016	End June 2015	Comments
ASX Clear	37	37	Data include four inactive participants. At the end of June 2016, there were 12 participants offering third-party or related-entity services.
ASX Clear (Futures)	19	20	Participants are predominantly large foreign banks and their subsidiaries. Four participants clear OTC transactions only, 11 clear exchange-traded derivatives only, and another four participants clear both.
ASX Settlement	89	86	At the end of June 2016, there were: 37 participants that were also ASX Clear participants; 26 general participants; 14 account participants; and 12 product issuer participants. Temporary special-purpose participants are not included.
Austraclear	855	846	At the end of June 2016, there were 182 full participants, 208 associate participants, 298 public trust participants and 167 special-purpose participants.

3.5 Material Developments and Recommendations

The ASX CS facilities have implemented a number of enhancements over the course of the Assessment period in response to recommendations and other regulatory priorities set out in the 2014/15 Assessment. In addition, the ASX CS facilities have made commercially driven improvements to existing processes and implemented changes related to the launch of new products and services.

3.5.1 CCP risk management

Risk management has again been an important focus for the ASX CCPs over the period, and for the Bank in its Assessment. The Bank made several recommendations in its 2014/15 Assessment related to stress testing, margin models, and recovery planning. CCP risk management has also continued to be a key focus of recent international policy work.

Independent model validation

The FSS require the ASX CCPs to conduct independent validations of their risk management models on an annual basis. ASX's internal Model Validation Standard further requires that for models that are critical to ASX (as measured against a series of risk factors), model validations should be reviewed by an external expert.

The first validation of ASX's cash market margining (CMM) model was completed in March 2016 by an external party. This validation considered ASX's processes for daily margin calculation and the quarterly calibration of margin parameters, including the accuracy and level of detail provided in relevant documentation. ASX's CMM model was benchmarked on a number of metrics against peer exchanges as part of this validation. Four low-risk issues were identified as part of the validation, primarily related to the documentation of the model.

Independent validations of ASX's credit and liquidity stress test models and the Standard Portfolio Analysis of Risk (SPAN) margin model were also completed in 2015/16 using an external party. These models were subject to detailed validations during the 2014/15 Assessment period also using an external party; accordingly, the 2015/16 validations considered whether the models remained fit for purpose in light of changes to ASX's product scope, economic trends and risk management developments at other financial institutions. The reviews noted that many of the recommendations from the 2014/15 reviews had been appropriately actioned by ASX.

A common theme in ASX's recent independent risk model validation exercises has been that there is scope for improvement in ASX's documentation of its risk models. This is consistent with the Bank's own observations. In its recommendations, the Bank encourages ASX to continue enhancing the documentation of the key elements of its financial risk management framework. This will better support the governance of decision-making and reduce key-person risk. It will also provide a sound basis for ASX's disclosures to both participants and regulators. Indeed, as part of this, ASX is encouraged to ensure that it clearly articulates to participants and regulators (and, where appropriate, the public) the analytical basis and rationale for the choice and calibration of key model parameters and assumptions.

Recommendation. ASX Clear and ASX Clear (Futures) are encouraged to continue enhancing the documentation of the key elements of their financial risk management frameworks, including clear articulation to participants and regulators (and where appropriate the public) of the analytical basis and rationale for the choice and calibration of key margin and stress test model parameters and assumptions.

Enhancements to stress testing

ASX implemented a number of enhancements to its credit and liquidity stress test models during the Assessment period, several of which are consistent with recommendations from ASX's external model validations and the Bank's 2014/15 Assessment.

- *Intraday price movements.* Effective February 2016, ASX's historical stress test scenarios incorporate intraday movements. Previously, historical stress test scenarios were calibrated using the most extreme change in closing prices. These scenarios are now based on the most extreme close-to-high or close-to-low price observed over the relevant holding period.

- *Additional credit stress test scenarios.* ASX implemented four additional forward-looking for-information stress test scenarios during the Assessment period, including scenarios which assume up to four simultaneous participant defaults. In August 2016, ASX Clear (Futures) also introduced a set of new scenarios for exchange-traded derivatives, and modified its existing scenarios for OTC derivatives and portfolio-margined futures, to incorporate absolute (i.e. basis point) shocks to yields. Prior to this change, ASX's stress-test scenarios applied only relative (i.e. percentage) shocks to yields; this approach could have understated the magnitude of potential shocks to yields in a low interest rate environment.
- *Enhanced sensitivity analysis.* ASX has extended the scope of its stress test sensitivity analysis to include stresses to the assumed shape of the yield curve. This analysis considered the effect of stressing the correlation between points on the yield curve from an 80 per cent to a zero per cent correlation. The analysis concluded that stress test losses were less extreme under a zero correlation assumption than under the current regime, which considers particular combinations of co-movements of yields at different maturities.[15]
- *Extended risk factor coverage.* Stress test scenarios may be designed to apply shocks to the full range of risk factors that could influence losses by a CCP in the event of a default, or they may apply shocks to only a subset of risk factors based on materiality considerations. As mentioned in the 2014/2015 Assessment, ASX Clear (Futures) has extended its coverage of risk factors to include the 30-day interbank cash futures contract, as well as electricity contracts. ASX further extended its coverage of risk factors during the 2015/16 Assessment period to include 20-year Treasury bond futures.

ASX has not implemented recommendations to make active in ASX Clear certain 'forward-looking' hypothetical scenarios and introduce a framework for collectively shocking individual sectors simultaneously with broader market-wide shocks. These recommendations will be implemented through enhancements to ASX's risk management systems (see below). In the meantime, ASX has put in place interim measures to ensure that the daily stress test results from ASX Clear's forward-looking scenarios and scenarios involving shocks to individual sectors are reviewed on a monthly basis. These monthly reviews may trigger ad hoc calls for AIM.

Liquidity risk management

ASX Clear (Futures) was one of 10 derivatives CCPs recently assessed as part of the CPMI-IOSCO Level 3 Implementation Monitoring Assessment, which considered the outcomes arising from CCPs' implementation of the Principles in the PFMI related to financial risk management and recovery (see Box B). Overall, the assessment found that CCPs had made important and meaningful progress in implementing arrangements consistent with the Principles. The assessment, however, also identified some gaps and shortcomings. Most relevant to the ASX CCPs, the report identified a number of shortcomings in relation to liquidity stress testing, including that some CCPs did not include sufficient liquidity-specific scenarios in their stress test scenarios.

Consistent with this finding, and also reflecting the Bank's own analysis and observations arising from ASX's independent validation of its liquidity stress tests, the Bank has discussed with ASX how its liquidity stress test approach may be enhanced to better reflect liquidity-specific risks. In light of these

15 These include 'twists', 'tilts', 'bends' and parallel shifts of the yield curve. For more information, see Section 5.4.4 of the 2014/15 ASX Assessment.

discussions, ASX has recently commenced work on a set of enhancements to its liquidity stress test and risk management framework.

- *Stresses to liquid resources.* From August 2016, ASX will apply haircuts to value its liquid resources when assessing the adequacy of those resources. These haircuts will incorporate extreme but plausible (once-in-20-year) movements in the prices of the underlying securities, as well as the relevant haircut that would apply if these securities were used to collateralise a repurchase agreement at the Bank. ASX assesses the adequacy of its liquid assets for each CCP and across both CCPs on a daily basis.
- *Liquidity-specific stress test scenarios.* ASX has developed four new liquidity-specific stress test scenarios. These scenarios consider stresses to cash margin outflows arising from various sources: a market contraction resulting from a market stress event; a market contraction resulting from the default of a major non-ASX CCP; a market contraction resulting from the default of two clearing participants; or a change in participants' use of cash versus non-cash collateral. Notwithstanding that these scenarios will undergo further refinement and validation during the coming Assessment period, initial stress test results indicate that ASX's total liquid assets were sufficient to cover the liquidity exposures arising from these scenarios. Once refined, ASX will integrate these scenarios into each CCP's liquidity stress test framework.
- *Cash market liquidity buffer.* ASX has also indicated its intention to refine elements of ASX Clear's liquidity stress test framework to better align the framework with its strategy for managing liquidity obligations in a default scenario. This would involve maintaining resources to cover a pre-specified value of stressed liquidity exposures arising from cash market transactions, while continuing to maintain sufficient liquid resources to cover the stressed liquidity exposures arising from derivatives transactions. ASX has already implemented processes for monitoring liquidity exposures against this buffer, and will make formal changes to its documentation and governance processes to implement this change during the 2016/17 Assessment period.

This work addresses the material concerns identified in the CPMI-IOSCO implementation monitoring report. ASX, nevertheless, plans to expand and refine the liquidity-specific stress test scenarios developed to date and formally integrate these scenarios into the CCPs' liquidity stress test framework. To support these enhancements, ASX should also clarify and document its processes for responding to breaches of target liquidity coverage, and enhance its sensitivity analysis on the effect of varying liquidity-specific assumptions in ASX Clear's liquidity stress test framework. The Bank also recommends ASX undertake several enhancements to its broader approach to liquidity risk management, including its processes for conducting due diligence on its liquidity providers and its arrangements for testing its procedures for accessing the CCPs' liquid resources.

Recommendation. ASX Clear and ASX Clear (Futures) should implement plans to expand and refine their liquidity-specific stress scenarios and integrate these into their liquidity stress testing frameworks. For ASX Clear (Futures), the expanded scenarios should include stress testing of non-AUD liquidity exposures.

ASX Clear should continue to refine and enhance the sensitivity analysis of its liquidity stress test model. This includes examining further the sensitivity of outcomes to certain underlying assumptions, such as the level of priming of securities.

ASX Clear should ensure that its liquidity stress test framework is aligned with a clearly defined strategy for managing liquidity obligations in a default scenario. ASX Clear should implement plans to maintain sufficient liquid resources to cover a pre-specified value of stressed liquidity exposures arising from cash market transactions, while continuing to maintain sufficient liquid resources to cover stressed liquidity exposures arising from derivatives transactions. For both ASX Clear and ASX Clear (Futures), processes should be in place to respond promptly to any breaches of target liquidity coverage; these processes should be clearly documented.

ASX Clear should conduct appropriate due diligence on its participants' ability to understand, quantify and manage any contingent liquidity obligations under its Rules. ASX Clear should ensure that its disclosures remain consistent with its liquidity risk management framework and assist participants in understanding their contingent exposure to the use of tools to address a liquidity shortfall.

ASX Clear should enhance and formalise its processes for conducting due diligence on the ability of its committed liquidity providers to perform as required under those commitments.

ASX Clear and ASX Clear (Futures) are encouraged to regularly test their procedures for accessing their liquid resources, including the on-market liquidation or repo of non-cash collateral and collateral investments, drawdown of ASX Clear's committed liquidity facilities and potential repo of eligible securities at the Bank.

Review of liquidity, concentration and spread risks

ASX is enhancing its approach to addressing risks arising from illiquid or highly concentrated participant portfolios. Under ASX's current approach, these risks are measured against selected metrics; if pre-specified triggers are hit, ASX reviews the materiality of the risks associated with the relevant portfolio and may call for AIM on a discretionary basis. This approach relies on a single trigger for each metric. For example, a portfolio is reviewed if a participant's position in an individual product is greater than 25 per cent of:

- the participant's total portfolio, either by value or the number of contracts held
- the product's total open interest or more than two times the average daily turnover in that product.

ASX is proposing an approach which will apply risk-based initial margin add-ons to address concentration and liquidity risks. These risks will be measured using similar metrics, but add-ons will be triggered at a lower threshold and on an automatic basis. The 'single trigger' approach will also be replaced by a more granular approach that scales the size of margin add-ons with the level of risk associated with a portfolio. Where add-ons are triggered, ASX will also apply risk-based multipliers to the price and volatility shocks used in credit stress testing for the relevant portfolio.

Alongside these changes, ASX will be introducing margin parameter add-ons and credit-stress test multipliers to address the risk that bid-offer spreads could widen in a close-out scenario. ASX currently uses mid prices in calibrating its margin and stress test models and parameters, with no adjustment for such 'spread risk'.

ASX expects to implement these changes in 2016/17.

Recommendation. ASX Clear and ASX Clear (Futures) are encouraged to complete their review of spread, concentration and liquidity add-ons for their margin and credit stress test models and incorporate these add-ons as appropriate.

Collateral haircuts

In June 2016, ASX revised its definition of 'stressed market conditions' for the purposes of setting haircuts on posted non-cash collateral for ASX Clear (Futures). The anticipated date for implementation of this change for ASX Clear is September 2016. Under the revised approach, haircuts on non-cash collateral are set to cover a fall in the value of the collateral over a three-day period at a 99.9 per cent confidence level, based on 20 years of price history (where available).[16] This coverage is equivalent to the fifth-worst price move over the 20-year look-back period. ASX had previously calibrated haircuts to cover the largest price fall over the 20-year look-back period, consistent with the methodology used to calculate price changes in credit stress test scenarios. Alongside these changes, ASX has increased the frequency of its reviews of collateral haircuts from annually to at least semiannually.

ASX Clear additionally already stresses posted collateral beyond the collateral haircut to cover a once-in-20-year event in its credit stress test framework. By contrast, ASX Clear (Futures)' credit stress test framework will require enhancement in order to similarly additionally stress posted collateral beyond the haircut. ASX is planning to implement this change as part of planned enhancements to its risk management system (discussed below). While this leaves a gap currently, the magnitude of this uncovered risk is small, since non-cash collateral comprised less than 4 per cent of posted collateral at ASX Clear (Futures) in 2015/16.

Recommendation. ASX Clear (Futures) is encouraged to review the assumptions it makes regarding the value of its prefunded financial resources in extreme but plausible market conditions, in light of any changes to its collateral haircuts.

Recovery planning

In October 2015, ASX implemented more detailed and comprehensive recovery arrangements. These include tools to address uncovered credit losses and liquidity shortfalls for the two CCPs, as well as measures to address non-default losses across all four CS facilities (see Section 3.3.6). In its 2014/15 Assessment, the Bank judged that ASX's new arrangements observed all of the minimum requirements in the FSS related to recovery planning, with the exception of certain requirements related to replenishment.

Accordingly, the 2014/15 Assessment recommended that ASX carry out further work to enhance its arrangements for the replenishment of the CCP's financial resources in the event that these were drawn down following a participant default. The objective was to allow for a more timely return to full financial cover while minimising any negative procyclical impact on the financial system. As part of this work, ASX was required to validate the credibility of its arrangements to fund the CCPs' own replenishment contributions in stressed circumstances. The Bank also encouraged ASX to complete the documentation of its enhanced recovery plans, and to integrate testing and review of the recovery plans into its broader framework for testing and review of risk management and default management policies and processes.

16 ASX Clear (Futures) also applies haircuts using the same methodology to cash collateral lodged to meet margin requirements for products denominated in a currency different to that of the collateral.

These recommendations were addressed during the Assessment period. Following a consultation in December 2015, and extensive engagement with the Bank, ASX implemented enhancements to its replenishment arrangements in June 2016 (see Box A for details).

ASX also reviewed its capacity to meet its own contribution to replenishment, as well as to replenish business risk capital in stressed market conditions. As part of this, ASX presented its recapitalisation plans to the Bank in late 2015. Under these plans, ASX Limited would use existing cash reserves and raise additional capital through equity issuance to meet its replenishment obligations, making these available to the ASX CCPs under a Replenishment Deed. ASX is encouraged to continue to review the credibility of these arrangements on an ongoing basis.

Also during the Assessment period, ASX updated its Recovery Plan to reflect the expanded set of recovery tools. The Plan identifies scenarios that could threaten the ASX CS facilities' ongoing provision of critical clearing services, describes the trigger events that would need to occur in each scenario for the Recovery Plan to be activated, and sets out how ASX would respond to such scenarios on the basis of its recovery powers. The Plan also covers the governance arrangements for the recovery framework; this includes responsibilities for the testing and maintenance of the associated documents and procedures, which has been integrated into ASX's broader framework for testing and review of its risk and default management processes. The first test of ASX's enhanced recovery arrangements took place in June 2016, in the context of ASX's default management fire drill for exchange-traded products (see Section 4).

The Bank has identified a number of aspects of the Plan that could usefully be elaborated to better support its practical application in a stressed scenario. These are refinements that ASX is encouraged to take up in the normal course of its business. The Bank will continue to monitor the development of the Plan over the coming Assessment period.

Recommendation. The CS facilities are encouraged to continue to refine the documentation of their recovery plans, including considering further elaborating: stress scenarios; communications procedures; the methodology for determining critical services; how structural weaknesses are identified and addressed; and links to other FMIs.

Box A: ASX's Enhanced Replenishment Arrangements

ASX has established a staged process for replenishment of the CCP default funds in the event that these were exhausted or partially drawn down following a participant default. These arrangements differ from those established in October 2015 in the timing of fixed replenishment contributions, while leaving unchanged the amount that would ultimately be replenished. At the end of a 22-business-day 'cooling-off period', the ASX Clear and ASX Clear (Futures) default funds would be fully replenished to $150 million and $400 million, respectively.[17]

The enhanced arrangements comprise three key stages: Initial Interim Replenishment, Further Interim Replenishment, and Final Replenishment.

17 The cooling-off period concludes 22 business days after the conclusion of the final default management process initiated during the period.

- *Initial Interim Replenishment.* As soon as practicable following the conclusion of the default management process (DMP), ASX would contribute an Initial Interim Replenishment amount to restore the default fund up to at least the Minimum Fund Size. In order to reach full financial cover during the cooling-off period, ASX would expect to supplement this contribution with AIM called from participants. The Minimum Fund Sizes for ASX Clear and ASX Clear (Futures) are set at $37.5 million and $100 million, respectively. In determining these amounts, ASX sought to balance the liquidity impact of relying on non-pooled resources (i.e. AIM) with the risk of the interim contribution being used to absorb further losses from a subsequent default. These amounts will be reviewed annually, in consultation with the relevant Risk Consultative Committee.

- *Further Interim Replenishment.* At any time during the cooling-off period, ASX would have the discretion to call for a Further Interim Replenishment amount from clearing participants. This amount would be capped at the level of the Minimum Fund Size for each CCP. Individual clearing participant contributions would be determined in proportion to the risk associated with positions held by the participant prior to the default, and capped at the level of the participant's maximum Recovery Assessment. Participants would not be required to contribute to Further Interim Replenishment if they satisfied all conditions for resignation prior to the call being made. Participants would be given at least five business days' notice of their obligations so as to provide sufficient time for approval processes to be completed and funding to be arranged.[18] ASX would consult with the relevant Risk Consultative Committee in determining whether to call for Further Interim Replenishment (including the amount and timing of the call).

  Irrespective of the number of defaults within a cooling-off period, the maximum required amount of interim replenishment would be capped at $75 million for ASX Clear and $200 million for ASX Clear (Futures), split 50/50 between ASX and its clearing participants. ASX also reserves the right to make additional contributions to the default fund beyond this amount, if it determined this to be appropriate. In the event of a subsequent default during the cooling-off period, ASX's interim contribution and any funds remaining from the existing waterfall would be used prior to participants' interim contributions.

- *Final Replenishment.* At the end of the cooling-off period, the CCP default funds would be fully replenished to $150 million for ASX Clear and $400 million for ASX Clear (Futures), with contributions split 50/50 between the CCP and its participants. ASX would retain the capacity to call additional clearing participant and ASX contributions to restore the default funds to pre-recovery levels as part of a recalibration at the end of the quarter, should stress testing reveal that post-recovery exposures were not being adequately covered.

Characteristics of replenishment tools

As in its 2014/15 ASX Assessment, the Bank evaluated the extent to which ASX's new replenishment arrangements met the desirable characteristics of recovery tools set out in the CPMI-IOSCO guidance on recovery planning.[19] The Bank assessed the replenishment tools at the two CCPs to meet each of the desirable characteristics, as set out below.

- *Comprehensiveness.* The provisions enable both CCPs to return to full financial cover immediately following completion of the DMP, through a combination of ASX contributions and

18 If a subsequent default during the cooling-off period depleted the default fund below the Minimum Fund Size, participants could be required to make the contribution as soon as reasonably practicable following completion of that DMP, and potentially as soon as the next day.

19 The CPMI-IOSCO report provides supplementary guidance on how FMIs can observe the relevant recovery-related requirements in the Principles (and FSS) that they have effective recovery plans. The guidance outlines a range of potential recovery tools with reference to a set of desired characteristics. See CPMI-IOSCO (2014), *Recovery of Financial Market Infrastructures*, Bank for International Settlements, Basel, available at <http://www.bis.org/cpmi/publ/d121.htm>.

the use of AIM.

- *Effectiveness.* The approach provides for the CCPs to return to full financial cover on a timely basis, including within one business day of completion of the DMP where this is practicable. ASX has arrangements in place to fund its own replenishment contribution in stressed conditions. ASX has not identified any material legal risk to the enforceability of replenishment powers.
- *Transparency and controllability.* Clearing participants are aware of the full extent of their replenishment obligations in advance, including the maximum amount of their interim replenishment obligations. Participants could avoid replenishment by resigning from the CCP.
- *Incentives.* Replenishment obligations linked to pre-default positions may create undesirable incentives for participants to resign, since they can be controlled only by exiting the CCP entirely. Some clearing participants may also be reluctant to make a fixed contribution to mutualised resources shortly after a fellow participant's default. Nevertheless, ASX has limited the strength of the incentives for resignation by placing a cap on participants' replenishment contributions. Furthermore, under the conditions of resignation, a participant would be permitted to resign from the CCP only by committing to close out its positions in an orderly manner; this could further mitigate the adverse consequences of participant resignation. ASX's reliance on non-pooled resources for an interim period, which would avoid immediately exposing clearing participants to further survivor-pays losses, may also reduce the risk of these participants exiting the CCP. Additionally, the use of AIM to manage risk in the interim would encourage clearing participants to manage the risks that they brought to the CCP.
- *Minimising negative impact.* ASX's approach is intended to allow clearing participants sufficient time to obtain approvals and funding to meet their obligations for both interim and final replenishment. The CCP's Initial Interim Replenishment contribution would reduce the liquidity burden on participants of using AIM to manage risk in the interim. ASX would also have the discretion to call on participants for Further Interim Replenishment contributions if it determined that there would be material stability or market functioning benefits to reducing the liquidity impact on participants from continued use of AIM.

Disclosures on participants' exposure to recovery tools

Following the introduction of its enhanced recovery arrangements in October 2015, ASX developed additional disclosures to assist participants in understanding and managing their contingent exposure to the use of the CCPs' tools for allocating uncovered credit losses and liquidity shortfalls (see Section 3.3.6).

- In June 2016, ASX Clear began to disseminate monthly disclosures to individual participants on their contingent liquidity exposures to the use of OTAs. These disclosures show each participant's 'worst-case' liquidity exposure arising from the default of the largest two clearing participants and their affiliates on each day in the preceding month.
- In August 2015, ASX Clear introduced monthly disclosures on participants' individual maximum exposures to the use of Recovery Assessments. ASX Clear (Futures) will also begin to disseminate disclosures on participants' aggregate contingent exposures to payment haircutting under a range of extreme scenarios by the end of 2016.

The disclosures will be disseminated to participants using ASX's new Customer Portal. This new portal improves the design and functionality of ASX's website and provides support for the dissemination of non-public information to participants. The new Customer Portal went live in June 2016.

Resolution

In February 2015, the government, on the advice of the Council of Financial Regulators (CFR), released a consultation paper on proposals to establish a special resolution regime for FMIs. The key proposals set out in the consultation paper were that: the regime would extend to all domestically incorporated and licensed CS facilities; the Bank would be the resolution authority for CS facilities, with an overarching objective to maintain overall stability in the financial system and an additional key objective to maintain the continuity of critical FMI services; and the powers of the resolution authority and safeguards under the regime would be aligned with the Financial Stability Board's (FSB) *Key Attributes of Effective Resolution Regimes for Financial Institutions*.

Eight responses to the consultation were received, including two confidential submissions. Stakeholders universally supported the principle of establishing an FMI resolution regime, with the consultation responses also providing feedback on a number of specific areas related to the design and scope of the regime. In November 2015, the CFR published a response to consultation, setting out the CFR's views on how this feedback should be addressed in developing draft legislation. During 2016, the CFR has continued to advise the government on the development of draft legislation consistent with the proposals in the February 2015 consultation and the response to the consultation. The CFR has also been developing operational arrangements that will support the regime once implemented.

Each ASX CS facility will be required to ensure that its operational arrangements are able to support resolution actions under the proposed Australian FMI resolution regime once operative. The CS facilities have therefore already introduced standard clauses into their agreements with critical service providers requiring that they give notice to the Bank of any intention to terminate the agreement as a consequence of the facility's insolvency or failure to meet its obligations. This is intended to give the Bank an opportunity to take action to remedy the breach or otherwise ensure continued service provision under the proposed FMI resolution regime. Once legislation to establish a special resolution regime for FMIs has been introduced, ASX should review its operational arrangements more broadly to ensure that they are consistent with the form of the regime.

Recommendation. The CS facilities will need to review their operational arrangements in light of the proposed special resolution regime for FMIs in Australia, once the regime has been finalised. In particular, the CS facilities will need to ensure that their operations are organised in such a way as to facilitate effective crisis management actions under that regime.

Renewal of risk systems

As part of its group-wide technology transformation project (see Section 3.5.7), ASX is enhancing its risk management systems. The first phase of this project, which focused on the default management of OTC derivatives and portfolio-margined futures products, was implemented in October 2015. This part of the system is able to generate hedging recommendations for the defaulter's OTC derivatives portfolio (including any portfolio-margined futures) prior to the portfolio being auctioned to non-defaulting participants. This system was used to support ASX's OTC derivatives default management fire drill in July 2016.

Implementation of the second phase has provided ASX Clear (Futures) participants with the functionality to automatically optimise their margin requirements for OTC and portfolio-margined futures positions by selecting the most optimal set of futures positions to be allocated to their cleared

OTC portfolio.[20] The margin optimiser was launched in January 2016, initially accepting four eligible futures products for portfolio-margining on OTC participants' house accounts. In July 2016, ASX broadened the scope of eligible futures contracts and extended the margin optimisation functionality to individual client accounts.

The third phase of the project is expected to deliver improved stress test and margining capabilities, including the ability to calculate exposures and margin requirements in close to real time. ASX is implementing this phase in stages, with the system functionality for ASX Clear (Futures) being developed first. ASX has finalised the design study and initial business requirements for the ASX Clear (Futures) part of the system, and has commenced work on some of the detailed functional requirements. The third phase is expected to take one to two years to implement. As ASX progressively develops its capabilities, it will consider how to integrate more frequent margin and stress test calculations into a 'real-time risk management' approach that removes the potential for delay in covering intraday changes to exposures.

Once these changes are implemented, the project will move on to enhancing and automating the CCPs' default management capabilities for exchange-traded products, creating a global view of all ASX exposures, and harmonising pre- and post-trade risk management capabilities.

The Bank is receiving regular updates on this project, and will continue to engage with ASX on the design, specifications and implementation of the system throughout the project. ASX is encouraged to continue to progress enhancements to the CCPs risk management systems, including the ability to calculate margin and stress test exposures on a near real-time basis.

Recommendation. ASX Clear and ASX Clear (Futures) are encouraged to continue to progress planned enhancements to their risk management systems, including to deliver the capability to calculate on a near real-time basis:

- credit stress test exposures
- liquidity stress test exposures
- margin requirements, using a range of models and parameters.

International CCP workplan

In light of the increasing systemic importance of CCPs, the FSB has been taking a deeper interest in CCP resilience. Since this interest cuts across the existing mandates of CPMI, IOSCO and the Basel Committee on Banking Supervision, the chairs of these standard-setting bodies have developed a joint CCP workplan to further enhance the effectiveness of CCP resilience, recovery and resolution. As part of this workplan, in August, CPMI-IOSCO published a report setting out an assessment of consistency in the outcomes of CCPs' implementation of the Principles with respect to their financial risk management and

20 ASX Clear (Futures) allows OTC participants to cross-margin specific interest rate futures positions by allocating these positions to their OTC derivatives portfolio. This allows offsetting OTC and futures positions to be accounted for in the calculation of the participant's margin requirements.

recovery practices (see Box B).[21] The assessment covered 10 CCPs internationally that provide clearing services for derivatives, including ASX Clear (Futures).

Overall, the assessment found that CCPs had made important and meaningful progress in implementing arrangements consistent with the Principles. The assessment, however, also identified some gaps and shortcomings. Most relevant to ASX, the report identified a number of shortcomings in relation to liquidity stress testing, including that some CCPs did not include sufficient liquidity-specific scenarios in their stress test scenarios (see 'Liquidity risk management' above).

In August, CPMI-IOSCO also published further draft guidance on the Principles in the area of resilience and recovery for CCPs for public comment. The draft guidance is intended to provide more detailed interpretation of the requirements in the Principles in key aspects of CCPs' financial risk management frameworks (see Box B).[22] The proposed additional guidance will inform the Bank's dialogue with ASX on these matters in the coming period.

Recommendation. ASX Clear and ASX Clear (Futures) are encouraged to review the following aspects of their risk management arrangements in light of forthcoming CPMI-IOSCO guidance on resilience and recovery of CCPs:

- governance arrangements
- framework for credit stress testing, including its interpretation of 'extreme but plausible' market conditions and its framework for determining the adequacy of its prefunded financial resources
- margin models
- framework for liquidity stress testing and determining the adequacy of its liquid resources.

Box B: Developments in International CCP Workplan

Implementation monitoring report

In August, the CPMI-IOSCO Implementation Monitoring Standing Group (IMSG) published the first Level 3 (L3) Principles Assessment. In contrast to the Level 1 and Level 2 Principles assessments, which assess implementation of the Principles in the PFMI in a jurisdiction's regulatory framework, L3 Principles assessments are peer reviews examining consistency in the outcomes of implementation of the Principles by FMIs. To enable a detailed examination of FMIs' implementation measures, each L3 review will be thematic, considering only a subset of Principles and in some cases only a subset of FMI types.

This review considered the implementation of the Principles relevant to financial risk management and recovery arrangements at a sample of 10 derivatives CCPs, including ASX Clear (Futures). The review considered six topics: governance of risk management; credit risk management; liquidity risk management; margin; collateral policy and investments; and default management and recovery

21 CPMI-IOSCO (2016), *Implementation monitoring of PFMI: Level 3 assessment - Report on the financial risk management and recovery practices of 10 derivatives CCPs*, Bank for International Settlements, Basel, available at <http://www.bis.org/cpmi/publ/d148.htm>.

22 CPMI-IOSCO (2016), *Resilience and recovery of central counterparties (CCPs): Further guidance on the PFMI - consultative report*, Bank for International Settlements, Basel, available at <http://www.bis.org/cpmi/publ/d149.htm>.

planning. L3 assessments are peer-benchmarking exercises and not supervisory exercises. Accordingly, the focus of the report is on the consistency of outcomes of implementation of the relevant Principles across the group of CCPs as a whole rather than an assessment of each CCP's consistency with the relevant requirements in the Principles.

The review found that the surveyed CCPs have made important and meaningful progress in meeting the financial risk management- and recovery-related requirements of the Principles, including in those areas where the Principles 'raised the bar'. The report nevertheless identifies several areas in which some CCPs' implementation measures are not fully consistent with the requirements in the Principles. In the area of recovery planning, in particular, a number of CCPs had not yet put in place at the time of the review the full set of recovery rules and procedures envisaged in the Principles. Gaps and shortcomings were also identified in the areas of credit and liquidity risk management, including: insufficient policies and procedures from some CCPs to ensure that they maintain the required level of financial resources on an ongoing basis, including adequate arrangements to ensure a prompt return to the target level of coverage in the event of a breach; and insufficient liquidity-specific scenarios in some CCPs' liquidity stress tests.

The IMSG will be conducting a targeted follow-up review of CCPs' progress in addressing these issues in the first half of 2017. This review will cover a wider range of CCPs and product classes, with progress assessed as of 31 December 2016.

Consultative guidance on CCP resilience and recovery

CPMI and IOSCO have published for comment additional guidance (the Guidance) on certain principles and key considerations in the Principles. The proposed Guidance provides more detailed descriptions of how CCPs are expected to implement the Principles in order to improve their resilience and recovery planning. This additional Guidance builds on knowledge gained from a stocktaking exercise of current CCP practices as well as detailed findings from the implementation monitoring exercise carried out by the IMSG. The proposed Guidance is not designed to create additional standards or principles for CCPs to follow, but rather seeks to clarify the existing Principles in a number of key areas described below.

Governance

The governance of a CCP (covered in Principle 2) is important in determining a CCP's overall resilience and its ability to carry out recovery plans effectively. The proposed Guidance focuses on governance of CCPs' key risk management frameworks, over which the board of directors should have explicit responsibility. It also notes that CCPs should have comprehensive mechanisms for disclosure to, and feedback from, participants and other stakeholders on issues such as margin and stress test methodologies, for example through risk committees.

Stress testing

Credit and liquidity stress testing (KC 4 of Principles 4 and 7) are used by CCPs to determine the necessary level of prefunded financial resources that are required to ensure resilience against potential losses following a participant default. The proposed Guidance highlights that, while credit and liquidity stress testing are similar, there are important distinctions between the requirements under Principles 4 and 7. Given this, CCPs should develop specific scenarios that address potential liquidity risks, for example the failure of a liquidity provider.

The proposed Guidance also clarifies that the requirement for 'extreme but plausible' stress scenarios should be considered in the context of a participant default. The default of a large participant may itself create secondary effects on market prices and the ability to close out positions. Within this context, CCPs should consider all potential sources of risk, e.g. changes in the value of cleared positions, the value of collateral and other financial resources, the size and composition of cleared portfolios, transaction costs and changes in the correlation between products. These scenarios should also consider the potential for positions and market prices to vary materially over the course of the day, and include peak intraday price changes.

The proposed Guidance clarifies that scenarios should cover all relevant historical stress periods, with exclusion of historical events from the set of scenarios only made on the basis that reoccurrence is implausible and not simply due to the passage of time. It is also important for CCPs to develop forward-looking scenarios that anticipate, to the extent possible, future extreme but plausible events. In addition to the construction of stress scenarios, it is important for CCPs to regularly test and review its framework. CCPs should consider using a combination of sensitivity analysis, reverse stress testing and additional for-information scenarios for this purpose.

Coverage

Principle 4 specifies that CCPs must maintain prefunded financial resources to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the one (or two) participant(s) and their affiliates that would potentially cause the largest aggregate credit exposure for the CCP in extreme but plausible market conditions (the Cover 1/Cover 2 standard). The proposed Guidance emphasises that the Cover 1/Cover 2 standard are minimum requirements, and that CCPs should consider their unique risk profiles in determining the sufficient level of prefunded resources they should hold. Coverage should be maintained on an ongoing basis and CCPs should have procedures in place to ensure that they can return promptly to cover when breaches occur. Sizing methodologies should be sufficiently conservative to minimise the likelihood of breaches in coverage, and daily, or intraday where necessary, stress test analysis should be used to ensure ongoing observance.

Margin

Margin requirements are set out in Principle 6 and guidance has been proposed in a number of areas. In particular, that CCPs should consider a number of key factors when designing margin models: risk factors and their interdependence; data availability; model accuracy; model stability (procyclicality); flexibility; independence of breaches; and transparency.

The proposed Guidance notes that all costs of closing out a participant's positions should be considered in margin models including fees paid to default brokers, bid/ask spreads, and the impact on market prices of the disposal of large, concentrated positions. Where various risks cannot be directly incorporated into the underlying risk models, CCPs may consider using add-on charges as supplements. One key parameter in calculating these costs is the close-out period, and while the proposed Guidance emphasises that no minimum level is prescribed by the Principles, CCPs should consider the likely market conditions surrounding a participant default when determining the appropriate length of this period.

On the backtesting of margin models, the proposed Guidance suggests that CCPs differentiate between assessment of margin coverage and of the statistical performance of the models. When assessing coverage, CCPs should use actual participant portfolios to calculate the historical profit or loss and appropriately account for any risks not included in the historical price series (e.g. liquidation risks) by either including these in the historical profit or loss, or excluding the associated margin add-ons. For testing the statistical performance of margin models CCPs should consider the models on an overall, as well as participant basis, analysing not just the number of exceedances but also their size and clustering. CCPs should also assess the procyclicality of their margin models in order to identify any risks associated with the potential for large destabilising increases in margin requirements. This should include appropriate metrics to identify the level of procyclicality in the models, and appropriate mechanisms to mitigate this risk, such as buffers or floors.

The proposed Guidance also discusses portfolio margining, in particular the importance of restricting margin offsets to those products with strong economic relationships and reliable statistical correlations. Margin models should take into account the potential for the dependence between price and volatility series to change during periods of market stress, and CCPs should use sensitivity analysis to test the assumptions in their models.

CCP contributions to losses

The Principles do not specify that a CCP must place its own equity at risk when covering the losses of a participant default (or other general business risk losses); however, the proposed Guidance points out that contribution of a CCP's own resources to losses can improve confidence that the interests of participants and other stakeholders are appropriately considered in the CCP's risk management. Given this, a CCP should apply an amount of its own resources, prior to that of non-defaulting participants, that is determined to be necessary to enhance the confidence of participants.

Recovery

The report also reiterates certain aspects of the 2014 guidance on recovery of FMIs. Recovery planning is an area where the IMSG implementation monitoring exercise found that a number of CCPs had not yet put in place the full set of recovery rules and procedures as required under the Principles. Consequently, CPMI-IOSCO expect to conduct targeted follow-up assessment of CCP's progress in these areas in the first half of 2017.

3.5.2 Legal basis

In May 2016, Parliament passed the *Financial Legislation Amendment (Resilience and Collateral Protection) Act (2016)* (Resilience Act) to amend the *Payment Systems and Netting Act (1998) (PSNA)*. The amendments enhance the legal basis of ASX's CS facilities in the following areas.

- *Non-terminal external administration*. The amendments provide additional certainty to the settlement of payments in real-time gross settlement (RTGS) systems, such as Austraclear and the Reserve Bank Information and Transfer System (RITS), and netting arrangements, such as ASX Settlement, that have been approved under the PSNA. In particular, the amendments facilitate the ongoing participation by institutions in 'non-terminal' external administration (e.g. statutory management) by clarifying that the protections under the PSNA continue to apply.
- *Extension of netting protections*. The amendments also extend the PSNA protections given to netting arrangements to cover any transfer of property for the purposes of discharging a net obligation in such arrangements that are governed by the rules of a CS facility. This enhances the finality protections given to the settlement of transactions in ASX Settlement that were entered into by a participant prior to its entry into any form of external administration.
- *Protection of recovery powers*. The Resilience Act enhances the protections afforded to the CCPs as 'netting markets', as defined in the PSNA. In particular, the changes protect the exercise of recovery powers and protect default fund contributions by participants should participants subsequently enter administration. The Resilience Act clarifies that the netting market protections in the PSNA apply to the rules governing the operation of a netting market (e.g. the operating rules of a CCP), which codify ASX's recovery powers and the replenishment obligations of participant. The Resilience Act also broadens the types of transaction that are protected to any payment or transfer of property (whether absolutely or by way of security) by a party to meet any obligation (previously, this protection was limited to payments and transfers to meet deposit or margin call obligations).

3.5.3 Governance

A number of changes to the governance of the ASX CS facilities' activities were implemented during and shortly after the Assessment period. These changes address regulatory developments during 2015/16 and respond to broader changes in the governance arrangements of the ASX Group.

Change in ASX CEO

On 21 March, ASX announced that its Managing Director and CEO, Elmer Funke Kupper, had resigned. ASX announced in August that a new Managing Director and CEO, Dominic Stevens, had been appointed. During the interim period, the ASX Chairman, Rick Holliday-Smith provided oversight and board-level input to the Deputy CEO and Group General Counsel, who together had assumed the day-to-day running of the company. Under these interim arrangements, the Chairman did not have day-to-day responsibilities within ASX, but served as a point of contact for senior external stakeholders, including regulators. Before the new CEO was appointed, the Bank discussed the effectiveness of the interim governance arrangements with the Chairman, including to understand how conflicts of interest are managed.

Competition in Clearing Review

On 30 March, the government endorsed the recommendations of the review of competition in clearing Australian cash equities carried out by the CFR and the Australian Competition and Consumer Commission – together, the Agencies – in the first half of 2015.[23] The Agencies had identified three core conclusions from their consultation and supporting analysis:

- *The policy approach should be one of openness to competition.* This would recognise the potential benefits of competitive discipline and be consistent with prevailing legislative settings. To prohibit competition would be unprecedented internationally.
- *Competition, even if permitted, may not emerge for some time, if at all.* There remain strong forces in favour of a single provider of clearing services, so a competing CCP may never emerge.
- *The regulators should have powers to deal with an ongoing monopoly.* Regulatory mechanisms may be necessary to discipline ASX's conduct as a monopoly provider.

Reflecting these views, the Agencies developed a number of recommendations. These included recommendations that the government confirm a policy stance of openness to competition, and implement legislative reforms giving the relevant regulators rule-making and arbitration powers that would enable them to enforce, as necessary:

- a set of Minimum Conditions that support competition in the clearing of cash equities, while also ensuring the safety and efficiency of the market
- a set of Regulatory Expectations for ASX's conduct in operating its cash equity clearing and settlement services until such time as a competitor emerged.

In its announcement, the government committed to develop and consult on legislative changes in accordance with these recommendations. The government also committed to developing legislative

23 The Conclusions and the Government's response are available at <http://www.treasury.gov.au/ConsultationsandReviews/Consultations/2015/Review-of-competition-in-clearing-Australian-cash-equities>.

proposals to bring ownership restrictions on ASX into line with similar limits on other important financial sector entities.

3.5.4 Participant default rules and procedures

The ASX DMF is intended to assist in the management of a participant default; the documentation covers each stage of a default, from its identification through to its conclusion. In the 2015/16 Assessment period, ASX carried out a comprehensive review of the DMF, in part to take into account enhancements to ASX's recovery arrangements (see Section 3.3.6) and experience gained from the default of BBY in May 2015.

A more detailed description and assessment of ASX's default management arrangements, including recommendations for further enhancements, is set out in Section 4.

Experience gained from the default of BBY Limited

In May 2015, ASX employed its default management procedures to deal with the appointment of a voluntary administrator to BBY, a participant of ASX Clear, ASX Settlement and Austraclear. Overall, the incident was managed successfully, with no evident market impact and all close-out losses sufficiently covered by margin held. The event nevertheless highlighted several matters related to ASX's risk management and default management arrangements that were worthy of further consideration.

In line with the Bank's 2014/15 recommendations, ASX completed a detailed review of the experiences gained from the default of BBY in May 2015. Based on the review, ASX set out a plan for implementing a number of enhancements to its risk and default management arrangements. This plan includes:

- changes to ASX Clear participants' core capital and liquidity risk management requirements
- a review of how the CCPs' margin and stress test models could better take into account liquidity, spread and concentration risks
- changes to improve portability arrangements and the close-out process
- education and communication initiatives, including updates to participant disclosures on ASX's default management arrangements.

ASX intends to implement the elements of the plan during 2016/17.

Segregation and portability

The FSS require the ASX CCPs to offer account structures that support the segregation of client positions and collateral from those of their clearing participant. Under the Bank's supplementary interpretation of the FSS, each CCP must also allow clients to hold excess collateral directly with the CCP. During the Assessment period, ASX Clear and ASX Clear (Futures) implemented arrangements that bring their client account structures into line with these requirements and fully address recommendations contained in the Bank's previous Assessments.

ASX Clear (Futures)

Since July 2014, ASX Clear (Futures) has offered both OTC and exchange-traded derivatives clients the choice of holding their positions in either an individually segregated account or a client omnibus account. Under both account types, client positions and collateral are separated from the clearing agent's proprietary positions. This protects client collateral from being used to meet a shortfall in a participant's proprietary account in the event of that participant's default. Under the omnibus account structure, however, if another client in the account were to subsequently default, any collateral in the client account could be used to cover losses arising from the client default. By using the standard individually segregated client account structure, client collateral is also protected against fellow customer risk by legally segregating positions and assuring (non-defaulting) clients the value of the collateral they posted.

In September 2015, ASX extended the standard segregated account structure to allow for the individual segregation of cash and securities lodged as excess collateral. For clients that choose to hold their margin under these new arrangements, ASX Clear (Futures) guarantees the transfer or return of the total value of collateral attributed to an individual client account (net of any close-out costs). Previously, excess client collateral could not be attributed to individual clients, which meant that ASX could only guarantee the value of a client's initial margin requirement. For a client that holds an individual account under the new arrangements, ASX Clear (Futures) would transfer or return *equivalent* securities to those that had been attributed to the client if its clearing participant were to default. This is because all client collateral continues to be operationally managed in a single commingled account. These arrangements are consistent with the supplementary interpretation of the FSS and address the recommendations set out in the Bank's 2013/14 Assessment.

While use of individually segregated account structures in ASX Clear (Futures) remains low at present, future growth in the use of individual client accounts would provide ASX Clear (Futures) the added benefit of more direct information on the risks associated with participants clearing large or concentrated positions on behalf of clients. The Bank will continue to discuss ASX's approach to addressing concentration risks associated with tiered participation.

ASX Clear

In November 2015, ASX Clear implemented arrangements that allow excess client cash collateral posted against derivatives positions to be held directly with ASX Clear and attributed to an individual client account.[24] Under these arrangements, ASX Clear would transfer or return to a defaulted participant's client trust account any excess collateral that had been attributed to an individual client account (net of any close-out costs). These arrangements are consistent with the supplementary interpretation of the FSS and address the Bank's 2014/15 recommendations.

Recommendation. ASX Clear and ASX Clear (Futures) are encouraged to review their approach to monitoring concentration risks in tiered participation, including triggers for further investigation and actions, and processes for ongoing review of concentration risk.

24 Previous arrangements already enabled non-cash collateral (including excess collateral) lodged with ASX Clear in respect of derivatives transactions to remain under the beneficial ownership of clients. These arrangements satisfied the Bank's supplementary interpretation of the FSS in respect of non-cash collateral.

3.5.5 Business and investment risks

Investment policy

In accordance with the treasury investment policy endorsed annually by the CS Boards, ASXCC invests cash margin posted by participants, as well as prefunded pooled financial risk resources, in highly rated short-dated assets. The policy establishes counterparty eligibility criteria and sets investment limits to control investment counterparty risk. For a number of years, the Bank has expressed concerns in its Assessments that, notwithstanding limits on both the absolute level and share of exposure to each of the four large domestic banks, the policy still allowed relatively large and concentrated credit exposures to these banks. In response to the Bank's concerns and ASX's own review of its treasury investment policy in 2012/13, it has since gradually lowered the concentration of investments in the major banks and placed greater reliance on government securities and secured investments.

Following continued dialogue with ASX on its treasury investment policy, in the 2014/15 Assessment, the Bank clarified its expectation for the credit and liquidity risk profile of ASX's treasury investments, with an implementation date of end June 2017. In particular, ASX should:

- limit its credit exposures to individual non-government investment counterparties/issuers to the level of capital set aside for non-default or general business risk losses
- ensure that other investments are with government-related obligors or secured by assets issued by government-related or other highly creditworthy obligors, subject to prudent concentration limits
- ensure that the CCPs' minimum liquid resource requirement (under CCP Standard 7.3) is invested in, or secured by, government/semi-government securities or cash, with other investments able to address effectively any additional liquidity shortfalls (e.g. be investments in, or secured by, securities eligible for repo with the Bank).

The timeframe for implementation reflected the time required for an orderly transition to the desired investment profile, including time to develop secured investment arrangements with a broad range of counterparties. In response, ASX has endorsed revisions to its treasury investment policy. The most recent revision, approved by the CS Boards in May 2016, clarifies how ASX intends to meet the Bank's expectations for the credit and liquidity risk profile of its treasury investments.

Under these changes, by end June 2017, over half of the CCPs' investment portfolio will be invested in government or semi-government bonds, or reverse repurchase agreements secured by such bonds. The remainder of the portfolio will be primarily invested in securities issued by authorised deposit-taking institutions (ADIs), or held in deposits with ADIs. Individual unsecured exposures to non-government-related issuers or counterparties will be limited to the level of business risk capital held across the two CCPs (currently $75 million). In the highly unlikely event that investment losses were incurred that exceeded this amount, ASX's enhanced recovery arrangements provide for the allocation of these losses to participants. In April 2016, ASX published guidance for participants on how to calculate their contingent exposure to the allocation of investment losses in excess of the CCPs' business risk capital.

Recommendation. In order to fully observe CCP Standard 15, ASX Clear and ASX Clear (Futures) should implement plans to:

- limit unsecured exposures to individual non-government investment counterparties/issuers to the level of capital set aside for non-participant-default or general business risk losses
- ensure that other investments are with government-related obligors or secured by assets issued by government-related or other highly creditworthy obligors, subject to prudent concentration limits
- ensure that ASX Clear and ASX Clear (Futures)' minimum liquid resource requirement (under CCP Standard 7.3) is invested in, or secured by, government/semi-government securities or cash. Other investments should be able to address effectively any additional liquidity shortfalls (e.g. be investments in, or secured by, securities eligible for repo with the Bank).

Financial results

The continued profitability of the ASX Group provides an important mitigant against general business risk for the ASX CS facilities. ASX Limited's statutory profit after tax for the 2015/16 financial year was $426 million, up 5.7 per cent from the previous year. Total operating revenue grew 6.5 per cent to $746 million over the year, reflecting broad-based revenue growth across ASX's four main business lines. Trading and clearing services across both the cash and derivatives markets accounted for approximately half of revenue growth, driven by higher trading activity across most cash market and derivative products. Operating expenses also increased by 6.5 per cent, primarily due to higher staff costs, equipment and administration costs resulting from the launch of new services, and costs associated with the CEO transition (see Section 3.5.3). Capital expenditure was 13.1 per cent higher at $50.2 million, primarily due to increased investment associated with ASX's technology transformation project (see Section 3.5.7).

Business strategy

ASX manages its strategic business risks at a group-wide level, communicating its business strategy to investors, participants and other stakeholders in accordance with its continuous disclosure obligations as a listed company. The key elements of the ASX strategy are to:

- continue development of new products and services in Australian and New Zealand dollar financial markets and expand the range of products and services to intermediaries and end-investors (see Section 3.5.6)
- provide globally connected financial infrastructure through investment in its technology platforms (see Section 3.5.7)
- deliver an outstanding customer experience.

3.5.6 New products and services

ASX launched, or further developed, several new products and services during the 2015/16 Assessment period.

- *OTC derivatives clearing*. Activity in ASX Clear (Futures)' OTC IRD clearing service continued to grow during 2015/16. At the end of the Assessment period, the notional value of cleared OTC derivatives trades outstanding was $1 600 billion, compared with $441 billion at the end of

June 2015.[25] The OTC service currently offers clearing of AUD-denominated interest rate swaps (IRS) referencing either the bank bill swap rate (BBSW) or the overnight indexed swap rate. ASX is planning, by end 2016, to extend its OTC product scope to include basis swaps referencing the BBSW and the Australian overnight index average rate (AONIA), and introduce longer maturities of BBSW-referenced IRS. ASX also intends to run its first multilateral OTC trade compression run by in early 2017. Although client clearing is available within the OTC service, activity currently remains focused on the inter-dealer market.

- *Deliverable Swap Futures (DSFs).* ASX Clear (Futures) introduced clearing of DSFs in November 2015. DSFs are futures contracts that result in the delivery of an at-the-money OTC IRS at expiry. These contracts allow users to gain exposure to the underlying swap rate, generally with lower collateral and initial margin requirements compared with a standard OTC swap. The futures products transition to OTC products at the point of expiry; participants must therefore either have OTC clearing arrangements established, or close out their positions at least five days prior to expiry. There has not been any activity in these products during the Assessment period.
- *20-year Treasury bond futures*. ASX Clear (Futures) launched a 20-year Australian Treasury bond futures contract in September 2016. Similar to the 3- and 10-year contracts, this contract is cash settled by reference to the average price of a basket of representative bonds, with settlement months in March, June, September and December. Since its launch, activity in this product has grown significantly to 1 600 trades on average each day in the June quarter, but still represents a relatively small proportion of total futures activity.
- *Mini SPI 200 index futures.* ASX introduced mini SPI 200 index futures contracts in October 2015. These contracts provide exposure to the same underlying index as the standard SPI 200 futures contract, but with a smaller notional value ($5 per index point, rather than $25). During the June quarter, activity in this product was around 100 trades on average each day.
- *New wheat contracts.* Also in October, ASX introduced Eastern Australia wheat futures and options contracts. These are essentially identical to the existing NSW wheat futures and options contracts (which will no longer be available to trade beyond a March 2017 futures expiry), but allow delivery to a broader range of ports on the east coast of Australia.
- *Total Return Single Stock (TORESS) Options.* ASX launched exchange-traded TORESS options in November 2015. TORESS options are designed to offer exposures that directly mirror returns on the underlying stock, with a lower upfront investment. In contrast to ordinary ETOs, TORESS options are cash settled upon exercise, and any ordinary dividends on the underlying are adjusted for by a cash transfer between the seller and the buyer of the option. The cash settlement of the dividend amount is intended to simplify the pricing of the options by eliminating dividend pricing risk. Margin requirements are calculated by ASX Clear using the SPAN methodology, allowing for margin offsets between TORESS options and standard ETOs. ASX currently only offers TORESS low exercise price options (LEPOs) on selected ETO classes, although it is also considering introducing TORESS low strike ETOs at a later stage.[26]

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25 These figures represent the notional value of all outstanding novated OTC IRD trades (i.e. the two novated contracts created by the clearing of a bilaterally agreed trade are counted separately).

26 A LEPO is a European-style call option (exercisable only on the expiry date) with a strike price of one cent.

- *Austraclear*. In August 2016, ASX introduced the capability to issue, settle and hold securities denominated in Chinese renminbi (RMB) in Austraclear. The RMB payments leg arising from settlement of these products will be facilitated by Austraclear's Foreign Currency Settlement Service.
- *ASX Collateral.* Use of ASX's centralised collateral management service continued to grow during 2015/16. Around $4.8 billion of collateral was under the management of the ASX Collateral service at the end of the Assessment period. This service automates the optimisation and allocation of collateral, with title remaining and settlement continuing to take place in Austraclear. ASX's focus currently remains on growing use of the service for Austraclear securities. As part of this, ASX has committed to expanding the ASX Collateral service for fixed income securities to provide for a tri-party securities lending service; this extension is expected to be implemented in the coming Assessment period. Once this is implemented, ASX will consider extending the service to allow for the lodgement of equity securities in ASX Settlement and establishing links to global collateral pools.
- *mFund Settlement Service.* Use of the mFund Settlement Service increased over the Assessment period. The service was launched in May 2014 as a means of facilitating payments for managed fund units through multilateral net settlement within the CHESS batch. At the end of June 2016, around 159 funds, with 48 fund managers and 8 brokers, were using the service. The Bank has continued to monitor the composition of the daily CHESS batch to assess any potential for settlement disruption arising from services that expand the use of the batch beyond settlement of novated transactions (and transactions to prime the settlement of novated trades). The Bank has judged that the mFund service does not currently pose significant risks to the batch process, as settlement values from the service remain relatively low; around $120.9 million was settled through the mFund service during 2015/16.
- *Services for unaffiliated market operators.* ASX offers a Trade Acceptance Service (TAS), which allows trades executed on approved market operator (AMO) platforms to be submitted to ASX Clear and ASX Settlement. The TAS had initially only been limited to ASX-listed securities traded on AMO exchanges, including Chi-X. During the Assessment period, the TAS was extended to facilitate the clearing and settlement of non-ASX-listed products. ASX began to clear and settle warrants listed on the Chi-X market in November 2015.

3.5.7 Operations

During the Assessment period, ASX progressed significant changes to a number of its key systems and operational arrangements. The Bank also discussed with ASX its arrangements for managing risks arising from critical service providers and continued its dialogue on ASX's cyber resilience approach.

Technology transformation

ASX is progressing its technology transformation project, which will upgrade all of its major trading and post-trading systems over the next two to four years. The project is intended to rationalise ASX's core technology onto a single services platform, removing interdependencies that currently exist between unrelated systems.

As part of this project, ASX is upgrading its trading, risk management and market monitoring systems. ASX is planning to launch a new derivatives trading platform in February 2017. The upgrade of ASX's risk management system, which is of particular interest to the Bank, is discussed in more detail in

Section 3.5.1. The project will also involve a renewal of ASX's clearing and settlement platforms. As part of this renewal, ASX plans on consolidating its derivatives clearing systems across the two CCPs onto a common platform. ASX has begun the design study for this new system.

Given the significance of the technology transformation project for ASX's critical trading, clearing, settlement and risk management systems, the ASX Limited Board and CS Boards will continue to receive regular status updates throughout the life of the project. ASX's Audit and Risk Committee, together with the executive-level Enterprise Risk Management Committee, oversees the management of operational and strategic risks associated with execution of the project, with internal and external audit carrying out reviews of key elements. ASX's Enterprise Portfolio Steering Committee provides executive-level oversight of project management; this includes determining the prioritisation of resourcing for key project elements.

During the Assessment period, the Bank has received regular detailed updates on the progress of the technology transformation project. These updates have provided an opportunity for the Bank to examine ASX's prioritisation decisions, resourcing challenges, interdependencies with day-to-day business-as-usual processes, and potential change-management issues.

Distributed ledger technology

Another important component of the technology transformation project is the replacement of the CHESS clearing and settlement system. This replacement is an important element of ensuring that ASX's core clearing and settlement infrastructure for cash equities meets international best practice, and that its performance, resilience, security and functionality continue to meet the needs of its users. ASX announced in January 2016 that it had selected a vendor, DAH, to develop a potential CHESS replacement based on a permissioned, private DLT system. As part of the partnership, ASX initially acquired a 5 per cent equity interest in DAH, increasing this to 8.5 per cent in June 2016.

Working with DAH, ASX has developed a working prototype of the DLT system. This prototype will be developed further over the coming 12–18 months, in consultation with stakeholders. ASX intends to make a final decision on whether to implement the replacement system towards the end of 2017. The Bank encourages ASX to continue to invest in the ongoing maintenance and smooth functioning of the CHESS system in the transition to its replacement system, ensuring that it continues to meet the needs of users and that it continues to support stability in the financial system. ASX is also encouraged to invest in appropriate contingency arrangements, to ensure the timely implementation of an alternative CHESS replacement system should the decision be taken not to proceed with the DLT solution.

The governance arrangements that apply to ASX's broader technology transformation project also apply to the DLT project. The Bank has received monthly updates on the DLT project through dedicated 'regulator workshops' involving ASX, DAH and other relevant regulators. These workshops provide an opportunity for the Bank to identify, at an early stage, any regulatory or supervisory issues that might need to be addressed.

Recommendation. ASX Settlement is encouraged to continue to invest in the ongoing maintenance and smooth functioning of the CHESS system in the transition to its replacement system, ensuring that it continues to meet the needs of users and that it continues to support stability in the financial system. ASX is also encouraged to invest in appropriate contingency arrangements, to ensure the timely implementation of an alternative CHESS replacement system should the decision be taken not to proceed with the DLT solution.

Cyber resilience

In light of the growing threat of cyber attacks, the Bank has made cyber resilience a key priority in its supervision of ASX's CS facilities, as well as other FMIs. Consistent with recommendations in its 2014/15 Assessment, the Bank has continued a dialogue with ASX on cyber resilience matters during the Assessment period, in collaboration with ASIC.

Separately, CPMI and IOSCO published guidance on cyber resilience for FMIs in late June (see Box C).[27] Subsequently, the Bank formally adopted this guidance to support its assessments against relevant requirements in the FSS. While most aspects of the guidance apply with immediate effect, the guidance recognises that it may take time for FMIs to meet the expectation that they be able to recover critical operations within two hours following an extreme cyber attack. Consistent with the guidance, the Assessment recommends that ASX develop concrete plans to improve its capabilities to meet this requirement by end June 2017.

An important theme in the guidance is that cyber resilience cannot be achieved by an FMI alone; it is a collective endeavour of the whole 'ecosystem'. This has recently been highlighted by the prominent cyber attacks on members of the Society for Worldwide Interbank Financial Telecommunication's (SWIFT) key messaging network. The guidance requires that an FMI's participation requirements should be designed to ensure that they adequately support its cyber resilience framework. For instance, SWIFT has announced a Customer Security Programme, which includes work to enhance the cyber resilience of its users. In light of these developments, the Assessment recommends that ASX consider developing participant requirements in the area of cyber resilience, liaising as appropriate with the Bank and other relevant authorities.

Recommendation. The CS facilities should review their cyber risk management arrangements in light of CPMI-IOSCO guidance on cyber resilience for FMIs.

As part of this review, the CS facilities should:

- consider developing participant requirements in the area of cyber resilience, liaising as appropriate with the Bank and other relevant authorities
- develop concrete plans to improve their capabilities to meet the two-hour recovery time objective following an extreme cyber attack.

27 CPMI-IOSCO (2016), *Guidance on Cyber Resilience for FMIs* is available at <https://www.bis.org/cpmi/publ/d146.pdf>.

Box C: CPMI-IOSCO Guidance on Cyber Resilience

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 Principles. The guidance is intended to help FMIs enhance their cyber resilience and provide a framework for supervisory dialogue. Key themes of the guidance include:

- board and senior management attention is critical
- the ability to resume operations quickly and safely after a successful cyber attack is paramount
- FMIs should make use of high-quality threat intelligence and rigorous testing
- cyber resilience requires a process of continuous improvements
- cyber resilience cannot be achieved by an FMI alone; it is a collective endeavour of the whole 'ecosystem'.

The guidance comprises of eight chapters. The first five address key risk management categories: governance; identification; protection; detection; and response and recovery. The Guidance also includes three chapters that cover overarching components relevant to an FMI's cyber security framework: testing; situational awareness; and learning and evolving.

The guidance is principles-based. This recognises that measures to mitigate cyber threats would need to continuously evolve given the dynamic nature of the threats. FMIs are also encouraged to adopt a risk-based approach in applying the guidance and it is noted that FMIs will need to implement the guidance consistent with applicable laws and regulations.

Given the systemic importance of FMIs and the increasing risk arising from cyber threats, FMIs are expected to apply the Guidance immediately. CPMI and IOSCO nevertheless recognise that it may take time for FMIs to meet the expectation that they be able to recover critical operations within two hours following an extreme cyber attack. Accordingly, in respect of this particular expectation, the Guidance encourages FMIs to develop, within 12 months, concrete plans to improve their capabilities for timely recovery, rather than immediately to develop such capabilities.

Shorter settlement cycle for cash equities

On 7 March 2016, ASX successfully transitioned from a three-day to a two-day settlement cycle (T+2) for cash equities. This was identified as a key priority by the Business Committee in 2013/14, and mirrors similar moves underway in a number of jurisdictions internationally.

As part of the changes, ASX has extended the cut-off time for submitting instructions to the daily settlement batch from 10.30 am to 11.30 am. This is intended to mitigate the potential impact of a shortened cycle on participant arrangements to process and pre-position securities for settlement. The extension, however, has reduced the time available to complete payment authorisations and address any problems or delays to settlement. Specifically, the time available to ASX to address any implications for batch settlement arising from a participant payment default has been reduced to 90 minutes (from two hours). The Bank has gained comfort that ASX has implemented sufficient measures to mitigate any adverse impact from this reduction. There have not been any material operational issues since the transition, and the settlement fail rate has decreased below historical observations.

ASX kept market participants engaged throughout the transition to the shorter settlement cycle, ensuring that the industry would be ready for the change. As part of this, ASX established a Market Implementation Group to facilitate the exchange of information on implementation progress and issues, which was open to all market participants, system vendors and other interested parties. ASX also hosted a number of workshops with industry bodies (including the Australian Custodial Services Association, the Australian Securities Lending Association, and the Stockbrokers Association of Australia), participants and their system vendors to discuss the relevant business and technical requirements.

Alongside the changes in the cash equities market, the Australian Financial Markets Authority endorsed the transition of settlement conventions for wholesale debt securities to T+2 (including for Australian Government bonds that are also traded on ASX). The New Zealand Stock Exchange also moved to a T+2 settlement cycle for cash equities. Both these transitions took effect on 7 March 2016.

Payment providers

In 2014/15, ASX Clear and ASX Settlement, in cooperation with the Australian Payments Clearing Association (APCA), established a forum for engaging Payment Providers. The APCA standing sub-committee comprises representatives of the Payment Providers, with ASX acting as an 'observer'. The role of the committee is: to consider and provide feedback on proposed amendments to the agreement that governs arrangements with Payment Providers; to facilitate consultation with Payment Providers; and to ensure that Payment Providers are notified of any upcoming developments. The committee met twice during the Assessment period. The issues discussed included the transition to a shorter settlement cycle in the cash equities market and changes to align the ASX Settlement business days with RITS's operating days.

Oversight of critical service providers

Consistent with the 2015/16 regulatory priorities, the Bank met with ASX to discuss how it applied the oversight expectations for critical service providers (CSPs) set out in Annex F of the PFMI and the Bank's guidance to CCP Standard 16.9 and SSF Standard 14.9. To complement Annex F, CPMI and IOSCO released an Assessment Methodology, which provides a framework for considering how to apply Annex F.

ASX has documented its approach to managing risks arising from CSPs. ASX's procedures prescribe that service levels be set for CSPs relating to the operations, resilience and security, and that these service levels must be codified in contractual agreements. ASX's approach includes a process for the regular collection of information from the CSP and evaluation of this information against the agreed service levels. To gather information from CSPs, ASX uses the Annex F Assessment Methodology as a source of questions.

Primary responsibility for managing risks arising from a CSP is assigned to the business area dependent on the provision of the relevant CSP's services. The ASX Limited Board and senior management, nevertheless, have ultimate responsibility for the management of risks arising from CSPs. The review of CSP risks is carried out on a periodic basis, and escalated where appropriate to the Enterprise Risk Management Committee and Audit and Risk Committee.

3.5.8 Participation and access

There were a number of developments during the Assessment period in relation to participation requirements and access.

Enhancements to ASX Clear participant requirements

- *Liquidity risk management requirements.* In light of experiences gained from the BBY default in 2016, ASX Clear consulted on new requirements in respect of participants' liquidity risk management frameworks during the Assessment period. The enhancements, which would be set out in a Guidance Note, would require that participants establish a formal liquidity risk management framework and prepare an annual liquidity plan. Participants would also be required to allocate overall liquidity risk management responsibility to a named individual and maintain robust liquidity-related operational and management reporting processes. The requirements are expected to be implemented in the Q3 2016.

  Participants that are ADIs regulated by Australian Prudential Regulation Authority (APRA) or non-bank subsidiaries of ADIs (subject to ASX's approval) would be exempt from the enhanced requirements if their arrangements are deemed to be adequately covered by an equivalent prudential supervisory framework. All other participants would be expected to carry out a 'gap analysis' that compares their current arrangements with the new requirements. Participants would be expected to comply with the new requirements within six months following the release of the Guidance Note.

- *Minimum core capital requirements.* To better recognise the complexity and breadth of participants' business models, in June 2016, ASX Clear launched a consultation on proposals to enhance the approach to determining minimum core capital requirements.[28] The proposed enhancements would impose add-ons to a participant's existing base capital requirement that reflect its activities in own-account trading, non-ASX business, and short options trading by clients. ASX would apply an additional capital requirement of $2.5 million or $5 million for each of these activities, depending on the level of materiality. Under the new requirements, the minimum amount of core capital required would range from $5 million to $35 million, up from the current range of $5 million to $20 million.

  Participants would be granted an initial transitional period of up to 12 months to meet any increased capital requirements. Subsequently, ASX would expect to review the capital requirements on at least an annual basis, and allow a transitional period of up to six months for participants to meet any subsequent increases.

Recommendation. ASX Clear is encouraged to complete enhancements to participant minimum core capital requirements.

28 'Core capital' is defined by ASX to be the sum of: all paid-up ordinary share capital; all non-cumulative preference shares; all reserves, excluding revaluation reserves; and opening retained profits/losses, adjusted for current year movements.

Wholly remote clearing

In April 2015, ASX Clear (Futures) commenced a pilot scheme for the admission of participants that are incorporated and base their operations offshore. To date, the pilot scheme has been limited to one futures-only participant based in the UK. ASX Clear (Futures) will consider whether to extend the scheme more broadly at the conclusion of the pilot program. Any extension would be limited to a narrow range of jurisdictions with regulatory and legal frameworks that are deemed to be comparable with those in Australia. Participants clearing from offshore would be required to demonstrate that no conflicts of law would arise as a result of their participation.

Facilitated membership

During the Assessment period, ASX began to examine ways of streamlining the process for establishing 'facilitated membership' arrangements for clients. Under a facilitated membership arrangement, a client is able to become a direct member of an ASX CCP while continuing to outsource operational and administrative tasks to another clearing participant. Such an arrangement would allow a client to realise the benefits of direct membership, while avoiding some of the costs of establishing its own operational arrangements. As a direct member, the client would be responsible for its own funding obligations, including margin and default fund contributions. Such arrangements are permitted under ASX's existing rulebook, but have traditionally been implemented on a case-by-case basis. ASX is developing standardised documentation to assist prospective or existing participants wishing to wholly outsource operational and administrative tasks.

3.5.9 Disclosure

In accordance with the Disclosure Framework set out in the CPMI-IOSCO *Principles for Financial Market Infrastructures: Disclosure framework and assessment methodology*, ASX is required to provide comprehensive and detailed disclosures demonstrating how its CS facilities' governance, operations and risk management frameworks meet the requirements of the Principles. ASX published a revised disclosure document in October 2015, in part to reflect the introduction of ASX's enhanced recovery arrangements (see Section 3.5.1).[29] ASX plans to continue updating this document periodically (at least annually) and to further enhance its disclosures as necessary.

ASX is also required to disclose certain quantitative risk and activity data in accordance with the CPMI-IOSCO *Public quantitative disclosure standards for central counterparties*, published in February 2015.[30] In December 2015, consistent with the timeline set by CPMI and IOSCO, ASX began publishing an expanded set of quantitative disclosures for each CCP, consistent with minimum expectations under the framework.[31] These data will be updated on a quarterly basis. The quantitative disclosures span a range of topics related to each CCP's implementation of the Principles. The disclosures are intended to enable participants and other stakeholders to more easily compare CCPs' risk controls, better understand the risks associated with direct or indirect participation in a CCP and with central clearing more broadly, and assess a CCP's systemic importance in relevant jurisdictions. The Bank will continue to monitor steps by ASX to refine and enhance its disclosures.

29 Available at <http://www.asx.com.au/documents/asx-compliance/pfmi-disclosure-framework.pdf>.

30 Available at <http://www.bis.org/cpmi/publ/d125.pdf>.

31 The quantitative disclosures for ASX Clear are available at <http://www.asx.com.au/regulation/regulatory-compliance/asx-clear.htm>, and for ASX Clear (Futures) at <http://www.asx.com.au/regulation/regulatory-compliance/asx-clear-futures.htm>.

4. Special Topic – Default Management

Default management rules and procedures are developed by CCPs and SSFs to ensure that they could continue functioning in the event that a participant failed to meet its obligations, and to minimise the impact of such an event on the market.

In May 2015, ASX employed its default management procedures to address the default of BBY.[32] Overall, the incident was managed without any evident market impact from ASX's default management process, and all costs incurred by ASX in the course of the default covered by margin held. The event nevertheless highlighted several matters related to ASX's default management arrangements that were worthy of further consideration.

Accordingly, ASX initiated a review of experiences gained from the BBY default. The Bank's 2014/15 Assessment of the ASX CS facilities encouraged ASX to complete this review and to enhance its default management arrangements as appropriate. The Assessment also recommended that ASX update its DMF to reflect its new recovery plans, and to integrate the testing and review of the recovery plans into its broader arrangements for testing and review of the DMF. The Bank also undertook to continue monitoring the testing of default management procedures for OTC interest rate derivatives in ASX Clear (Futures).

This Section provides an overview of ASX's default management arrangements and assesses them against each of the sub-standards within the Standard on participant default rules and procedures in the FSS.[33] The facilities are found to have observed all of the relevant requirements of the FSS. The Bank has nonetheless made a number of recommendations outlining further steps required for the facilities to continue to observe these requirements. The Bank has also identified some additional areas in which ASX should address some minor issues or could usefully enhance its default management approach in the spirit of continuous improvement. Many of the recommendations are consistent with ASX's plans to implement further refinements to its DMF. The ratings and recommendations are presented in Tables 9 and 10, and discussed in Section 4.8.

4.1 FSS Requirements

The key FSS requirements on default management arrangements are contained within CCP Standard 12 and SSF Standard 11 (set out in Tables 9 and 10). These requirements cover five main areas, summarised as follows:

- *Rules and procedures.* The ASX CS facilities should have powers under their rules and procedures to manage a participant default while continuing to meet any obligations to surviving participants. ASX should have prompt access to the financial resources and other tools that it

32 The steps taken by ASX to manage the BBY default and the experiences gained from the event are discussed in Section 4 of the Bank's 2014/15 ASX Assessment, available at <http://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2014-2015/>.

33 Default management was previously included as a special topic in the Bank's 2010/11 ASX Assessment.

maintains for meeting losses and mitigating liquidity pressures in an event of default. ASX's default rules and procedures should specify the order in which its financial resources would be used during the management of a participant default, and how these resources would be replenished (CCP Standard 12.1, SSF Standard 11.1).

- *Governance and processes.* ASX's default management plans should specify the roles, obligations and responsibilities of the parties involved in managing a default (CCP Standard 12.1, SSF Standard 11.1), and ensure that these parties are prepared to carry out their roles. This includes ensuring that the relevant parties have the appropriate tools and expertise to close out or otherwise manage the defaulter's positions (CCP Standard 12.2, SSF Standard 11.2).
- *Testing and review.* ASX should review and test its default management plan at least annually, and following any material changes to its rules and procedures or service offering. ASX should include all parties that would be involved in the default management process in the testing of these arrangements (CCP Standard 12.4, SSF Standard 11.4).
- *Public disclosure.* ASX should publicly disclose the key aspects of its default management plans in order to provide certainty and predictability to market participants regarding the actions it may take in a default event (CCP Standard 12.3, SSF Standard 11.3).
- *Market impact.* ASX should take into account the impact of its default management plans on all relevant financial markets (CCP Standard 12.5, SSF Standard 11.5).

4.2 ASX's Default Management Framework

ASX maintains a documented DMF, which provides guidance on the principles and procedures for managing the default of a clearing or settlement participant. The DMF, which includes the ASX Operating Rules and Procedures, is intended to be flexible, rather than prescriptive. It provides ASX with considerable discretion to adapt its response to every individual event of default based on its assessment of the specific facts and circumstances of that event.

4.2.1 Documentation

Each of the ASX CS facilities has powers under its Operating Rules and Procedures to deal with the default of a participant. The formal rules are supplemented by a collection of internal and public documents that also form part of ASX's DMF for the four CS facilities. This includes several documents that ASX has published on its website, which outline the key aspects of the default management approach for ASX Clear, ASX Clear (Futures) and ASX Settlement:

- a high-level overview of the default management process for exchange-traded products in ASX Clear and ASX Clear (Futures)[34]
- the OTC Handbook, which explains the default management process for OTC derivatives[35]
- a client fact sheet that outlines the segregation and portability arrangements in ASX Clear (Futures) and the rights of clients in the event of their clearing participant's default[36]

34 Available at <http://www.asx.com.au/documents/clearing/131001_Default_Management_-_Public_Information_Document_v2.pdf>.
35 Available at <http://www.asx.com.au/documents/rules/asx_otc_handbook.pdf>.
36 Available at <http://www.asx.com.au/documents/clearing/ASXClientClearingClientFactSheet22January2016.pdf>.

- a Guidance Note on the suspension and termination of ASX Settlement participants[37]
- guidelines on default management in ASX Settlement, including use of the back-out algorithm.[38]

In 2015/16, ASX undertook a wide-ranging review of its DMF documentation. The new DMF documents, together with any relevant updates to the existing documentation, are due to be finalised in 2016/17 (see Section 4.7.2).

4.2.2 Roles and responsibilities

Ultimate responsibility for the oversight of risks faced by the ASX CS facilities lies with the CS Boards. In managing a participant default, the Boards delegate decision-making responsibilities to the Managing Director and CEO of ASX. The CEO's responsibilities include authorising the declaration of a default and approving the default management strategy to the extent that any actions taken do not incur losses of more than a pre-specified limit in excess of the defaulter's collateral. Actions that might incur losses beyond this approval limit would require approval from the CS Boards. This limit enables ASX management to respond quickly to a participant incident, while maintaining appropriate Board involvement and oversight of the process.

The DMF also assigns specific responsibilities in managing a participant default across a number of internal and external groups.

- *Default Management Committee (DMC).* The DMC convenes as required to coordinate ASX's response to a clearing participant default. The DMC is chaired by the Chief Risk Officer (CRO) and comprises senior management from ASX's operational, risk management, compliance and legal departments. The DMC's responsibilities include recommending to the CEO whether to declare a default, devising a risk reduction plan and coordinating the implementation of this plan.
- *Participant Incident Response Committee (PIRC).* The PIRC is responsible for monitoring and managing participant incidents across all ASX markets and CS facilities. Meetings of the PIRC are convened as required to address a participant incident. In the event of a potential default involving a clearing participant, the PIRC would escalate the matter to the DMC. The PIRC would continue to manage ASX's response in the event of a settlement-only participant default. The PIRC is chaired by the Group Executive, Operations and comprises a subset of the DMC members; this facilitates the continuity of action when an incident is referred to the DMC.
- *Default Management Group (DMG).* The primary role of the DMG, which is comprised of trading and risk experts from ASX's OTC clearing participants, is to advise the DMC on aspects of the management of an OTC participant default specified in the Operating Rules. Although the DMC is not obliged to follow the DMG's recommendations, it would be required to provide reasons where it did not accept such advice. DMG members are also tasked with periodically convening to test and review the OTC default management process. This includes taking part in regular default management 'fire drills' (see Section 4.6.1). DMG members are required to abide by the DMG Code of Conduct, which seeks to mitigate potential conflicts of interest and duty, and ensure confidentiality and best execution in the default management process.

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37 Available at <http://www.asx.com.au/documents/rules/asx_settlement_guidance_note_05.pdf>.

38 See Section 9 of the ASX Settlement Procedure Guidelines.

- *Default brokers.* ASX's nominated default brokers would execute the close-out and hedging trades in exchange-traded products on behalf of the CCPs. The DMC may also choose to consult with the default brokers when determining the appropriate close-out strategy for a defaulter's portfolio. ASX currently has two default brokers, which are selected based on factors such as market share, creditworthiness and the ability to execute trades on behalf of both CCPs (i.e. authorised participants of the ASX, ASX 24 and Chi-X markets).

The Default Management Steering Group (DMSG) is responsible for identifying potential enhancements to the DMF through regular review and testing, and monitoring the implementation of any enhancements that are approved by the CS Boards.[39] Membership of the DMSG is similar to that of the DMC. The DMSG meets on a regular basis. Specific reviews of the SSF default management documents are carried out by the Settlement Risk Policy Committee on at least an annual basis.

4.3 Establishment of an Event of Default

Each ASX CS facility's Operating Rules set out the circumstances in which it may declare a participant to be in default, or when it may otherwise impose restrictions on a participant's rights and activities. In the case of clearing participants, these include scenarios in which a participant becomes subject to external administration, is unable to fulfil the obligations arising from its open contracts, defaults at another exchange or CS facility, or breaches the CCP's risk-control requirements. An event of default may also arise where the CCP suspects that a participant would not be able to fulfil its obligations or otherwise comply with the CCP's rules. The CCPs' participants are obliged to inform ASX immediately if an event of default has occurred or may reasonably be suspected to occur.

ASX's response to a potential clearing participant default would depend on whether the incident was a financial, operational or other compliance breach. This differentiation appropriately reflects the severity of the breach and potential consequences of declaring an event of default.

- A *financial breach* arises when a participant is unable to meet its existing financial obligations, or there is considerable uncertainty about the participant's ongoing ability to meet such obligations.
- An *operational breach* occurs when a participant has sufficient assets to meet its obligations but is unable to settle these obligations due to a technical or operational failure.
- Other *compliance breaches* may result from a participant's failure to otherwise comply with the CCP's Operating Rules.

Similarly, the ASX Settlement Operating Rules set out a number of events of 'non-compliance' in which ASX may suspend, terminate or impose restrictions on a settlement participant. These events include entry or anticipated entry into external administration, a significant breach of the Operating Rules, failure to comply with other legal or regulatory obligations, and failure or expected failure of a Payment Provider to authorise the participant's net payment obligation. Provisions in the Standard Payment Provider Deed also allow ASX Settlement to suspend a Payment Provider in similar circumstances. The Austraclear Regulations allow ASX to suspend or terminate an Austraclear participant or Participating Bank that has or is likely to become insolvent, or otherwise fails to comply with the Regulations. ASX Settlement participants are obliged to inform ASX immediately if an event

39 Reviews of the SSF default management documents are carried out by the Settlement Risk Policy Committee.

of non-compliance has occurred, while Participating Banks, Austraclear participants and Payment Providers must give notice to ASX if an event of insolvency.

Participant 'incidents' (i.e. any financial, operational or compliance breaches) would generally initially be monitored and managed by the PIRC. If the PIRC determined that an incident involving a clearing participant was likely to lead to an event of default, the incident would be escalated to the DMC; potential defaults of settlement-only participants would continue to be managed by the PIRC.

Declaration of default would never be automatic. Instead, ASX maintains the right to investigate the incident first, taking into account the severity of the breach, the potential consequences of declaring an event of default, and any extenuating circumstances. This allows ASX to consider alternative approaches to handling the incident, such as working with the participant to restore viability or implementing an orderly wind-down plan. ASX may impose conditions on a participant during its investigation; these may include restricting the participant's activity, calling for additional collateral, and/or requesting Directors' Solvency Statements.

Should ASX determine to declare an event of default or otherwise suspend or terminate a participant, it would immediately notify the Bank and ASIC, and a market notice would be issued as soon as possible. In the event of an OTC participant default, ASX Clear (Futures) would convene the relevant DMG. As part of its default management process, ASX would develop a communication plan to ensure that the appropriate information was disclosed to all relevant stakeholders throughout the event.

4.4 Default Management of a Clearing Participant

The CCPs' overarching objective in handling a participant default is to minimise the impact of the event on ASX, its non-defaulting participants and the broader market. The CCPs' Operating Rules and Procedures allow ASX to take a variety of actions to close out or otherwise manage the positions of a defaulted participant, and establish the order in which ASX would use its available financial resources to meet any losses or liquidity pressures arising during the default management process. ASX's internal policies and procedures provide further guidance on each stage of a default, including the identification of a default event and the management of the defaulter's positions.

4.4.1 Management of a defaulted participant's portfolio

Following a declaration of default, ASX may suspend the defaulted participant and restrict its access to trading, clearing, settlement and payment systems. Suspension, rather than termination, ensures that the participant remains bound by the CCP's Rules. With a stable set of positions and collateral, the CCP would proceed rapidly to generate detailed account-level position data as a basis for the close-out process.

Recommendations on the appropriate close-out strategy would be submitted by the DMC to the appropriate delegate(s) for approval. The DMC may have regard to matters such as the composition of the defaulter's portfolio and the client account structure, as well as any legal or operational impediments. The DMC may also consider factors such as market conditions, potential contagion and systemic risk implications, and the impact on the CCP's risk profile and financial standing. ASX's internal policies and procedures provide further guidance on the various alternative methods for managing the CCP's exposures arising from the default, including the feasibility of execution and associated costs and benefits. ASX may also consult with its default brokers and the DMG in determining the appropriate close-out strategy.

Position transfer

Where practicable, ASX would seek to transfer, or port, the defaulted participant's clients to another participant. Porting mitigates the costs and potential market disruption associated with the close-out process, provides continuity of positions to the end client, and may reduce ASX's exposure.

A key determinant of the likelihood of portability is the client account structure. The individually segregated account structure offered to derivatives clients at both CCPs supports portability, since it enables the transfer of individual client accounts on a fully collateralised basis. However, the majority of clients of ASX Clear (Futures)' participants have chosen to continue to clear via an omnibus account, and ASX Clear uses a commingled house and client omnibus account structure for all cash market transactions. Since positions in omnibus accounts are margined on a net basis, a fully collateralised transfer of an individual client's positions would be unlikely.[40] ASX would manage a defaulted participant's omnibus account as a single account – that is, no individual client within an omnibus account would be transferred separately from the others. Since porting requires the consent of the receiving participant and each individual client, the simultaneous transfer of a large number of clients would be challenging.

Even for individually segregated client accounts, however, portability cannot be guaranteed since it relies on clients having established arrangements with alternative clearing participants and the willingness and capacity of those participants to take on the affected clients within a short period. Until the defaulted participant's client positions are ported or closed out, the CCP would remain exposed to market risk. ASX Clear (Futures) has therefore established windows of up to 24 and 48 hours for the porting of individually segregated exchange-traded and OTC derivatives clients, respectively. ASX retains the flexibility to close or extend these porting windows based on market conditions and the likelihood of successful transfers. Although there is no prescribed porting window for ASX Clear, it would be expected to be similarly limited to a one- or two-day period. Given the short porting windows and the impediments to client transfers (see Section 4.7.1), ASX would be unlikely to attempt to transfer clients that did not have prearranged 'back-up' clearing arrangements in place at the time of default. Client positions that could not be transferred within the permitted timeframe would be managed alongside those of the clearing participant.

Management of positions in exchange-traded products

Under their Operating Rules, the ASX CCPs are able to employ a number of methods to manage its exposure from the positions of a defaulted participant and its remaining (i.e. non-ported) clients, and restore a 'matched book'. The primary methods for exchange-traded products include settlement of the defaulted participant's outstanding cash equity transactions, exercise or expiry of contracts, and on- or off-market liquidation.

- *Settlement.* ASX may seek to carry the defaulted participant's unsettled cash equity positions through to settlement. This would be possible only if: the defaulter was a net receiver of funds in the batch or had approved funding in place for its net payment obligation; the securities were available; and the participant had the operational capacity to continue with settlement. In addition to mitigating the potential market impact from liquidation, this approach may reduce

40 In relation to cash market transactions, ASX Clear uses commingled house and client omnibus accounts, which means that house and client positions are therefore not separately identified. In any case, however, a transfer of cash market client positions is unlikely to be feasible due to the short (two-day) settlement cycle.

the disruption caused by altering the net settlement obligations of surviving participants if the defaulted participant were not to proceed with settlement (see Section 4.5.1).

- *Expiry and exercise.* ASX may carry through to expiry positions in out-of-the-money ETOs that have minimal time value. ASX may also choose to exercise particular derivatives positions, although it would have to assess carefully any obligations that this would establish for the CCP and/or the defaulter's clients.
- *Liquidation.* Remaining positions in exchange-traded products would typically be liquidated, or closed out, by entering into equal-but-opposite transactions. This eliminates the CCP's ongoing exposure to market risk on those positions. On-market liquidation trades would be executed by a default broker on behalf of ASX. ASX could also enter into off-market trades, although this would generally be reserved for extreme circumstances since it would require greater assessment of counterparty risk and may lead to greater pricing scrutiny.

Prior to liquidating a defaulter's remaining positions, ASX may obtain a net position in each security or contract by 'matching-out' offsetting positions across all of the defaulter's remaining client and house accounts. Netting down positions allows for faster execution and lower transaction costs, and mitigates the potential market impact arising from the close-out process. ASX has an established process for the allocation of close-out prices where positions have been netted across separate accounts to ensure the equal treatment of clients holding the same positions.

Hedging and auction

ASX Clear (Futures)' preferred approach for managing the default of an OTC derivatives clearing participant is through a process of hedging the defaulter's OTC portfolio (including any portfolio-margined futures), and then auctioning the hedged portfolio to non-defaulting participants. This reflects the structure of the OTC market and the more complex product and risk characteristics of OTC derivatives. The DMG would advise ASX on the OTC default management process and assist ASX in executing the hedging transactions.

Hedging

Following the suspension of a defaulted OTC participant, ASX Clear (Futures) may terminate the open OTC positions of the defaulted participant and its non-ported clients, and immediately move to hedge its exposure. The DMG would develop recommendations for an appropriate hedging strategy, balancing precision against factors such as the speed and cost of execution. Since the hedged portfolio would eventually be auctioned to an OTC participant, hedging instruments are limited to exchange-traded and OTC products cleared by ASX Clear (Futures).

The hedging strategy proposed to the DMC may include details of the recommended hedges and priority of execution, as well as indicative pricing quotes obtained from non-defaulting participants. Following approval from the DMC, the DMG would begin to execute the strategy. The DMC would continue to review the strategy during its execution, and may implement further iterations to the strategy as required. A key objective of hedging is not only to reduce ASX's immediate exposure, but also to promote a successful auction outcome. Since any remaining risk in the portfolio would be assumed by the auction winner, ASX would expect to consider the trade-off between the amount of residual risk in the portfolio and the competitiveness of auction bids that it would be likely to receive.

Ideally, hedging would take place as soon as practicable following a default. Although the DMG is required to convene within two hours of notification by ASX, even this timeframe could impede the rapid neutralisation of risk. ASX is examining the possibility of developing a standing 'hedge recommendation' by the DMG, which would specify a predetermined approach to the macro hedging stage. This would allow ASX to begin executing hedge transactions immediately upon declaration of a default, leaving the DMG to make recommendations on the appropriate micro hedges at a later stage.

Auction

Following execution of the hedging strategy, the DMC would expect to proceed to the auction stage. Since hedging would have reduced much of its exposure, ASX would have some flexibility around the timing of the auction, taking into consideration efficiency and liquidity.

All OTC clearing participants that have positions in the relevant products are required to bid in the auction of a defaulter's portfolio. To incentivise competitive bidding, ASX uses a 'juniorisation' mechanism. This determines the order in which surviving participants' default fund contributions would be applied if default losses exceeded the defaulter's collateral and the first tranche of ASX capital. The order of application is related to the competitiveness of participants' bids.

The chosen auction format would seek to maximise participation, and provide efficiency and predictability for surviving participants. There are several methods for conducting the auction.

- The defaulter's portfolio could be auctioned off in a single pool to the highest bidder, or split into multiple identical units auctioned to several bidders. In the latter case, the degree of juniorisation would be based on the lowest bid submitted by the participant for any unit.
- Alternatively, the defaulter's portfolio could be broken up into separate pools with specific characteristics (such as by currency, product, tenor or trade volume). Each pool could then be auctioned off in a single unit or multiple identical units. The degree of juniorisation would be based on the ranking of bids in each pool, weighted according to the relative risk of each pool.

The DMG can make recommendations to the DMC on the terms of the auction, including the timing, format, and the minimum bid threshold. The DMC is responsible for finalising the auction strategy and, on the day of the auction, examining the bids and determining the auction winner(s). The auction winner would be notified immediately following the end of the auction, and the auction portfolio would be transferred to that participant's account.

In certain circumstances, the DMC may choose to declare that the auction has failed. These include situations in which all submitted bids were below the reserve price set by the DMC, where the highest bid would result in losses beyond ASX's available financial resources, or there was evidence of errors or other irregularities that may have affected the auction result.

Hedging of exchange-traded derivatives exposures

ASX may also choose to hedge a defaulted participant's positions in exchange-traded products in order to reduce its exposure to market volatility during the close-out period, or where it may be unable to close out the risk of that portfolio in a reasonable timeframe. Since hedging imposes additional obligations on the CCP, an exit strategy from both the existing positions and the hedge transactions would need to be determined as part of the formulation of the hedging strategy.

Termination

In the event that the CCP could not manage its exposures arising from the default using the standard processes listed above, ASX's recovery arrangements would allow the CCP to restore a matched book through a process of partial termination of positions held by non-defaulting participants in the relevant products or contracts (on a pro rata basis to the extent practicable). As a last resort, ASX would have the power to restore its matched book through complete termination of all open contracts.[41]

4.4.2 Use of financial resources

While managing an event of default, a CCP must continue to meet its payment obligations to surviving participants. This requires having reliable access to the financial resources and tools it maintains to meet any liquidity exposures and close-out losses that may arise in such an event.

ASX would allocate any losses it incurred while managing the default of a clearing participant to the CCP's default waterfall. In the first instance, ASX would meet losses or obligations arising from the default using collateral lodged by the defaulted participant. Losses incurred on a client account may be covered by that client's collateral; where the client's collateral was insufficient to meet losses on its account, the participant's collateral would be used to cover the shortfall.

The DMC would provide recommendations on an appropriate strategy for the realisation of non-cash and foreign currency collateral. Although non-cash collateral would typically be liquidated after the losses on individual accounts had been quantified, ASX retains the discretion to liquidate collateral at any stage in the default management process, taking into account factors such as forecast cash requirements and the market risk of the non-cash collateral pool.

In the event that the collateral lodged by the defaulted participant, including its contribution to the default fund, was insufficient to cover the losses stemming from the default, the CCP could draw upon the remainder of its prefunded pooled financial resources (see Section 3.3.3 and Appendices A1.1 and A1.2, CCP Standard 4.4). In the event that these prefunded resources were exhausted, each CCP would have the power to allocate any further losses to non-defaulting participants via its recovery tools (see Section 3.3.6 and Appendices A1.1 and A1.2, CCP Standards 4.8 and 7.9).[42] These tools include Recovery Assessments and, for ASX Clear (Futures), the haircutting of outgoing payment obligations to participants. As a last resort, the CCPs could also allocate losses by reducing settlement payments in the context of complete termination of all open contracts. In 2015/16, ASX implemented an enhanced approach for replenishing the CCP default funds in the event that these were drawn upon during the management of a participant default (see Box A).

Prior to completion of the default management process, any losses resulting from the liquidation of the defaulted participant's positions – including any hedging, auction or other execution costs – would need to be allocated to the appropriate accounts of the defaulted participant at the CCP.[43] Losses incurred on a client account may be covered by that client's collateral; where the client's collateral was insufficient to meet losses on its account, the participant's collateral would be used to cover the shortfall. ASX would provide a detailed financial reconciliation of the liquidation process to the defaulting participant or its external administrator. Following completion of the default management

41 For further information on ASX's recovery tools, see Section 6 of the 2014/15 ASX Assessment.

42 In October 2015, ASX implemented enhanced recovery plans, which include tools to fully address any uncovered credit losses and replenish financial resources following a participant default, as well as arrangements to meet any liquidity shortfall. See Section 6 of the 2014/15 ASX Assessment.

43 The defaulting participant (or its external administrator) would use this information as one of the inputs to the process of closing the positions of clients on the participant's books. This is a separate process which is outside the scope of ASX's default management process.

process, ASX would initiate a formal review of the actions taken during the default management process.

4.5 Default Management of a Settlement Participant

ASX's approach to managing the default of an ASX Settlement or Austraclear participant would be guided by the Settlement Default Management Policy and associated standards and procedures. An event of default of a settlement participant that is also a clearing participant would be managed under the clearing participant default management framework (as described in Section 4.4).

Under the Settlement Default Management Policy, a key objective for ASX in managing a participant default is to minimise disruption to the stability and efficiency of the settlement process. ASX Settlement and Austraclear are not exposed as principals to risks in the settlement process and would not be required to meet any obligations on behalf of a defaulted participant in the SSF. Many of the actions taken by the SSFs to manage a participant default are therefore largely procedural in nature. Such a default could, however, affect other ASX participants that relied on the defaulter to effect payments or settlements as an agent on their behalf. In managing a default, the ASX SSFs must therefore take into account the potential impact of any known interdependencies between the defaulter and other ASX participants.

4.5.1 Suspension and termination

If a SSF participant experienced an event of default or non-compliance, ASX would have the discretion to suspend, terminate or restrict the participant's access to the relevant settlement system. This power applies to settlement participants in both SSFs, as well as Payment Providers and Participating Banks. A suspended participant would no longer be able to settle transactions through the relevant facility, and ASX may cancel any of its outstanding non-novated instructions scheduled for settlement. Following termination, all access to the SSF would be removed. Neither suspension nor termination would affect the participant's outstanding obligations to the ASX CS facilities.

Effect on securities holdings

A suspended or terminated ASX Settlement participant is unable to effect transfers of any securities holdings on the CHESS sub-register, including those of its sponsored clients, unless permitted by ASX. In the event of termination, ASX Settlement would remove all of the participant's sponsored securities holdings from its control. In order to allow clients to access their securities, ASX may either transfer their holder identification numbers (HINs) to an alternative settlement participant or convert their securities holdings to issuer-sponsored.[44] The Operating Rules lay out the process for notifying the defaulted participant's clients of these options.

In the case of a suspended ASX Settlement participant, clients may submit a request to ASX to have their CHESS holdings either converted or transferred to another participant. In the absence of any instructions from the client, and after giving sufficient notice, ASX Settlement may convert the holdings to issuer-sponsored.

Under the Austraclear Regulations, a suspended or terminated Austraclear participant must immediately withdraw its securities from the SSF and make alternative holding arrangements.

44 A client's HIN identifies their holdings of securities in CHESS.

4.5.2 ASX Settlement default management process

ASX Settlement performs its cash and securities settlements in a daily multilateral net batch. If a participant was unable to settle its scheduled obligations, including in the event that it was suspended from the SSF, ASX Settlement could remove some or all of that participant's settlement instructions from the daily batch using its 'back-out algorithm'. If the failed instructions related to a shortfall of funds, the algorithm would remove instructions from the batch that reduced the participant's payment obligations to zero or a small receipt. Failed instructions arising from a securities shortfall would be rescheduled for settlement on the next settlement day. The back-out process is outlined in ASX Settlement's Operating Rules and Procedures.

The back-out algorithm is an important tool used in the management of ASX Clear participant defaults. In the event that the defaulted participant had a net payment obligation, ASX Clear would first consider injecting liquidity to ensure the settlement of novated trades. If it was not possible or prudent to rely solely on available liquid resources, ASX would use the back-out algorithm to identify instructions to be settled by means of OTAs with participants that were due to deliver securities.[45]

The back-out algorithm removes settlement instructions according to a predefined set of rules, which are designed to avoid increasing other participants' net payment obligations, minimise spillovers to other participants, and maximise settlement values and volumes. Non-novated instructions would typically be backed out first. Hence, while ASX Settlement is not exposed to financial risk from a participant default, the use of the back-out algorithm to reconstitute the batch prior to settlement could alter the obligations of surviving participants. Notwithstanding that the algorithm aims to minimise flow-on effects, the use of OTAs may also impose liquidity pressures on surviving participants.

Further interdependencies may arise in the event of default of a Payment Provider. Commercial bank Payment Providers are used by ASX Settlement participants to effect money settlements on their behalf. If an ASX Settlement participant's Payment Provider was suspended, the participant would be unable to settle its payment obligations until it had established arrangements with a new Payment Provider. Since this would constitute an event of default, ASX may also suspend the settlement participant, at least until new payment arrangements were in place.

4.5.3 Austraclear default management process

The settlement of transactions in Austraclear is on a real-time gross basis. The majority of Austraclear transactions involve the simultaneous transfer of cash and securities between the buyer and seller on a trade-by-trade basis. Austraclear can also be used to settle individual payments or deliver securities free of payment. This settlement model ensures that unintended credit risks do not accumulate between participants during the settlement process. Furthermore, Austraclear does not extend credit to participants or provide a settlement guarantee. Accordingly, Austraclear is not exposed to financial obligations arising from the default of a settlement participant.

Since transactions are settled individually, suspension of an Austraclear participant would not prevent other Austraclear participants' transactions from settling. In the event of a default, Austraclear has

45 ASX Clear can address a liquidity shortfall in the settlement batch via the use of OTAs with participants due to receive funds. Under the OTA, ASX Clear would re-deliver the stock to the relevant non-defaulting participant in return for an amount equal to ASX Clear's payment obligation to that participant. ASX Clear would agree to repurchase the stock the next business day.

the ability to suspend a participant, which would prevent any further transactions from settling. The actions involved in suspending a participant would be taken by the relevant business units.

The default of a Participating Bank in Austraclear, however, could have flow-on effects for other ASX participants. Austraclear participants that are not eligible to hold an Exchange Settlement Account (ESA) at the Bank may nominate a Participating Bank to act as an agent for money settlements on their behalf. In the event that an Austraclear participant's Participating Bank was suspended, that participant may also be suspended until it could establish alternative payment arrangements. If a clearing participant had been using the suspended Austraclear participant as an agent for making margin payments to the ASX CCPs, this suspension could in turn trigger an operational default of that clearing participant (which would be dealt with separately by the DMC).

4.6 Testing and Review

ASX has a testing program in place and reviews the effectiveness and appropriateness of its default management procedures. Responsibility for testing, reviewing and updating the DMF for the CCPs lies with the DMSG and with the Settlement Risk Policy Committee for the SSFs. Formal reviews are carried out at least annually and following any material changes to ASX's rules, procedures or service offering. The primary method of testing the DMF for the CCPs is through regular in-house default management fire drills. ASX may also identify potential enhancements to the DMF through feedback from ASX participants and the Risk Consultative Committees, as well as through experiences gained from actual default events. Changes to the DMF are submitted to the CS Boards for approval.

In recent years, the DMF has been updated on several occasions:

- in 2011/12, to incorporate experience gained from the default of MF Global
- during 2012/13, in anticipation of the launch of the OTC derivatives clearing service
- in 2014, to account for the implementation of OTAs in ASX Clear, new client segregation arrangements and the juniorisation mechanism
- in 2016, to reflect ASX's new recovery planning arrangements, the experiences gained from the BBY default, and learnings from the 2016 fire drills.

A further update is expected in due course to reflect the introduction of the proposed special resolution regime for FMIs.

4.6.1 Fire drills

ASX conducts regular fire drills to test the effectiveness of its default management arrangements and identify areas in which the DMF should be refined. The drills aim to ensure that the relevant ASX personnel, as well as external stakeholders who would be involved in the event of an actual default, are familiar with the default management process and prepared to carry out any discretionary procedures. To date, fire drills for the OTC derivatives clearing service have focused on the role of the DMG, with each OTC participant directly involved in the simulations of the hedging and auction stages. This year's fire drills also tested the decision-making of the DMC based on the advice of the DMG. In contrast, fire drills for exchange-traded products consider only the role of the DMC, without any direct involvement of participants. ASX nevertheless seeks to verify the compatibility of its default brokers' systems by sending a sample order file that would be used to execute close-out trades to each broker following the fire drill.

Fire drills are conducted on an annual basis for each of ASX's major clearing services. ASX discusses the results of the fire drills and any recommended enhancements with its Risk Consultative Committees and the Bank. Among recent enhancements, ASX has completed work to provide DMG members with access to additional reporting and system functionality and to improve the clarity of the auction process. ASX is also working with the DMG to develop a predetermined macro hedging strategy that could be initiated immediately upon the declaration of an OTC participant default.

ASX expects to continue increasing the complexity and diversity of its fire drill scenarios, building up a library of scenarios that test different aspects of the default process. The 2015/16 fire drill for exchange-traded products, for example, was used to test ASX's new recovery arrangements; this was consistent with the Bank's 2014/15 recommendation that ASX integrate the testing and review of its recovery plan into its broader framework for the testing and review of the DMF.

4.6.2 Actual defaults and participant incidents

ASX's default management arrangements have recently been tested in the context of the defaults of BBY in May 2015 and MF Global in November 2011. In accordance with its review policy, ASX undertook assessments of the experiences gained from each of these events, and has subsequently implemented a number of enhancements to the DMF. A number of other participant incidents in recent years have also tested the ASX Settlement and Austraclear default management procedures.

BBY Limited default

In May 2015, ASX Clear employed its default management procedures in response to the appointment of an external administrator to BBY.[46] BBY's entry into administration occurred two weeks after BBY missed the deadline for an AIM call. This 'early warning' gave ASX time to work with BBY to start managing down its clearing business. By the time the default was called, BBY had closed out or transferred client positions representing around a third of its derivatives exposures.

ASX managed the default through a combination of client transfers (where these had already been sufficiently advanced prior to the declaration of default) and the close out or expiry of remaining derivatives positions. Unsettled cash equity positions were closed out since BBY's administrators did not consent to ASX carrying these positions through to settlement.

Upon notification of the appointment of external administrators to BBY, Austraclear placed restrictions on and subsequently suspended BBY's participant status in the SSF. Following discussions with BBY's administrators, ASX initially placed restrictions on BBY's access to ASX Settlement rather than suspending BBY as a participant. This allowed BBY's administrators to process within CHESS client instructions for securities holdings to be transferred to alternative participants or converted to issuer-sponsored holdings, while prohibiting BBY from participating in the settlement process. ASX Settlement ultimately suspended BBY six weeks later.

Overall, the incident was managed without any evident market impact from ASX's default management process, and all costs incurred by ASX in the course of the default covered by margin held. ASX nevertheless identified a number of experiences gained from the event, including in relation to both its risk and default management processes. ASX has begun to implement enhancements to its DMF accordingly (see Section 4.7.1).

46 ASX's management of the BBY default is discussed in Section 4 of the Bank's 2014/15 ASX Assessment.

MF Global default

In November 2011, ASX managed the defaults of three MF Global subsidiaries, which entered into external administration following the default of their parent company.[47] In light of widespread concerns about the financial viability of MF Global in the week leading up to the default, ASX imposed conditions on the subsidiaries that participated in its CCPs. Some MF Global clients also began to move their positions to other participants.

MF Global UK, an ASX Clear (Futures) participant, was the only subsidiary with open positions at either CCP at the time of the default. Although ASX was quickly able to close out the broker's outstanding equity and interest rate derivatives positions, MF Global held a dominant share of the open interest in ASX grains and wool futures. ASX suspended trade in these futures products on the day of default to prevent a disorderly market, and subsequently closed out the positions over the course of the following week. All of the losses incurred by ASX in the close-out process were covered by initial margin held. On the day of default, ASX also suspended MF Global's participant status in ASX Settlement and Austraclear.

This was the first clearing participant default faced by the ASX CCPs. One of the key issues highlighted by the event was the complexity of client portability and the various impediments to this process. ASX has since reviewed the circumstances under which it would attempt to port a defaulted participant's clients and made a number of enhancements to its segregation and portability arrangements.

Other participant incidents

There have also been a number of other participant incidents in recent years that have tested the default management arrangements of ASX Settlement and Austraclear.

- On 29 January 2008, Tricom Equities Limited (Tricom), an ASX Clear and ASX Settlement participant, failed to meet its payment obligation into the CHESS batch. ASX Settlement used the back-out algorithm to recalculate the batch, removing a number of off-market transactions under which Tricom was due to receive securities. This left Tricom a small net receiver of funds. A similar issue arose on the following day, although Tricom's Payment Provider ultimately agreed to fund the position.

  Based on the circumstances of the incident, ASX had decided not to declare an event of default. Instead, ASX imposed conditions on Tricom's participation in ASX Clear and ASX Settlement, and worked with the participant to restructure its operations and management. Tricom was also required to commission an independent review of its internal compliance and risk controls, and implement any recommended enhancements. While ASX also imposed a fine on Tricom, it noted that no clients or third parties were adversely affected by the event except the counterparties to the failed settlements in the batch.

- Austraclear has suspended and terminated a number of participants in recent years, either where the participant had experienced an insolvency event or otherwise failed to meet its obligations as a participant. Austraclear has, on occasion, delayed suspension of a participant that had entered external administration, where the administrators were willing to continue meeting that participant's obligations.

47 ASX's management of the MF Global default is discussed in Box B of the Bank's 2011/12 ASX Assessment, available at <http://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2011-2012/>.

4.7 Planned Developments

Reflecting the experiences gained from the fire drills and events of default over recent years, ASX has continued to refine its DMF, and has identified a number of areas in which it plans to make further enhancements. The key planned developments include examining potential improvements to the porting and close-out processes, enhancing the DMF documentation and participant education, and developing additional default management capabilities within its new risk management systems.

4.7.1 Effectiveness of the default management processes

Effectiveness of portability arrangements

The BBY and MF Global experiences demonstrated that the transfer of a client's positions, HINs and collateral could take around 2–3 weeks to arrange. The main impediments to porting are the time required for receiving participants to complete both the regulatory due diligence (i.e. 'know your customer') requirements and their own assessment of the client's financial risk, as well as the considerable manual processing and documentation involved. Porting a defaulted participant's clients may therefore not be possible if transfer arrangements had not already been pre-positioned prior to the default. Although many institutional ETO clients already have back-up clearing arrangements, the cost of maintaining client accounts limits the availability of such services for retail clients. Furthermore, even where a client has established back-up clearing arrangements, the back-up participant may be unwilling or unable to take on the positions in the specific circumstances. Another issue that may arise is an absence of suitable transferee participants.

Accordingly, ASX has begun to consider how transfer arrangements could be enhanced to assist in the efficient porting of clients in an event of default. This includes examining ways to improve the operational efficiency of the portability process. ASX also plans to examine how the CHESS replacement system and the new Customer Portal could be used to facilitate portability.

Operational efficiencies

The BBY default highlighted some of the operational difficulties that can arise in the default management process, particularly where there are a large number of individual accounts or ETO positions that need to be closed out. While default brokers are able to close out many futures and cash equity positions via algorithmic trading strategies, ETO positions are generally closed out manually. In light of the BBY experience, ASX has indicated that it would be likely to use both of its default brokers to expedite the close-out process. ASX also plans to appoint a third default broker for the major markets that it clears to provide extra protection against the risk that one of the default brokers was itself the defaulting participant. ASX is also examining the possibility of auctioning large or complex ETO portfolios, particularly where a portfolio might otherwise take an unreasonably long time to close out.

ASX is also examining ways in which its new risk management system could be used to facilitate, and mitigate risks arising in, its default management processes, as well as considering developing guidelines for the treatment of specific cover positions for incorporation into the DMF.[48]

48 ASX Clear participants are able to lodge stocks as 'specific cover' collateral for call options written on that stock. All other collateral (including cash and eligible securities) posted by the participant to cover its margin requirement is treated as 'general cover'.

Legal impediments

The two ASX participant defaults have drawn attention to the legal restrictions on dealing with the assets and liabilities of an entity under external administration. These restrictions could limit the options available to ASX in managing a participant default. There was also a concern that the PSNA, which protects the finality of cash equity settlements in ASX Settlement (see Appendix A2.1, SSF Standard 1.2), did not extend to the settlement of outstanding obligations by a participant under administration. Without the consent of the participant's administrator, such settlements could potentially therefore have been challenged and unwound, which would have been highly disruptive to the market.

In order to mitigate such legal risks, ASX proposed that the PSNA be amended to provide CS facilities that operate approved netting arrangements, such as ASX Settlement, with the legal basis to proceed with the settlement of outstanding netted obligations by a participant under external administration without the administrator's consent. This proposal was taken forward by the government as part of the Resilience Act, which was passed by Parliament in May 2016. ASX is also considering engagement with professional associations to educate insolvency practitioners about the default management processes of CCPs and SSFs, in an attempt to assist their decision-making on such matters in the event of a participant default.

4.7.2 Revision of DMF documentation

In 2015/16, ASX undertook a wide-ranging review of the DMF documentation related to its CCPs. The review was intended to enhance the accessibility of the DMF and align it with ASX's broader risk management framework, taking into account ASX's new suite of recovery tools and learnings from the BBY default and recent fire drills. The new and updated documents are due to be finalised in 2016/17, following the incorporation of any learnings from the 2016 fire drills and approval by the CS Boards.

ASX also carried out its annual review of the SSFs' overarching Default Management Policy and Standards in early 2016. ASX has indicated its intention to carry out further work on updating the SSF default management procedures documentation and enhancing its public disclosures on the SSF default management process during the coming Assessment period. This will include publishing a Guidance Note on the suspension and termination of an Austraclear participant.

4.7.3 Participant education and disclosures

As part of its broader review of the DMF, ASX is enhancing its published information on default management. The BBY default highlighted the potential benefit of increasing clients' awareness of both their exposure to their clearing participant and the actions that could be taken by ASX in the event of that participant's default. Greater awareness could support default management processes, since certain actions may require client consent (including the transfer of positions and collateral to another participant). Accordingly, ASX plans to update and expand the suite of disclosures published on its website. ASX has also launched a public education initiative, which is aimed at promoting a deeper understanding among market participants about the role of the CCPs and their risk and default management arrangements. Consistent with recommendations in the Bank's 2014/15 Assessment, ASX has also developed participant disclosures on the potential liquidity impact from the use of OTAs and the back-out algorithm (see Section 3.5.1).

4.7.4 New risk management system

In 2014/15, ASX commenced the development of a new risk management system (see Section 3.5.1). The first phase of this project centred on facilitating the OTC default management process; this functionality was implemented in October 2015. The new system is able to provide ASX with near real-time information on the defaulter's outstanding exposures, track profits and losses, perform 'what-if' analysis, and recommend hedging transactions. The system also automates the auction process and facilitates the tracking and reporting of actions taken throughout the default management process. The new system was used to support ASX's OTC default management fire drill in July. A future phase of the project will deliver enhanced default management capabilities for cash equities and exchange-traded derivatives.

The system's functionality will continue to be developed over time, integrating learnings from upcoming fire drills and other enhancements identified by the DMSG. As part of this project, ASX is also developing an enhanced reporting system. This is expected to assist ASX's close-out process by enabling the identification of option strategies and the use of specific cover within individual portfolios.

4.8 Conclusions and Recommendations

ASX has a well-established framework for managing the default of a participant, which it has continued to enhance over recent years through its testing and review process. The Bank's assessment is that the facilities have observed all of the relevant requirements in the FSS. The Bank has nonetheless made a number of recommendations outlining steps required for the facilities to continue to observe these requirements. The Bank has also identified some additional areas in which ASX could usefully enhance its default management approach in the spirit of continuous improvement.

Many of the Bank's recommendations are consistent with ASX's plans to implement further enhancements to its DMF, and ASX has already undertaken to carry out work in a number of these areas. The Bank therefore expects ASX's DMF to continue to evolve over the coming period, largely to incorporate the refinements identified during ASX's review of experiences gained from the BBY default. The key conclusions drawn by the Bank in performing its assessment are set out below.

- *Rules and procedures.* ASX's DMF documentation for its CCPs provides clear and comprehensive guidance on the CCPs' default management arrangements. In order to ensure that this guidance remains effective, ASX is encouraged to complete its review of the DMF documentation and finalise the planned revisions to the relevant documents.

  ASX should carry out further work to enhance its SSF default procedures in order to ensure an effective response in an event of default. At a minimum, these documents could usefully elaborate on any discretionary decisions that the SSF can make and the factors that need to be considered in making these decisions, such as known interdependencies with other ASX CS facilities and market participants. Furthermore, the SSF procedures documents should be reviewed on a regular basis to ensure that they remain practical and appropriate.

- *Governance and processes.* ASX has practical and effective rules and procedures for managing the default of a participant. Consistent with recommendations in the Bank's 2014/15 Assessment, ASX has carried out a comprehensive review of experiences gained from the BBY default and set out a plan for further refining its default management processes accordingly. The

Bank encourages ASX to implement these refinements, and to continue seeking ways of enhancing the effectiveness of the DMF through its ongoing testing and review process.

The Bank also encourages ASX to continue examining ways in which its new risk management system could be used to facilitate, and mitigate any risks arising in, the default management process. This system functionality should continue to be developed over time as further enhancements are identified by the DMSG. Until the new risk system is developed, there may also be some benefit in exploring further options for improving the effectiveness of the default management process within ASX's existing systems.

Relatedly, ASX should ensure that any default management procedures (along the lines of the back-out algorithm) built into its new system for clearing and settlement of cash equities are clearly documented, and that the effectiveness of these procedures can be tested and reviewed on an ongoing basis.

- *Testing and review.* ASX has appropriate processes and governance in place for the ongoing testing and review of its DMF. ASX has continued to enhance this testing and review framework, with further plans to increase the complexity and scope of its default management fire drills over the coming years. As part of its future refinements, ASX should extend the participation in its default management fire drills to involve all relevant internal and external stakeholders. This will aim to ensure that all relevant stakeholders are familiar with the default management processes, and allow ASX to test the interaction between the different stakeholders. In particular, the Bank recommends that:

  – ASX seek more substantial feedback from its default brokers during the fire drills for exchange-traded products; at a minimum, ASX should engage with its default brokers on an appropriate close-out strategy for the hypothetical defaulter's portfolio and ensure that there are no impediments to the default brokers' ability to carry out its responsibilities

  – ASX involve its Risk Consultative Committees and all other clearing participants in fire drills that test ASX's recovery arrangements; in particular, ASX should test its participants' capacity to receive instructions or notifications regarding the use of recovery tools and carry out any necessary internal processes to receive approval for meeting their obligations

  – ASX test the interaction between the DMC and the DMG in its OTC fire drills, and between the DMC and the PIRC in fire drills that simulate the default of a clearing and settlement participant.

  As part of the fire drills, ASX should also ensure that it gives due consideration to the known interdependencies between market participants and linked FMI. In particular, where the fire drill scenario involves the default of an SSF participant, ASX should explicitly consider the potential implications of the default of for any dependent participants or linked FMI.

- *Public disclosure.* The information disclosed by the ASX CCPs is sufficient to provide guidance to the market about the actions that ASX may take in an event of default. ASX is nevertheless encouraged to continue promoting participants' understanding of its DMF by completing its review of participant disclosures and carrying out its plans to enhance public education on this matter.

  The ASX SSFs should carry out further work to meet the minimum required standard of disclosures that promote participants' understanding of their default rules and procedures. At a minimum, ASX should release its planned Guidance Note on the suspension and termination of Austraclear participants, and develop an information note that provides an overview of the back-out algorithm and the potential flow-on effects of a settlement participant or Payment Provider default on other market participants. ASX should ensure that all disclosures related to its default management arrangements are easily accessible.

- *Market impact.* The overarching objective of ASX's default management arrangements is to minimise the impact of a participant default on ASX, its participants and the broader market. As part of its default management fire drills, ASX should nevertheless validate its expectation that its default management arrangements take appropriate account of stability interests in other jurisdictions in which it has material activity, most notably in New Zealand.

Tables 9 and 10 summarise the Bank's assessment of the ASX CCPs and SSFs, respectively, against the specific sub-standards of the FSS that address matters related to default management, applying the rating system described in Section 2.2. Tables 9 and 10 include the Bank's recommendations and identify areas in which the Bank will continue to monitor developments during the 2016/17 Assessment period.

Table 9: Ratings and Recommendations on Standards Related to Default Management for ASX Clear and ASX Clear (Futures)

CCP Standard 12: Participant default rules and procedures

Overall rating: Observed

Standard	Rating	Recommendation
CCP Standard 12.1. Rules and procedures for managing a participant default. A CCP should have default rules and procedures that enable the CCP to continue to meet its obligations in the event of a participant default and that address the replenishment of resources following a default. A CCP should ensure that financial and other obligations created for non-defaulting participants in the event of a participant default are proportional to the scale and nature of individual participants' activities.	Observed	ASX is encouraged to complete its review of the DMF and finalise planned enhancements to the relevant documents.
CCP Standard 12.2. Implementation of default management plans. A CCP should be well prepared to implement its default rules and procedures, including any appropriate discretionary procedures provided for in its rules…	Observed	ASX is encouraged to implement its plans for enhancing the effectiveness of its default management arrangements, including improvements to portability and the close-out process for ETOs, and finalise its policy on dealing with 'specific cover' exposures. ASX is encouraged to continue examining ways in which its new risk management system could be used to facilitate, and mitigate risks arising in, the default management process. ASX is encouraged to continue developing the system functionality over time, integrating learnings from fire drills and other enhancements identified by the DMSG. In the meantime, ASX is encouraged to continue to explore options to improve the effectiveness of the default management process within its existing systems. ASX is encouraged to carry out plans to sign on an additional default broker for the ASX, ASX 24 and Chi-X markets.
CCP Standard 12.3. Disclosure of default management processes. A CCP should publicly disclose key aspects of its default rules and procedures.	Observed	ASX is encouraged to carry out its plans to enhance participant and client education and communication regarding its default management arrangements. As part of this, ASX is encouraged to complete its planned updates of existing participant disclosures on the key aspects of its default management arrangements, including the development of an ASX Clear Client Fact Sheet. Any disclosures should be easily accessible, preferably in a centralised location.

Standard	Rating	Recommendation
CCP Standard 12.4. Testing and review of default management processes. A CCP should involve its participants and other stakeholders in the testing and review of the CCP's default procedures, including any close-out procedures. Such testing and review should be conducted at least annually and following material changes to the rules and procedures to ensure that they are practical and effective.	Observed	ASX should continue enhancing its approach to the testing and review of its default management arrangements. Such enhancements should include increasing the complexity and scope of its default management fire drills. ASX should also ensure that these fire drills involve all relevant internal and external stakeholders and committees, and test the interaction between all relevant stakeholders. ASX should more prominently involve its default brokers in the testing of default management arrangements for exchange-traded products. On an annual basis, ASX should engage with its default brokers on their proposed method for closing out the hypothetical portfolio used in the fire drill, including expected close-out prices and timeframes. ASX should also involve the Risk Consultative Committees and other clearing participants in future default management fire drills that test ASX's recovery arrangements. As part of its annual review of the DMF, ASX should assess the potential implications of any changes to the resolution regimes that govern its participants. This includes the resolution regimes of any offshore-based participants. ASX should also review its DMF in light of the proposed establishment of a special resolution regime for FMIs in Australia, once the regime has been finalised.
CCP Standard 12.5. Market impact of default management plans. A CCP should demonstrate that its default management procedures take appropriate account of interests in relevant jurisdictions and, in particular, any implications for pricing, liquidity and stability in relevant financial markets.	Observed	ASX should validate through its testing and review processes its expectation that its default management arrangements take appropriate account of stability interests in other jurisdictions in which it has material activity, most notably in New Zealand.

Table 10: Ratings and Recommendations on Standards Related to Default Management for ASX Settlement and Austraclear

SSF Standard 11: Participant default rules and procedures

Overall rating: Observed

Standard	Rating	Recommendation
SSF Standard 11.1. Rules and procedures for managing a participant default. An SSF should have default rules and procedures that enable the SSF to continue to meet its obligations in the event of a participant default and that address the replenishment of resources following a default. An SSF should ensure that financial and other obligations created for non-defaulting participants in the event of a participant default are proportional to the scale and nature of individual participants' activities.	Observed	ASX is encouraged to complete its review of the DMF and finalise planned enhancements to the relevant documents, including the SSF default procedures documents. In order to continue to observe SSF Standard 11, ASX should carry out further work to enhance the DMF documentation for its SSFs, including the documents that set out the specific procedures to be followed in the event of default of an Austraclear participant, ASX Settlement participant, Participating Bank, or Payment Provider. In particular, these documents should provide guidance on the discretionary decisions that may need to be taken by the PIRC and other relevant parties, including elaborating on relevant factors for consideration in making these decisions. ASX should formalise the review of its SSF default procedures within its broader framework for testing and review of the DMF.
SSF Standard 11.2. Implementation of default management plans. An SSF should be well prepared to implement its default rules and procedures, including any appropriate discretionary procedures provided for in its rules...	Observed	
SSF Standard 11.3. Disclosure of default management processes. An SSF should publicly disclose key aspects of its default rules and procedures. Where an SSF settles via a multilateral net batch, arrangements for dealing with any unsettled trades of a defaulting participant that are not guaranteed by a CCP … should be clear to all its participants and should be capable of being executed in a timely manner.	Observed	ASX should carry out its plans to enhance participant and client education and communication regarding its default management arrangements. As part of this, ASX should: - complete its planned updates of participant disclosures on the key aspects of its default management arrangements, including releasing the Guidance Note on the suspension and termination of Austraclear participants - extend the scope of the Guidance Notes on the suspension and termination of ASX Settlement and Austraclear participants to explain the potential implications of the default of a settlement participant, participating bank or Payment Provider on other ASX participants - develop an accessible information note on the ASX Settlement back-out algorithm, which provides an overview of the algorithm and outlines the potential implications of a settlement participant or Payment Provider default on other ASX participants. Any disclosures should be easily accessible, preferably in a centralised location. In developing its new system for clearing and settlement of cash market securities, ASX should ensure that any default management processes are clearly documented, and that the effectiveness of these processes can be tested and reviewed on an ongoing basis.

Standard	Rating	Recommendation
SSF Standard 11.4. Testing and review of default management processes. An SSF should involve its participants and other stakeholders in the testing and review of the SSF's default procedures, including any close-out procedures. Such testing and review should be conducted at least annually and following material changes to the rules and procedures to ensure that they are practical and effective.	Observed	ASX should continue enhancing its approach to the testing and review of its default management arrangements. Such enhancements should include increasing the complexity and scope of its default management fire drills. ASX should also ensure that these fire drills involve all relevant internal stakeholders and committees, and test the interaction between all relevant stakeholders. As part of the annual ASX default management fire drills, consideration should be given to the implications of the default of an Austraclear participant, ASX Settlement participant, participating bank or Payment Provider for other ASX CS facilities.
SSF Standard 11.5. Market impact of default management plans. An SSF should demonstrate that its default management procedures take appropriate account of interests in relevant jurisdictions and, in particular, any implications for pricing, liquidity and stability in relevant financial markets.	Observed	

Abbreviations

ADI	authorised deposit-taking institution
AFR	available financial resources
AIM	additional initial margin
ALMO	Approved Listing Market Operator
AMO	Approved Market Operator
AONIA	Australian overnight index average rate
APCA	Australian Payments Clearing Association
APRA	Australian Prudential Regulation Authority
ASIC	Australian Securities and Investments Commission
ASXCC	ASX Clearing Corporation Limited
AUD	Australian dollar
BBSW	bank bill swap rate
BCL	Banque Centrale du Luxembourg
CALCO	Capital and Liquidity Committee
CBPL	capital-based position limit
CCMS	centralised collateral management service
CCO	Chief Compliance Officer
CCP	central counterparty
CDI	CHESS Depository Interest
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CFR	Council of Financial Regulators
CFTC	US Commodity Futures Trading Commission
CHESS	Clearing House Electronic Sub-register System
CIO	Chief Information Officer
CMaX	Collateral Management Exchange
CMM	cash market margining
CPMI	Committee on Payments and Market Infrastructures
CPRC	Clearing Risk Policy Committee
CPRM	Clearing Risk Policy and Management
CPSS	Committee on Payment and Settlement Systems
CRA	Counterparty Risk Assessment
CRO	Chief Risk Officer
CROCC	CCP Risk, Operations and Compliance Committee
CRPC	Clearing Risk Policy Committee
CRQ	Clearing Risk Quantification
CS	clearing and settlement
CSP	critical service provider
DAH	Digital Asset Holdings
DBOR	Daily Beneficial Ownership Report
DCO	Derivatives Clearing Organization
DCS	Derivatives Clearing System
DLR	default liquidity requirement
DLT	distributed ledger technology
DMC	Default Management Committee
DMF	Default Management Framework

DMG	Default Management Group
DMP	default management process
DMSG	Default Management Steering Group
DPS	Derivatives Pricing System
DSFs	Deliverable Swap Futures
DvD	delivery-versus-delivery
DvP	delivery-versus-payment
EMIR	European Regulation on OTC derivatives, central counterparties and trade repositories
EPSC	Enterprise Portfolio Steering Committee
ERMC	Enterprise Risk Management Committee
ESA	Exchange Settlement Account
ESAS	Exchange Settlement Account System
ESMA	European Securities and Markets Authority
ETO	exchange-traded option
EU	European Union
EUR	euro
FHSVaR	Filtered Historical Simulation of Value at Risk
FMI	financial market infrastructure
FSB	Financial Stability Board
FSS	Financial Stability Standards
GBP	United Kingdom pound
GE	Group Executive
HIN	holder identification number
HLE	High-level Expectation
HSVaR	Historical Simulation of Value at Risk
ICR	Internal Credit Rating
IMSG	Implementation Monitoring Standing Group
IOSCO	International Organization of Securities Commissions
IRD	interest rate derivatives
IRS	interest rate swaps
JPY	Japanese yen
L3	Level 3
LEPOs	low exercise price options
NSX	National Stock Exchange of Australia
NTA	net tangible assets
NZD	New Zealand dollar
OTA	offsetting transaction arrangement
OTC	over-the-counter
PBC	People's Bank of China
PFMI	Principles for Financial Market Infrastructures
PIRC	Participant Incident Response Committee
PMO	Project Management Office
PSNA	Payment Systems and Netting Act 1998
PSR	price scanning range
PvP	payment-versus-payment
RBNZ	Reserve Bank of New Zealand
RITS	Reserve Bank Information and Transfer System
RMB	Chinese renminbi
RQG	Risk Quantification Group
RTGS	real-time gross settlement
S&P	Standard & Poor
SIM	SIM Venture Securities Exchange Limited
SOF	SWIFT Oversight Forum
SPAN	Standard Portfolio Analysis of Risk

SROCC	SSF Risk, Operations and Compliance Committee
SRPC	Settlement Risk Policy Committee
SSF	securities settlement facility
SSX	Sydney Stock Exchange Limited
STEL	stress test exposure limit
SWIFT	Society for Worldwide Interbank Financial Telecommunication
T+2	two-day settlement cycle
TAS	Trade Acceptance Service
TORESS	Total Return Single Stock
UK	United Kingdom
US	United States
USD	US dollar
VaR	value at risk
VSR	volatility scanning range

Appendix A: Detailed Assessment of Clearing and Settlement Facilities against the Financial Stability Standards

Introduction

This Appendix sets out the Reserve Bank's assessment of how well ASX Clear and ASX Clear (Futures) have complied with the CCP Standards, and how well ASX Settlement and Austraclear have complied with the SSF Standards during the year to 30 June 2016.[49] In setting out its assessment, the Bank has applied the rating system used in CPMI and IOSCO's *Principles for Financial Market Infrastructures: Disclosure framework and assessment methodology*.[50] Under this framework, the Bank has assessed each of the ASX CS facilities' observance of the requirements of each of the applicable CCP or SSF Standards as being:

- *Observed* – Any identified gaps and shortcomings are not issues of concern and are minor, manageable and of a nature that the facility could consider taking them up in the normal course of its business.
- *Broadly observed* – The assessment has identified one or more issues of concern that the facility should address and follow up on in a defined timeline.
- *Partly observed* – The assessment has identified one or more issues of concern that could become serious if not addressed promptly. The facility should accord a high priority to addressing these issues.
- *Not observed* – The assessment has identified one or more serious issues of concern that warrant immediate action. Therefore, the facility should accord the highest priority to addressing these issues.
- *Not applicable* – The standard does not apply to the type of facility being assessed because of the particular legal, institutional, structural or other characteristics of the facility.

Section 821A(aa) of the *Corporations Act 2001* requires that a CS facility licensee, to the extent reasonably practicable to do so, comply with the FSS and do all other things necessary to reduce systemic risk. In assessing how well a CS facility complies with a CCP or SSF standard, the Bank has assessed how well the facility complies with the headline standard and each of the 'sub-standards'

49 The full text of the detailed assessments of each of these CS facilities is available at <http://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2015-2016/index.html>.

50 Available at <http://www.bis.org/cpmi/publ/d106.htm>.

listed under the headline standard. A single overall rating is applied to each CCP or SSF Standard, reflecting this assessment.

Where a facility has been assessed to *observe* a CCP or SSF Standard, the Bank nevertheless expects ASX to work towards continual strengthening of its observance of the standard. ASX recognises this and has governance arrangements in place to motivate and encourage continuous improvement. This Appendix includes some recommendations encouraging such improvement in some specific areas. These are not exhaustive, and ASX is encouraged to continue to seek further improvements to its observance of the FSS over the coming Assessment period. This is in accordance with the general obligation on CS facilities to do all things necessary to reduce systemic risk.

Where a facility has been assessed to *broadly observe* a CCP or SSF Standard, the Bank will have sought evidence that a plan is in place to address the identified issue of concern within a clear, defined and reasonable time frame, and that it would not be reasonably practicable for the facility to take such actions immediately in order to fully observe the standard. This Appendix includes recommendations that identify the steps required by ASX to address the relevant issues of concern and fully observe the applicable CCP or SSF Standard.

The Bank's ratings of each of the CS facilities against relevant FSS are supplemented by detailed information under each sub-standard that is relevant to the Bank's assessment. The Bank gathered this information through its regular liaison with ASX staff, the supply of regular data and reports by ASX, and a series of specific information requests and meetings with ASX during and immediately following the Assessment period to gather information relevant to assessing compliance with the FSS. Arrangements for regular liaison and the supply of data and reports by ASX are described in further detail under the detailed assessments of CCP Standard 21 and SSF Standard 19.

Supplementary interpretation of CCP Standards

In assessing how well ASX Clear and ASX Clear (Futures) have observed certain sub-standards of the CCP Standards, the Bank has applied the supplementary interpretation of these sub-standards issued by way of an exchange of letters with ASX in October 2014.[51] This supplementary interpretation supersedes the Bank's previous supplementary interpretation of the CCP Standards issued in August 2013. The supplementary interpretation of the CCP Standards applies to any domestically licensed derivatives CCP that provides services to participants that are either established in the EU or subject to EU bank capital regulations, and affects CCP Standards 2.6, 4.2, 4.4, 6.3, 7.3, 13.2, 13.3, 15.4 and 21.

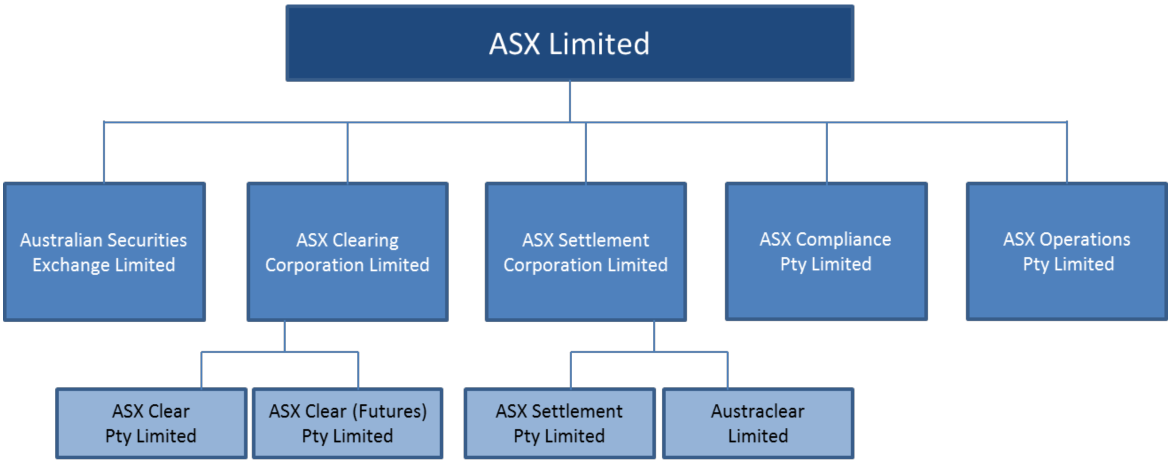
ASX Group Structure

All four CS facilities are part of the ASX Group. In the ASX corporate structure, the two CCPs – ASX Clear and ASX Clear (Futures) – are subsidiaries of ASXCC, while the two SSFs – ASX Settlement and Austraclear – are subsidiaries of ASX Settlement Corporation Limited (Figure 1). ASXCC and ASX Settlement Corporation Limited are in turn subsidiaries of the ASX Group's parent entity, ASX Limited. ASX Limited is the licensed operator of the ASX market, which provides a trading platform for ASX-quoted securities and equity derivatives. Another subsidiary, Australian Securities Exchange Limited, is the licensed operator of the ASX 24 market, an exchange for futures products.

51 This letter is available at <http://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/pdf/supplementary-guidance-domestic-derivatives-ccps.pdf>.

- ASX Clear provides clearing services for the ASX market. Under the TAS, it also acts as a CCP for trades in both ASX- and non-ASX-quoted financial products executed on AMO platforms. This service is currently only utilised by Chi-X.
- ASX Clear (Futures) provides clearing services for the ASX 24 market, as well as AUD-denominated OTC IRD.
- ASX Settlement provides settlement services for the ASX market and AMOs utilising the TAS. Under the Settlement Facilitation Service, ASX Settlement also provides settlement services for transactions in non-ASX-listed securities undertaken on trading platforms operated by Approved Listing Market Operators (ALMOs); these include SSX, the NSX and SIM.
- Austraclear provides settlement and depository services for debt securities, and settlement services for derivatives traded on the ASX 24 market and for margin payments in ASX Clear and ASX Clear (Futures).

Figure 1: ASX Group Structure



ASX Limited is a listed company. The ASX Limited Board is responsible for overseeing the processes for identifying significant risks to ASX and ensuring that appropriate policies, as well as adequate control, monitoring and reporting mechanisms, are in place. In addition, ASX Limited's Board assigns certain responsibilities to subsidiaries within the group, including the boards of the four CS facilities (the CS Boards). The CS Boards are responsible for managing the particular clearing and settlement risks faced by each respective CS facility, including through compliance with the FSS. The CS Boards are subject to common governance arrangements with high-level objectives set out in the CS Boards' Charter. A majority of the directors on the CS Boards are common to the boards of all four CS facilities; however, one of the directors on the ASX Clear and ASX Settlement Boards does not sit on the ASX Clear (Futures) and Austraclear Boards, and four of the directors on the ASX Clear (Futures) and Austraclear Boards do not sit on the ASX Clear and ASX Settlement Boards.

ASXCC is a wholly owned subsidiary of ASX Limited. ASXCC is the holding company for, and manages the financial resources of, the two CCPs. It invests these resources according to a treasury investment policy and investment mandate approved by the CS Boards.

In delivering their services, the CS facilities rely on group-wide operational and compliance resources that reside in ASX Operations Pty Limited (ASX Operations), which is a wholly owned subsidiary of ASX Limited.

- ASX Operations provides most operational resources required by the CS facilities, including resources to enable ASX Compliance Pty Limited (ASX Compliance) to perform its services.
- ASX Compliance provides compliance services to the licensed entities of the ASX Group, including monitoring and enforcing participants' compliance with the Operating Rules of the CS facilities.

ASX has adopted a group-wide organisational structure to manage the business operations of its various entities, including the CS facilities. Its business units are organised into nine main divisions:

- Office of the CEO
- Risk
- Operations
- Technology
- Business Development
- ASX Compliance
- Office of General Counsel and Company Secretariat, Regulatory Policy and Regulatory Assurance
- Chief Financial Officer (CFO) Office
- Human Resources.

Risk contains a number of departments that play key roles in the management of risks faced by the CS facilities:

- Clearing Risk Policy and Management (CRPM) – develops, maintains and implements CCP policies and standard, and maintains effective procedures for carrying out those policies and standards.
- Clearing Risk Quantification (CRQ) – maintains and validates CCP risk and pricing models.
- Clearing Risk Development – responsible for the development of clearing risk management systems.
- Enterprise Risk – responsible for enterprise-wide risk management, including general business risk.
- Portfolio Risk Management – responsible for managing investment and liquidity risks associated with ASXCC's investment portfolio.
- Internal Audit – conducts risk-based reviews of internal controls and procedures across ASX. Internal Audit reports to the CRO for administrative purposes only.

ASX's Clearing Risk Policy Framework also sets out roles for a number of internal committees that bring together decision makers and experts from departments across the group:

- Clearing Risk Policy Committee (CRPC) – reviews policies and standards prior to submission to the CS Boards.
- Capital and Liquidity Committee (CALCO) – advises on changes to clearing risk policies and standards related to capital, liquidity and balance sheet management.
- CCP Risk, Operations and Compliance Committee (CROCC) – discusses and shares information across relevant operational, compliance and risk management departments.

- Enterprise Risk Management Committee (ERMC) – reviews and approves enterprise risk management policy and related reporting prior to Board submission.
- Risk Quantification Group (RQG) – responsible for quantitative risk management matters, including the review and application of quantitative risk policies and the Model Validation Framework, including oversight of model governance and the outcomes and recommendations of regular reviews of margining and stress test outcomes and recommendations.
- DMC – coordinates ASX's response to a clearing participant default, and conducts the review and testing of the CCPs' default management framework.
- PIRC – responsible for monitoring and managing participant incidents and, in the case of a clearing participant, escalating potential default events to the DMC.

ASX's Settlement Risk Policy Framework sets out roles for a number of additional internal committees:

- Settlement Risk Policy Committee (SRPC) – reviews policies and standards prior to submission to the CS Boards.
- SSF Risk, Operations and Compliance Committee (SROCC) – discusses and shares information across relevant operational, compliance and risk management departments.
- ERMC – reviews and approves enterprise risk management policy and related reporting prior to Board submission.
- PIRC – responsible for monitoring and managing material participant incidents, including any non-compliance with participant obligations, settlement default, operational failure or an event which might result in the participant becoming an externally-administered body corporate or an insolvent under administration, and, in the case of a clearing participant, escalating potential default events to the DMC.