

2013/14 Assessment of ASX Clearing and Settlement Facilities

September 2014

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1. Introduction and Executive Summary

In accordance with its responsibilities under the *Corporations Act 2001*, the Reserve Bank (the Bank) carries out periodic assessments of how well each clearing and settlement (CS) facility licensee is complying with applicable Financial Stability Standards (FSS) determined by the Bank and the more general obligation to do all other things necessary to reduce systemic risk.¹ The Bank's findings are reported to the Minister with portfolio responsibility for Corporations Law, and are also notified to the Australian Securities and Investments Commission (ASIC) and published on the Bank's website.

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 2014.² In accordance with the governance arrangements for the Bank's oversight 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 2012/13 Assessment. Many of these priorities have been fully addressed.³ Accordingly, it is the Bank's assessment that all four facilities have either observed or broadly observed all relevant requirements under the FSS in the Assessment period (Section 2 and Appendix A). 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 further strengthen the ASX facilities' observance of requirements under the FSS. Some recommendations have also been made 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 new FSS are aligned with the requirements in the *Principles for Financial Market Infrastructures* (the PFMI), developed by the Committee on Payment and Settlement Systems (CPSS) and the Technical Committee of the International Organization of Securities Commissions (IOSCO) that

1 Until June 2013, the Bank was obliged under the *Corporations Act* to carry out assessments annually. Further to a legislative amendment at that time, a CS facility licensee must be assessed annually only where this has been prescribed by regulation. While no CS facility licensee has yet been prescribed for annual assessment, the Bank has clarified in a policy statement that it intends to continue to carry out assessments of the ASX CS facility licensees on an annual basis; see <<http://www.rba.gov.au/payments-system/policy-framework/frequency-of-assessments.html>>.

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

3 The Bank's 2012/13 Assessment may be found at <<http://www.rba.gov.au/payments-system/clearing-settlement/assessments/2012-2013/index.html>>.

address matters relevant to financial stability.⁴ The Bank's Assessment applies the rating system used in the assessment methodology that supports the PFMIIs.⁵

The Bank's Assessment also forms the basis for formal assessments of the ASX CS facilities against the principles within the PFMIIs (the Principles), carried out jointly with ASIC. These assessments will be carried out periodically, with the first published under separate cover alongside this report.⁶

1.1 Overview of Activity in the ASX Clearing and Settlement Facilities

As in 2012/13, price volatility in the markets cleared and settled by the ASX CS facilities remained low in 2013/14 relative to the crisis and immediate post-crisis periods. Trends in daily average trading values and volumes were also broadly similar to those observed in the previous year. Daily average values for cash equity trades cleared by ASX Clear declined, as did the volume of trades in equity options. The volume of trading in the main futures contracts cleared by ASX Clear (Futures) continued to increase, however. An increase in the daily average value of debt securities settled in Austraclear reversed the decline of the previous year.

The 2013/14 Assessment period was the first full year in which ASX Clear collected initial and variation margin on cash equity positions. Initial margin, which provides cover for potential future exposures on unsettled cash equity transactions, declined by 7 per cent relative to the margin notionally calculated on these transactions in 2012/13 prior to implementation of the margining regime. Margin held by ASX Clear against equity derivatives also decreased slightly, with lower open interest contributing to this decline. Initial margins held by ASX Clear (Futures), however, rose by 1 per cent in 2013/14, reflecting the slightly higher trading volumes and participant exposures.

Key operational objectives were met by all four facilities during the Assessment period: system availability was at or close to 100 per cent for all core systems, while peak usage was well below the maximum of 50 per cent in each case. In May, ASX upgraded its clearing system for exchange-traded derivatives at ASX Clear (Futures). ASX is also improving its capacity to directly manage operational risk at Austraclear through an insourcing project to take over all support of its core system, EXIGO.

1.2 Review of Regulatory Priorities and Key Recommendations

In its 2012/13 Assessment, the Bank made a number of recommendations for the ASX CS facilities. In most cases, these related to the completion of work already underway to attain full observance of those standards where ASX had been rated 'broadly observed', and actions to ensure that ASX would meet the requirements of those standards for which transitional relief had been granted until 31 March 2014. Other recommendations identified areas in which ASX could make further enhancements in the spirit of continuous improvement, even where the minimum requirements of the relevant standard were met. In addition, the Bank noted several matters that it would follow up with ASX.

4 As of 1 September 2014, the mandate and charter of the Committee on Payment and Settlement Systems have been refreshed and the Committee has been renamed. It is now known as the Committee on Payments and Market Infrastructures (CPMI).

5 See <<http://www.bis.org/publ/cpss101.htm>> for the Principles and related Assessment Methodology and Disclosure Framework.

6 The first Assessment against the Principles is available at <<http://www.rba.gov.au/payments-system/policy-framework/principles-fmi/assessments-of-cs-facilities.html>>.

These recommendations and other matters formed the Bank's regulatory priorities for the 2013/14 Assessment period and are the principal focus of this report. ASX has made considerable progress in all areas and has fully addressed many of the stated priorities. Some of the key actions taken by ASX are summarised below, along with core recommendations and priorities for the 2014/15 Assessment period.

Risk management and model validation

In its 2012/13 Assessment, the Bank made a number of recommendations for enhancements to the ASX CCPs' model validation approach. During 2013/14, ASX further developed its approach, including by:

- implementing substantial enhancements to the backtesting and sensitivity analysis of margin models
- introducing reverse stress testing
- engaging external experts for a three-year period to undertake a comprehensive validation of all key risk models.

In the 2013/14 Assessment, the Bank has examined in detail ASX's progress in this area (Section 4). In the Bank's assessment, both ASX Clear and ASX Clear (Futures) have observed most relevant requirements under the FSS. Aside from a specific recommendation around liquidity stress testing at ASX Clear (see below), it is expected that both CCPs will fully observe all relevant requirements once the first year of the independent external model validation program has been completed. The CCPs are also encouraged to continually refine and enhance their margin backtesting, sensitivity analysis and reverse stress-testing methodologies and their integration into existing risk management processes. The Bank will continue to monitor these developments.

Default management

Further to the introduction of clearing for over-the-counter (OTC) interest rate derivatives in July 2013, ASX carried out a review of its Default Management Framework. Default rules and procedures specific to the OTC clearing service were introduced to the Framework. Reflecting the lower liquidity of OTC derivatives products, ASX's default management approach envisages the use of an auction to surviving participants to close out its exposure to the defaulted participant. The Bank recommended that ASX Clear (Futures) develop an appropriate mechanism to encourage competitive bidding in any auction of a defaulted participant's positions, and also that it make arrangements to involve participants in the testing of OTC derivatives default arrangements. During the 2013/14 Assessment period, ASX Clear (Futures) fully addressed this priority, enhancing its default management rules and procedures for OTC derivatives, including by articulating its auction design and introducing a 'juniorisation' mechanism to encourage competitive bidding. ASX Clear (Futures) also established a Default Management Group for its OTC derivatives participants, which held its first OTC derivatives default management 'fire drill' in June 2014.

Business and investment risks

In previous assessments, the Bank has expressed the concern that the ASX CCPs' treasury investment policy allows relatively large and concentrated exposures to a small number of domestic banks. In response, ASX has lowered the limits on its unsecured exposures to the large domestic banks, and taken steps to improve its capacity to both make secured investments and invest with a broader

range of high-quality counterparties. While the Bank welcomes the steps taken to date, it expects further progress before the ASX CCPs will be deemed to have fully observed the relevant standard. The Bank has opened a dialogue with ASX on the detail of its expectations around credit limits on unsecured exposures to non-government-related entities and the liquidity profile of the investment portfolio. This dialogue will reveal any practical issues or implementation challenges. It will also clarify a reasonable time frame over which a transition should be achieved.

Also in the 2013/14 Assessment period, having explicitly set aside capital at the group level to cover its general business risks, ASX amended its intragroup legal agreements to clarify the allocation and availability of business risk capital to each of the CS facilities.

FSS transitional relief

A small number of CCP and SSF Standards that were previously subject to transitional relief came into effect at end March 2014. Some recommendations had been made in the 2012/13 Assessment in anticipation of the expiry of transitional relief. Accordingly, during the 2013/14 Assessment period ASX made a number of enhancements to the CS facilities' rules and processes relevant to their observance of the new requirements.

- *Recovery and resolution.* In order to meet new requirements related to recovery and resolution, the Bank recommended that ASX prepare recovery plans for each CS facility and that the CCPs develop tools to address an unfunded credit loss or liquidity shortfall, consistent with forthcoming CPSS-IOSCO guidance on recovery.⁷ ASX was also encouraged to review its operational arrangements in light of the proposed special resolution regime for Australian financial market infrastructures (FMIs), to ensure that they are consistent with the form of the regime once finalised. While the final CPSS-IOSCO guidance has still not yet been published, in early 2014 ASX developed a basic recovery plan based on the facilities' existing powers under their Operating Rules. ASX has also formulated a plan to enhance those rules in order to be able to fully address any uncovered credit losses and liquidity shortfalls and replenish financial resources following a participant default. It plans to consult on its proposed recovery approach later in 2014. Legislation to establish a special resolution regime for Australian FMIs has not yet been introduced.
- *Segregation and portability.* In response to the Bank's recommendations, and in accordance with the new CCP Standards, ASX Clear (Futures) introduced individual client segregation within its account structures for both OTC derivatives and exchange-traded futures. Sitting alongside the pre-existing omnibus client account structure for exchange-traded products, the new arrangements give clients a choice in the level of protection they receive and the likelihood that positions and associated collateral could be transferred to an alternative participant in the event of a clearing participant default. In July 2014, ASX released a consultation paper seeking stakeholder feedback on proposals to provide additional protection for client collateral, including collateral posted in excess of margin requirements. Also during the Assessment period, ASX Clear implemented the first of two phases of enhancements to its cash market arrangements to provide clients with equivalent protection to house/client omnibus segregation.
- *Liquidity risk.* Both CCPs' prefunded liquid resources are currently considered to be sufficient to meet the required level of cover for liquidity exposures arising from derivatives transactions.

⁷ Recovery refers to steps taken by an FMI to respond to a threat to its continued viability; resolution refers to steps taken by public authorities to restore an FMI in distress to viability or wind it down.

However, ASX Clear's prefunded liquid resources may not be sufficient to cover extreme but plausible payment obligations arising from the settlement of cash equity transactions. In April 2014, ASX introduced changes to its Operating Rules whereby participants commit to provide liquidity to ASX Clear to address any funding shortfall. Under these arrangements, ASX Clear would settle transactions by entering into 'offsetting transaction arrangements' with participants that were due to deliver securities to the defaulted participant. The Bank considers these arrangements to be consistent with the relevant standard. ASX plans to make enhancements to ASX Clear's liquidity stress testing, including to routinely provide more information to management and the Bank on the degree of contingent reliance on offsetting transaction arrangements. The Bank will monitor these enhancements and discuss further with ASX how such information might best be disseminated to participants to support their liquidity management and planning.

1.3 Other Developments

The 2013/14 Assessment period saw other important developments in the ASX CS facilities' business and service offerings.

Code of Practice

ASX released its *Code of Practice for Clearing and Settlement of Cash Equities in Australia* (the Code) on 9 August 2013. The Code was developed in response to the conclusions of the Council of Financial Regulators' (CFR's) review of competition in the clearing of cash equities, published in February 2013. The review concluded that a decision on any licence application from a CCP seeking to compete in the Australian cash equity market should be deferred for two years, and recommended that ASX establish a code of practice in the meantime. The Code commits ASX to maintain transparent and non-discriminatory pricing of, and terms of access to, cash equity clearing and settlement services, and to enhance user engagement through the establishment of a senior-level advisory Forum and a supporting Business Committee. The CFR will review the performance of the Code in early 2015.

- *User engagement.* The Forum, which met for the first time in October 2013, has identified two strategic initiatives: a move to a two-day (T+2) settlement cycle for cash equities from the current three-day cycle; and adoption of global messaging standards. Having consulted on the shortening of the settlement cycle and received broad-based industry support, ASX is targeting implementation in early 2016. The transition to global messaging standards will be pursued as part of a broader project to replace the CHES clearing and settlement system; this is expected to be implemented within the next three to four years.
- *Pricing.* Under the Code, ASX has committed to a number of initiatives regarding transparent and non-discriminatory pricing. ASX released a cost allocation and transfer pricing policy ahead of the release of its 2012/13 financial statements. At the same time, it introduced the practice of publishing management accounts for its cash market clearing and settlement businesses alongside its financial statements. Also, in the first half of 2014, ASX commissioned the economic consultancy Oxera to conduct a detailed international cost benchmarking study, with the Forum providing input on the scope and methodology of the review. Oxera's final report was presented to the Forum in June 2014, concluding that ASX's cash equity clearing and settlement costs were broadly in line with international exchanges of comparable size.
- *Access.* In accordance with commitments under the Code relating to transparent and non-discriminatory access for alternative execution venues, ASX released a consultation paper in

January 2014 seeking feedback on enhancements to the service-level and information-handling standards established under the Trade Acceptance Service (TAS) and the Settlement Facilitation Service. ASX has since made a number of amendments to the TAS Legal Terms and the associated Operational and Technical Standards and Information Handling Standard.

Renminbi settlement

During the first half of 2014, ASX worked with Bank of China's Sydney branch to develop a settlement service in Austraclear for Chinese renminbi payments. Interest in the offshore use of renminbi for both trade and financial market transactions has grown following Chinese reforms, including a gradual move towards a more market-determined exchange rate and incremental liberalisation of the capital account. The service, launched on 28 July 2014, is also able to support payments in other approved foreign currencies and at any designated settlement bank. Since the service was initially developed as a joint venture with Bank of China, at the time of launch the service supported only renminbi payments settling at Bank of China.

1.4 Cross-border Recognition

There were a number of developments during the 2013/14 Assessment period related to recognition of the ASX CCPs in the European Union (EU) and the United States (US).

European Union

Under the European Regulation on OTC derivatives, central counterparties and trade repositories (EMIR), non-EU CCPs that provide clearing services to participants established in the EU must obtain recognition from the European Securities and Markets Authority (ESMA). Consequently, ASX Clear (Futures) applied for EU recognition in September 2013.

One of the preconditions for recognition is that the Australian regime for regulation of CCPs is assessed as equivalent to EU regulation. While both are based on the Principles, the EU standards are drafted at a more detailed level. The Bank therefore issued supplementary interpretation of a subset of standards to provide additional clarity in some areas. Currently, the supplementary interpretation applies only to domestically licensed derivatives CCPs in Australia that provide services to clearing participants established in the EU. The Bank has applied this interpretation of the relevant CCP Standards in its assessment of ASX Clear (Futures) for 2013/14.

ESMA published its conclusions on the equivalence of the Australian regime for CCPs in late 2013. In part reflecting the supplementary guidance, ESMA concluded that the Australian regulatory framework provided legally binding requirements equivalent to those required in the EU. On the basis of this conclusion, the European Commission (EC) is proposing to adopt an Implementing Act, which will give legal effect to this equivalence decision. ASIC and the Bank are also discussing cooperation arrangements with ESMA. These will be reflected in a Memorandum of Understanding (MOU).

ASX Clear also recently submitted an application for EU recognition. In the EU, recognition by ESMA is a prerequisite to a CCP becoming a Qualifying CCP for bank capital purposes. If ASX Clear chooses to pursue this application and achieves EU recognition, then to allow participants that are subsidiaries of EU banks would be able to apply lower capital charges for exposures to ASX Clear. The Bank is currently in dialogue with ASX, the EC and ESMA on the implications of ASX Clear's application and the degree to which the matters covered in the supplementary interpretation would apply in the case of

ASX Clear. Depending on the outcome of this dialogue, and if ASX Clear chooses to pursue its application, ASX Clear may become subject to additional aspects of the FSS in 2014/15.

United States

The CFTC currently requires non-US derivatives CCPs that offer swap clearing services to US persons to register as Derivatives Clearing Organizations (DCOs) with the CFTC. However, on 6 February 2014 the CFTC granted ASX Clear (Futures) time-limited relief from the requirement to register as a DCO. This allows US participants of ASX Clear (Futures) to clear proprietary trades in Australian and New Zealand dollar-denominated interest rate swaps using its service. The relief will expire at the end of 2014, or earlier if ASX Clear (Futures) registers as a DCO or is granted an exemption from DCO registration. The CFTC has indicated that it is considering an exemption regime that will place reliance on a CCP's home regulatory regime. To govern information sharing to support these and any other future arrangements related to the oversight and regulation of cross-border CCPs, ASIC and the Bank executed an MOU with the CFTC in June 2014.

The remainder of this report is structured as follows. Section 2 summarises in tabular form each CS facility's progress towards meeting recommendations and regulatory priorities arising from the Bank's 2012/13 Assessment, as well as conclusions and recommendations arising from the 2013/14 Assessment. Section 3 draws out material developments during the Assessment period and discusses the considerations underlying each recommendation. Section 4 presents a 'special topic' on ASX's model validation approach, which was the subject of a number of recommendations in the 2012/13 Assessment. Appendix A concludes with an overview 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 over 2013/14 in relation to regulatory priorities identified in the 2012/13 Assessment, and summarises the recommendations and other priorities identified by the Bank in its 2013/14 Assessment of the facilities against the FSS.

2.1 Progress against 2012/13 Recommendations and other Priorities

The Bank's 2012/13 Assessment of ASX Clearing and Settlement Facilities set out a number of recommendations for the ASX CS facilities to address areas of concern identified under various standards or to support continuous improvement. The 2012/13 Assessment also noted several developments that the Bank would continue to monitor and other matters arising from the Assessment that the Bank wished to further discuss with ASX. Together these matters formed the Bank's regulatory priorities for the 2013/14 Assessment period.

The following table summarises the recommendations made to ASX in the 2012/13 Assessment, and actions taken by the ASX CS facilities in relation to these recommendations over the 2013/14 Assessment period.

Table 1: Summary of Progress against 2012/13 Recommendations and other Priorities

Recommendation/Priority	Standard	Facility	Actions
<i>Recommendations to address areas of concern</i>			
Recovery planning, loss and liquidity allocation – preparation of a recovery plan based on identified scenarios that may threaten the ongoing provision of critical services, consistent with forthcoming CPSS-IOSCO guidance on recovery planning, including mechanisms for the CCPs to fully address any uncovered credit losses and liquidity shortfalls, and replenish financial resources following a participant default.	CCP Standards 3.5, 4.8, 7.9 and 14.3, SSF Standards 3.5 and 12.3	All facilities	<p>Partly addressed. Progress dependent on the finalisation of international recovery planning guidance. Expected to be fully addressed by mid 2015.</p> <p>ASX has prepared a basic recovery plan to address threats to the CS facilities' ongoing provision of critical services based on their existing powers. ASX has also articulated a plan to enhance its rules so as to be able to fully address any uncovered credit losses and liquidity shortfalls, and replenish financial resources following a participant default (see Section 3.6.1).</p> <p>ASX Clear has introduced a rule-based mechanism to address any liquidity shortfall related to the settlement of cash market transactions (see Section 3.6.3).</p>

Recommendation/Priority	Standard	Facility	Actions
Model review and validation – implementation of plans to strengthen the analysis of margin, collateral and stress-test models, through comprehensive annual validation, reverse stress testing, sensitivity analysis, and more detailed monthly reviews of scenarios, models and underlying parameters and assumptions.	CCP Standards 4, 5, 6 and 7	Both CCPs	<p>Mostly addressed. Expected to be fully addressed by mid 2015.</p> <p>ASX has introduced enhanced daily and periodic margin backtesting, periodic sensitivity analysis of margin models, annual review of collateral haircut rates and monthly reverse stress testing. ASX has also engaged an external expert to undertake annual external validation of key risk models. These developments are discussed in detail in Section 4.</p>
Liquidity arrangements for cash equities – development and implementation of offsetting repurchase agreements with participants as an alternative to rescheduling trades, to cover liquidity exposures in respect of cash equity transactions.	CCP Standard 7	ASX Clear	<p>Fully addressed.</p> <p>ASX Clear has introduced a rule-based mechanism to cover liquidity exposures related to the settlement of cash market transactions (see Section 3.6.3).</p>
OTC default management arrangements – further development of default rules and procedures, including an appropriate mechanism to encourage competitive bidding in any auction of a defaulting participant's positions.	CCP Standard 12	ASX Clear (Futures)	<p>Fully addressed.</p> <p>ASX Clear (Futures) has enhanced its OTC derivatives default management rules and procedures, including by introducing a 'juniorisation' mechanism to encourage competitive bidding in any auction of a defaulting participant's positions (see Section 3.7).</p>
Cash equity account structures – complete development and commence implementation of arrangements for client account segregation for cash equities.	CCP Standard 13	ASX Clear	<p>Partly addressed. Expected to be fully addressed in May 2015.</p> <p>ASX Clear has developed alternative arrangements to provide clients with equivalent protection to house/client omnibus segregation, and has completed the first of two stages of implementation of these arrangements (see Section 3.6.2).</p>
Client clearing – implementation of proposals to introduce individual client account segregation for both exchange-traded and OTC derivatives.	CCP Standard 13	ASX Clear (Futures)	<p>Fully addressed.</p> <p>In April, ASX Clear (Futures) launched a client clearing service offering individual client account segregation for OTC derivatives and, in July, extended this service to exchange-traded derivatives (see Section 3.6.2).</p>
Business risk capital arrangements – implementation of plans to enhance intragroup legal agreements to explicitly clarify the allocation and availability of business risk capital to each of the CS facilities.	CCP Standard 14, SSF Standard 12	All facilities	<p>Fully addressed.</p> <p>ASX has included a clause in its intragroup legal agreements to clarify the allocation and availability of business risk capital to each of the CS facilities (see Section 3.5.4).</p>
Treasury investment policy – implementation of plans to further reduce the concentration of unsecured exposures to the large domestic banks.	CCP Standard 15	Both CCPs	<p>Partly addressed. The Bank has opened a dialogue with ASX on the time frame for fully addressing this recommendation.</p> <p>ASX has further lowered limits governing its exposures to the large domestic banks and has improved its capacity to invest in secured investments and with a broader range of high-quality counterparties (see Section 3.5.4).</p>
Resolution planning – review of operational arrangements in light of the proposed Australian FMI resolution regime, to ensure that they are consistent with the form of the regime once finalised.	CCP Standard 16.11, SSF Standard 14.11	All facilities	<p>Not addressed. Progress dependent on legislation to establish an Australian FMI resolution regime, which is not yet in place (see Section 3.6.1).</p>

Recommendation/Priority	Standard	Facility	Actions
Disclosure Framework – publication of an expanded Disclosure Framework document, in a form consistent with that prescribed by CPSS-IOSCO, setting out in detail how each CS facility meets the requirements of each of the Principles.	CCP Standard 20, SSF Standard 18	All facilities	Fully addressed. ASX has published an expanded Disclosure Framework document, which it plans to update quarterly (see Section 3.5.7).
Recommendations to support continuous improvement			
Review of participation requirements – carrying out a planned review of capital requirements.	CCP Standard 17	ASX Clear	Fully addressed. ASX Clear carried out a review of capital requirements, determining that a planned increase in core capital requirements was no longer necessary. It also introduced a tiered capital structure for participants clearing on behalf of third parties (see Section 3.5.6).
Enhanced monitoring of tiered participation – investigation of options to improve monitoring of risks associated with tiered participation.	CCP Standard 18	Both CCPs	Fully addressed. ASX has developed a risk-based approach to monitoring concentration risks in tiered participation, based on market activity/structure, the structure of client accounts and the number of participants (see Section 3.5.6).
Website enhancements – provision of a central location on the ASX website linking to all information that is subject to disclosure requirements under the FSS.	CCP Standard 20, SSF Standard 18	All facilities	Fully addressed. ASX has redesigned its website, with improved access to information on the CS facilities. Links to information subject to disclosure requirements under the FSS have been included in ASX's expanded Disclosure Framework document (see Section 3.5.7).
Other regulatory priorities – matters for further consideration by the Bank			
Governance arrangements for risk management – monitoring the implementation and effectiveness of enhancements to the governance of risk at the ASX CS facilities.	CCP Standard 2, SSF Standard 2	All facilities	The Bank has received periodic updates on the activities of the Clearing Risk Policy Committee, the Risk Quantification Group and the ASX Clear (Futures) Risk Committee. These are discussed in Sections 3.5.2 and 4.2.
Conflict-handling arrangements – better understanding the arrangements in place for handling conflicts of interest created by its group structure.	CCP Standard 2, SSF Standard 2	All facilities	ASX has restructured the boards of its CS facilities, reducing the incidence of common directorships, and has discussed with the Bank procedures for handling conflicts if they were to arise (see Section 3.5.2).
Risk committees – monitoring the implementation of the participant Risk Committee introduced at ASX Clear (Futures) and considering whether it would be appropriate to establish a similar participant risk committee at ASX Clear.	CCP Standard 2, SSF Standard 2	Both CCPs	The Bank has received updates on the establishment and activities of the ASX Clear (Futures) Risk Committee. ASX has determined that establishing a similar risk committee at ASX Clear is not necessary in the short term, given the availability of alternative means of seeking participant feedback on risk matters (see Section 3.5.2).
OTC risk management measures – monitoring the effectiveness of the measures implemented by ASX Clear (Futures) to manage the risks associated with real-time novation of OTC derivatives transactions.	CCP Standard 4	ASX Clear (Futures)	The Bank has reviewed updates to ASX Clear (Futures)' intraday risk management policies and has discussed the effectiveness of these policies with ASX (see Section 3.7).

Recommendation/Priority	Standard	Facility	Actions
Default fund arrangements – monitoring of ASX Clear (Futures)' annual review of its commingled arrangements for pooled financial resources, as well as the adequacy of those resources.	CCP Standards 4 and 12	ASX Clear (Futures)	ASX Clear (Futures)' Board and participant Risk Committee have undertaken reviews of the commingling of pooled financial resources across OTC and exchange-traded derivatives, and the adequacy of those resources; supporting information for these reviews have been shared with the Bank (see Section 3.7).
Collateral policies – monitoring the outcomes of a planned ASX review of collateral policies and standards.	CCP Standard 5	Both CCPs	ASX has revised its collateral policies and standards and discussed these with the Bank (see Sections 3.5.1 and 4).
Retail Commonwealth Government securities (CGS) – monitoring developments in the retail CGS service to ensure that there is no material migration of wholesale activity in CGS from Austraclear to the new facility.	CCP Standard 11, SSF Standard 10	ASX Clear, ASX Settlement	There has been no material migration of wholesale activity in CGS from Austraclear to the retail CGS facility.
OTC derivatives default arrangements – monitoring the implementation of ASX's plans to involve participants in the testing of OTC derivatives default arrangements.	CCP Standard 12	ASX Clear (Futures)	A Default Management Group (DMG) has been established for ASX Clear (Futures)' OTC derivatives participants; the DMG held its inaugural default management fire drill in June (see Section 3.7).
Adequacy of resourcing – monitoring ASX's resource adequacy to ensure that new projects do not impede work on the core risk management framework for the CS facilities.	CCP Standard 16, SSF Standard 14	All facilities	ASX has provided further detail on its management of resourcing to the Bank; in particular, additional resources have been devoted to the quantitative analysis of clearing risk (see Sections 3.5.5 and 4.3.1).
Operational interdependencies – monitoring of steps to address operational interdependencies related to participant vendors and offshore outsourcing.	CCP Standard 16, SSF Standard 14	All facilities	ASX has discussed with the Bank its approach to managing relationships with participant vendors and steps to monitor participants' use of offshore outsourcing arrangements (see Section 3.5.5).

2.2 2013/14 Ratings and Recommendations

The following tables summarise the Reserve Bank's 2013/14 Assessment of ASX's CS facilities against the FSS. In setting out its Assessment, the Bank has applied the rating system used in the *Principles for Financial Market Infrastructures: Disclosure Framework and Assessment Methodology* produced by CPSS and IOSCO in December 2012.⁸ 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.

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. The tables include 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. The tables include recommendations that identify the steps required by ASX to address the relevant issues of concern and fully observe the applicable CCP or SSF Standard.

In addition, Table 6 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 6 will form the basis for the Bank's regulatory priorities in 2014/15, and are discussed in more detail in Section 3 and in Appendix A.

⁸ Available at <<http://www.bis.org/cpmi/publ/d106.htm>>.

Table 2: ASX Clear Ratings and Recommendations

Standard	Rating	Recommendation
1. Legal basis	Observed	
2. Governance	Observed	
3. Framework for the comprehensive management of risks	Broadly observed	In order to fully observe CCP Standard 3, ASX Clear should implement plans to enhance its recovery plan consistent with forthcoming CPSS-IOSCO guidance on recovery planning.
4. Credit risk	Broadly observed	In order to fully observe CCP Standard 4, ASX Clear should implement mechanisms consistent with forthcoming CPSS-IOSCO guidance on recovery planning that would fully address any uncovered credit losses and replenish financial resources following a participant default. ASX Clear should also complete the full validation of its capital stress test model by external experts and consider further enhancements to its reverse stress testing approach that take into account the impact of systematic shocks across multiple products. ASX Clear is encouraged to continually refine and enhance its reverse stress testing methodology and its integration into existing risk management processes.
5. Collateral	Observed	
6. Margin	Broadly observed	In order to fully observe CCP Standard 6, ASX Clear should complete the full validation of its SPAN margin model and Derivatives Pricing System by external experts, and carry out plans for these external experts to perform a full validation of the Cash Market Margining model within the next two years. ASX Clear is encouraged to continually refine and enhance its margin backtesting and sensitivity analysis methodologies and their integration into existing risk management processes.
7. Liquidity risk	Broadly observed	In order to fully observe CCP Standard 7, ASX Clear should implement mechanisms consistent with forthcoming CPSS-IOSCO guidance on recovery planning that would fully address any uncovered liquidity shortfall related to derivatives transactions following a participant default. ASX Clear should also complete the full validation of its liquidity stress test model by external experts, and enhance its sensitivity analysis approach to allow it to systematically examine the effect of underlying assumptions. This should include assumptions on the porting of client derivatives positions and the degree to which timely settlement can be achieved without the use of offsetting transaction arrangements.
8. Settlement finality	Observed	
9. Money settlements	Observed	ASX Clear is encouraged to work with ASX Settlement to introduce a framework to formally engage Payment Providers on changes to settlement processes in response to regulatory or market-driven change.
10. Physical deliveries	Not applicable	
11. Exchange-of-value settlements	Observed	
12. Participant default rules and procedures	Observed	
13. Segregation and portability	Broadly observed	In order to fully observe CCP Standard 13, ASX Clear should complete implementation of enhanced client protection arrangements for cash equities that provide materially equivalent protection to house/client omnibus account segregation.
14. General business risk	Broadly observed	In order to fully observe CCP Standard 14, ASX Clear should carry out plans to enhance its recovery plan in line with forthcoming CPSS-IOSCO guidance, and ensure that the capital it holds under CCP Standard 14.2 continues to be sufficient to fund the enhanced plan. As ASX Clear further develops its recovery plan, it should also review and integrate its recapitalisation processes with its broader recovery planning arrangements.

Standard	Rating	Recommendation
15. Custody and investment risks	Broadly observed	In order to fully observe CCP Standard 15, ASX Clear should implement plans to further reduce the concentration of unsecured exposures to the large domestic banks under the ASXCC treasury investment policy. The Bank has opened a dialogue with ASX on the detail of its expectations for the credit and liquidity risk profile of ASXCC's investment portfolio, as well as the time frame over which these expectations should be met.
16. Operational risk	Observed	In order to continue to observe CCP Standard 16, ASX Clear will need to review its operational arrangements in light of the proposed establishment of a special resolution regime for FMIs in Australia. In particular, ASX Clear will need to ensure that its operations are organised in such a way as to facilitate effective crisis management actions under that regime once finalised.
17. Access and participation requirements	Observed	
18. Tiered participation arrangements	Observed	
19. FMI links	Observed	
20. Disclosure of rules, key policies and procedures, and market data	Observed	
21. Regulatory reporting	Observed	

Table 3: ASX Clear (Futures) Ratings and Recommendations

Standard	Rating	Recommendations
1. Legal basis	Observed	
2. Governance	Observed	
3. Framework for the comprehensive management of risks	Broadly observed	In order to fully observe CCP Standard 3, ASX Clear (Futures) should implement plans to enhance its recovery plan consistent with forthcoming CPSS-IOSCO guidance on recovery planning.
4. Credit risk	Broadly observed	<p>In order to fully observe CCP Standard 4, ASX Clear (Futures) should implement mechanisms consistent with forthcoming CPSS-IOSCO guidance on recovery planning that would fully address any uncovered credit losses and replenish financial resources following a participant default.</p> <p>ASX Clear (Futures) should also complete the full validation of its capital stress test model by external experts. ASX Clear (Futures) is encouraged to continually refine and enhance its reverse stress testing methodology and its integration into existing risk management processes.</p>
5. Collateral	Observed	
6. Margin	Broadly observed	<p>In order to fully observe CCP Standard 6, ASX Clear (Futures) should complete the full validation of its SPAN and OTC IRS Historic VaR margin models by external experts.</p> <p>ASX Clear (Futures) is encouraged to carry out plans to further enhance its margin backtesting and sensitivity analysis to test coverage of actual static participant portfolios on a daily and periodic basis. ASX Clear (Futures) is also encouraged to continually refine and enhance its margin backtesting and sensitivity analysis methodologies and their integration into existing risk management processes.</p>
7. Liquidity risk	Broadly observed	<p>In order to fully observe CCP Standard 7, ASX Clear (Futures) should implement mechanisms consistent with forthcoming CPSS-IOSCO guidance on recovery planning that would fully address any uncovered liquidity shortfall following a participant default. ASX Clear (Futures) should also complete the full validation of its liquidity stress test model by external experts.</p> <p>ASX Clear (Futures) is encouraged to continually refine and enhance its liquidity reverse stress testing methodology and its integration into existing risk management processes.</p>
8. Settlement finality	Observed	
9. Money settlements	Observed	
10. Physical deliveries	Observed	
11. Exchange-of-value settlements	Observed	
12. Participant default rules and procedures	Observed	
13. Segregation and portability	Broadly observed	In order to fully observe CCP Standard 13, ASX Clear (Futures) should carry out plans to implement enhanced client segregation arrangements that support the lodgement of excess client collateral.
14. General business risk	Broadly observed	In order to fully observe CCP Standard 14, ASX Clear (Futures) should carry out plans to enhance its recovery plan in line with forthcoming CPSS-IOSCO guidance, and ensure that the capital it holds under CCP Standard 14.2 continues to be sufficient to fund the enhanced plan. As ASX Clear (Futures) further develops its recovery plan, it should also review and integrate its recapitalisation processes with its broader recovery planning arrangements.
15. Custody and investment risks	Broadly observed	In order to fully observe CCP Standard 15, ASX Clear (Futures) should implement plans to further reduce the concentration of unsecured exposures to the large domestic banks under the ASXCC treasury investment policy. The Bank has opened a dialogue with ASX on the detail of its expectations for the credit and liquidity risk profile of ASXCC's investment portfolio, as well as the time frame over which these expectations should be met.

Standard	Rating	Recommendations
16. Operational risk	Observed	In order to continue to observe CCP Standard 16, ASX Clear (Futures) will need to review its operational arrangements in light of the proposed establishment of a special resolution regime for FMIs in Australia. In particular, ASX Clear (Futures) will need to ensure that its operations are organised in such a way as to facilitate effective crisis management actions under that regime once finalised.
17. Access and participation requirements	Observed	
18. Tiered participation arrangements	Observed	
19. FMI links	Observed	
20. Disclosure of rules, key policies and procedures, and market data	Observed	
21. Regulatory reporting	Observed	

Table 4: ASX Settlement Ratings and Recommendations

Standard	Rating	Recommendations
1. Legal basis	Observed	
2. Governance	Observed	
3. Framework for the comprehensive management of risks	Broadly observed	In order to fully observe SSF Standard 3, ASX Settlement should implement plans to enhance its recovery plan consistent with forthcoming CPSS-IOSCO guidance on recovery planning.
4. Credit risk	Not applicable	
5. Collateral	Not applicable	
6. Liquidity risk	Observed	
7. Settlement finality	Observed	
8. Money settlements	Observed	ASX Settlement is encouraged to work with ASX Clear to introduce a framework to formally engage Payment Providers on changes to settlement processes in response to regulatory or market-driven change.
9. Central securities depositories	Observed	
10. Exchange-of-value settlement systems	Observed	
11. Participant default rules and procedures	Observed	
12. General business risk	Broadly observed	In order to fully observe SSF Standard 12, ASX Settlement should carry out plans to enhance its recovery plan in line with forthcoming CPSS-IOSCO guidance, and ensure that the capital it holds under SSF Standard 12.2 continues to be sufficient to fund the enhanced plan. As ASX Settlement further develops its recovery plan, it should also review and integrate its recapitalisation processes with its broader recovery planning arrangements.
13. Custody and investment risks	Not applicable	
14. Operational risk	Observed	In order to continue to observe SSF Standard 14, ASX Settlement will need to review its operational arrangements in light of the proposed establishment of a special resolution regime for FMIs in Australia. In particular, ASX Settlement will need to ensure that its operations are organised in such a way as to facilitate effective crisis management actions under that regime once finalised.
15. Access and participation requirements	Observed	
16. Tiered participation arrangements	Observed	
17. FMI links	Observed	
18. Disclosure of rules, key policies and procedures, and market data	Observed	
19. Regulatory reporting	Observed	

Table 5: Austraclear Ratings and Recommendations

Standard	Rating	Recommendations
1. Legal basis	Observed	
2. Governance	Observed	
3. Framework for the comprehensive management of risks	Broadly observed	In order to fully observe SSF Standard 3, Austraclear should implement plans to enhance its recovery plan consistent with forthcoming CPSS-IOSCO guidance on recovery planning.
4. Credit risk	Not applicable	
5. Collateral	Not applicable	
6. Liquidity risk	Observed	
7. Settlement finality	Observed	
8. Money settlements	Observed	
9. Central securities depositories	Observed	
10. Exchange-of-value settlement systems	Observed	
11. Participant default rules and procedures	Observed	
12. General business risk	Broadly observed	In order to fully observe SSF Standard 12, Austraclear should carry out plans to enhance its recovery plan in line with forthcoming CPSS-IOSCO guidance, and ensure that the capital it holds under SSF Standard 12.2 continues to be sufficient to fund the enhanced plan. As Austraclear further develops its recovery plan, it should also review and integrate its recapitalisation processes with its broader recovery planning arrangements.
13. Custody and investment risks	Observed	
14. Operational risk	Observed	In order to continue to observe SSF Standard 14, Austraclear will need to review its operational arrangements in light of the proposed establishment of a special resolution regime for FMIs in Australia. In particular, Austraclear will need to ensure that its operations are organised in such a way as to facilitate effective crisis management actions under that regime once finalised.
15. Access and participation requirements	Observed	
16. Tiered participation arrangements	Observed	
17. FMI links	Observed	
18. Disclosure of rules, key policies and procedures, and market data	Observed	
19. Regulatory reporting	Observed	

Table 6: Other Regulatory Priorities

Standard	Facilities	Priority
CCP Standard 2, SSF Standard 2	All facilities	The Bank will continue to monitor the effectiveness of user governance arrangements in each of the ASX CS facilities.
CCP Standard 3, SSF Standard 3	All facilities	The Bank will continue to monitor ASX's maintenance of existing policies and standards, and the finalisation of new policies and standards that document ASX's risk management framework and practices.
CCP Standards 4, 5, 6, 7	Both CCPs	The Bank will monitor developments in ASX's model validation framework, including: <ul style="list-style-type: none"> the outcome of external model validation processes for stress testing and margin models the ongoing implementation of ASX's monthly stress testing review, and daily, monthly and periodic margin backtesting and sensitivity analysis processes ongoing review of collateral haircut rates the outcome of sensitivity analysis to verify assumptions used in portfolio margining.
CCP Standard 4	ASX Clear (Futures)	The Bank will continue to monitor the effectiveness of the measures implemented by ASX Clear (Futures) to manage the risks associated with real-time novation of OTC derivatives transactions.
CCP Standard 5	Both CCPs	The Bank will continue to discuss with ASX its approach to monitoring collateral concentration risks.
CCP Standard 6	Both CCPs	The Bank will continue to discuss with ASX its approach to the ongoing measurement and management of procyclicality in its margin models.
CCP Standard 7, SSF Standard 6	ASX Clear, ASX Settlement	The Bank will monitor planned enhancements to ASX Clear's liquidity stress test to provide additional information to management and the Bank on the degree of contingent reliance on offsetting transaction arrangements with participants to meet settlement-related payment obligations in a participant default. The Bank will discuss further with ASX how such information might best be disseminated to participants to support their liquidity management and planning. Since ASX Settlement relies on similar underlying calculations when addressing failed transactions in the settlement batch more broadly, the Bank will discuss with ASX whether any additional information could be disclosed to participants on the potential liquidity impact of reconstitution of the ASX Settlement batch in scenarios that extend beyond the management of an ASX Clear participant default.
SSF Standard 8	Austraclear	The Bank will monitor developments in the Foreign Currency Settlement Service to ensure that money settlement arrangements remain appropriate for the level of activity within the service.
CCP Standard 12	ASX Clear (Futures)	The Bank will continue to monitor ASX Clear (Futures)' annual review of its commingled arrangements for pooled financial resources, as well as the adequacy of those resources.
CCP Standard 12	ASX Clear (Futures)	The Bank will continue to monitor the testing and review of default management procedures for OTC interest rate derivatives by ASX Clear (Futures) and the Default Management Group.
CCP Standard 16, SSF Standard 14	All facilities	The Bank will discuss with ASX its approach to cyber security, and in particular its governance arrangements, mechanisms for prevention and detection, and plans to recover from a cyber-related incident.
CCP Standard 18	Both CCPs	The Bank will monitor the operation of ASX's risk-based approach to monitoring concentration risks in tiered participation, particularly in the light of the new individual client account structure in ASX Clear (Futures).
CCP Standard 20, SSF Standard 18	All facilities	The Bank will continue to monitor steps by ASX Clear to refine and enhance its disclosure, including in response to forthcoming CPSS-IOSCO quantitative disclosure standards for CCPs.

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 2001* to comply with applicable FSS determined by the Reserve 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 CS facility licensee's board and senior management.

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

- ASX Clear Pty Limited (ASX Clear) provides CCP services for 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) Pty Limited (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 OTC interest rate derivatives.

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 arrangements incorporated within the settlement process. Since SSFs are important FMIs that are critical to the smooth functioning of the financial system, 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:

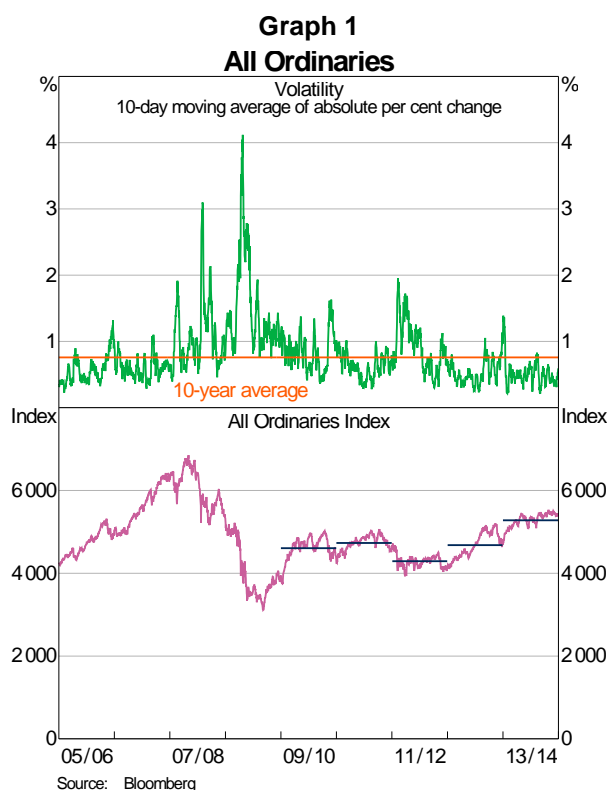
- ASX Settlement Pty Limited (ASX Settlement) provides SSF services for cash equities, debt products and warrants traded on the ASX and Chi-X markets; ASX Settlement also provides SSF services for non-ASX listed securities.
- Austraclear Limited (Austraclear) provides SSF services for trades in debt securities, including government bonds and repurchase agreements.

3.2 Activity in the ASX Clearing and Settlement Facilities

As in 2012/13, price volatility in the markets cleared and settled by the ASX CS facilities remained low in 2013/14 relative to the crisis and immediate post-crisis periods. Trends in daily average trading values and volumes were also broadly similar to those observed in the previous year. Daily average values for cash equity trades cleared by ASX Clear declined, as did the volume of trades in equity options. The volume of trading in the main futures contracts cleared by ASX Clear (Futures) continued to increase, however. An increase in the daily average value of debt securities settled in Austraclear reversed the decline of the previous year.

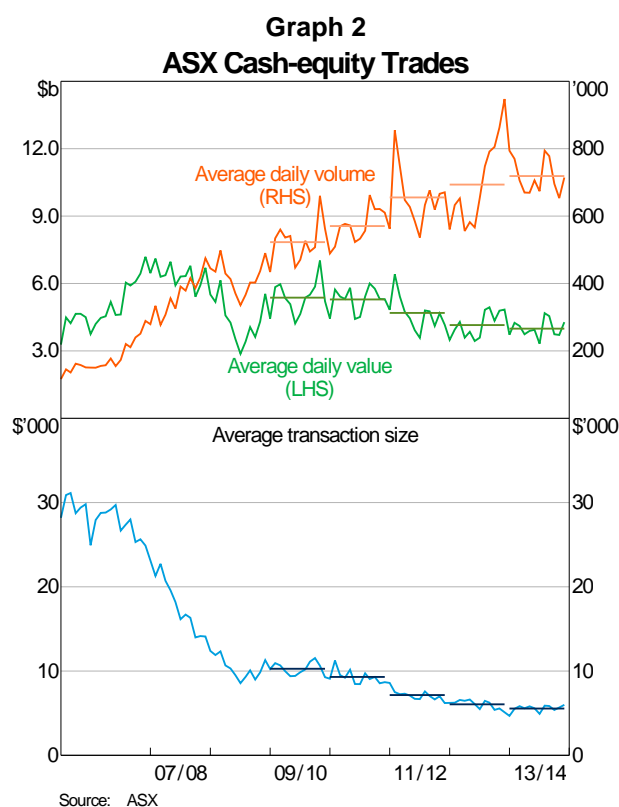
3.2.1 Cash equities

The average volatility in equity prices in 2013/14, as measured by the average of absolute daily percentage changes in the S&P ASX All Ordinaries Index, was unchanged from the previous year, remaining at 0.5 per cent (Graph 1). After easing from the elevated levels recorded in the first half of 2013, volatility remained below the 10 year average for much of 2013/14. These developments are broadly in line with trends in major international equity markets.



The daily average number of cash equity trades increased by 4 per cent in 2013/14, while the daily average value fell by 4 per cent (Graph 2). These diverging trends resulted in a decline in average trade size of 7 per cent in 2013/14, a fifth consecutive year-on-year decline. This at least in part reflects the continuation of a long-term trend associated with the growth in algorithmic trading.

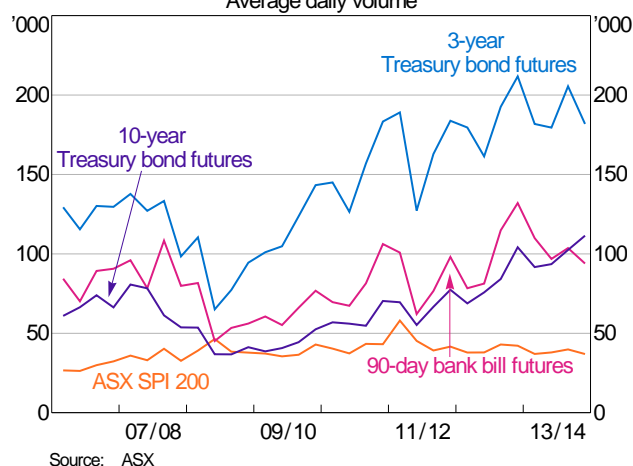
The daily average value of cash equity transactions settled by ASX Settlement decreased by 3 per cent in 2013/14, to \$17.1 billion. Settlement values differ from trade values because they reflect both market traded and non-market transactions. Also taking into account multilateral netting of participants' obligations, average daily settlements between participants associated with these trades increased marginally in 2013/14, to \$8.3 billion.



3.2.2 Derivatives

The average daily trading volume on the ASX 24 market increased by 2 per cent in 2013/14, to around 460 000 trades per day (Graph 3). A sharp increase in turnover of 10-year Treasury bond futures (up 20 per cent) was slightly offset by a decline in trading activity in ASX SPI 200 futures (down 6 per cent). Daily average volumes of the other two most actively traded contracts, 90-day bank bill futures and 3-year Treasury bond futures, were broadly similar to 2012/13.

Graph 3
ASX 24 Derivatives Trades
Average daily volume



In contrast, the average daily number of equity options contracts traded on the ASX market declined in 2013/14, by 21 per cent. In response to these declining volumes, ASX established an exchange-traded options advisory panel, representing participants and clients, and has implemented a number of changes proposed by that panel. These include enhanced quotation obligations for market makers to promote greater liquidity, and changes to crossing rules designed to encourage users of OTC options to instead execute these on market.

3.2.3 Debt securities

In 2013/14, the average daily value of debt securities settled in Austraclear increased by around 7 per cent, to \$40.5 billion. This includes the value of securities under repurchase agreements (other than intraday repurchase agreements with the Bank). There has been no material migration of settlement activity in Commonwealth Government securities (CGS) from Austraclear to ASX Settlement since the May 2013 launch of a service aimed at retail investors to trade, clear and settle interests in CGS.

3.3 Risk Management in the ASX Central Counterparties

A CCP is exposed to potential losses arising in the event of participant default. ASX Clear and ASX Clear (Futures) manage this risk in a number of ways, including through participation requirements, margin collection, the maintenance of pooled risk resources, 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 hold at least \$5 million in capital. During the Assessment period, General Participants (which may clear on behalf of third-party trading participants) were required to hold at least \$20 million in capital; this requirement was lowered in August 2014 for participants that clear for only a small number of third parties. See Section 3.5.6 for further discussion of participation requirements at ASX Clear.

- ASX Clear (Futures) requires participants to hold at least \$5 million in net tangible assets (NTA). Further to the launch of the OTC derivatives clearing service, ASX has introduced a higher minimum NTA (or Tier 1 Capital) requirement of \$50 million for OTC derivatives participants.

3.3.2 Margin collection

The CCPs cover their credit 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.* The CCPs are also exposed to 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. To mitigate this risk, both CCPs routinely collect initial margin from participants.
- *Intraday margin.* Both CCPs monitor participants’ portfolios intraday, to take account of changes in both prices and positions. Intraday calls may be made where there is significant erosion in the margin cover provided by individual participants for derivatives positions. Intraday margin calculations are carried out routinely in ASX Clear (Futures), but calls may also be made on an ad-hoc basis in both CCPs.
- *Additional initial margin.* The CCPs may also make calls for ‘Additional Initial Margin’ (AIM) when exceptionally large or concentrated exposures are identified through stress testing, or when predefined limits on the ratio of positions to capital are exceeded.

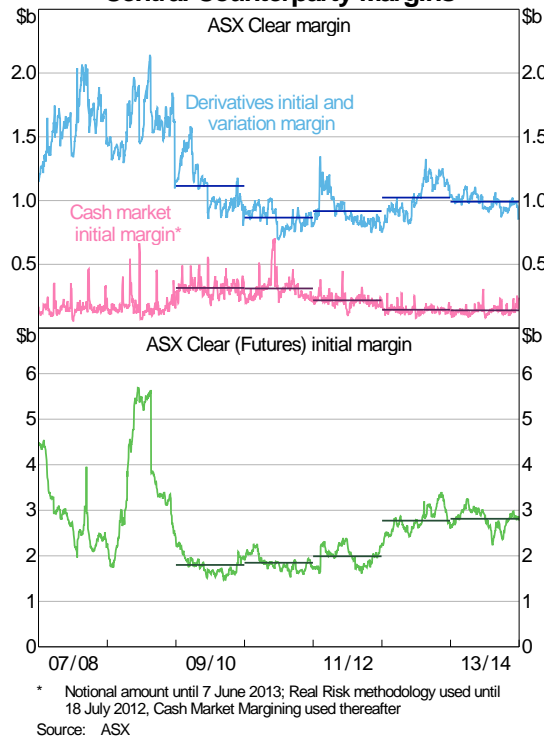
ASX requires that margin be posted in the form of cash or securities that ASX would be able to rapidly and reliably liquidate in the event of the participant’s default. ASX applies haircuts to non-cash collateral to cover market risk on the liquidation of securities.⁹ Much of the margin posted across the two CCPs in 2013/14 took the form of cash, with an average of 43 per cent of margin requirements in ASX Clear and 98 per cent of Australian dollar margin requirements in ASX Clear (Futures) met in this way over the Assessment period. Clients of participants in ASX Clear commonly post collateral in excess of margin requirements for equity derivatives; in 2013/14, on average only 16 per cent of total non-cash collateral posted in ASX Clear was required to meet margin obligations.

As measured by margin requirements, the CCPs’ total credit exposure in 2013/14 was unchanged from the previous year.

- Margin held by ASX Clear against equity derivatives decreased by 3 per cent in 2013/14, in part reflecting lower open interest (Graph 4, top panel). 2013/14 was the first full year in which ASX Clear collected initial and variation margin on cash equity positions. Initial margin held by ASX Clear against unsettled cash equity transactions declined by 7 per cent relative to the margin notionally calculated on these transactions in 2012/13 prior to implementation of the margining regime (Graph 4, top panel). This decline was largely due to more volatile price data from 2011/12 dropping out of the sample period used for margin calculations.

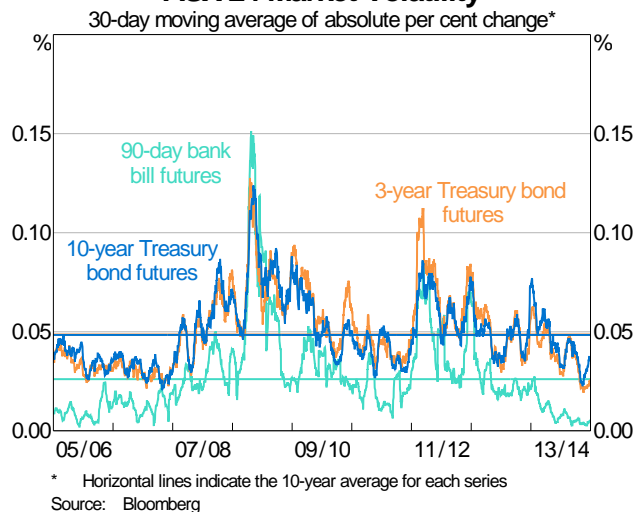
⁹ Haircuts also apply to foreign currency collateral to cover exchange rate risk.

Graph 4
Central Counterparty Margins



- Initial margin held by ASX Clear (Futures) rose by 1 per cent in 2013/14 (Graph 4, bottom panel). This is consistent with the slightly higher trading volumes and participant exposures, which were broadly offset by reductions in margin rates associated with a decline in volatility in the ASX 24 market (Graph 5).

Graph 5
ASX 24 Market Volatility



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 include both variation and initial margin.

- ASX Clear calculates margin when there is a significant market movement, with margin 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 8.00 am and 11.30 am, and at other times if there are significant movements in the prices of individual contracts. As with ASX Clear, margin is called if the calculated call amount represents an erosion of initial margin of 40 per cent or greater, and the call amount exceeds \$100 000. For OTC derivatives positions, intraday margin is calculated at scheduled intervals during the day and is called if the calculated call amount exceeds \$1 million.

Large and frequent intraday margin calls could indicate that initial margin does not adequately cover intraday exposures. During the Assessment period, there were 61 intraday margin calls at ASX Clear totalling \$37 million, and 670 calls at ASX Clear (Futures) totalling \$1.4 billion. The larger value of calls at ASX Clear (Futures) in part reflects the larger size of exposures. The larger number of intraday calls at ASX Clear (Futures) results from arrangements for the allocation of positions to accounts, with delays in participants' allocation of positions to client accounts resulting in calls on their house accounts (to which positions are initially allocated). As calls made for this latter reason reflect only the timing of participant operational processes, ASX has concluded that the frequency of intraday margin calls at ASX Clear (Futures) does not indicate inadequate margin cover. This view is supported by the results of backtesting (see Section 4.3.2). The average amount of intraday margin called (on those days when calls were made) for ASX Clear and ASX Clear (Futures) was \$1.5 million and \$5.6 million, respectively, or less than 1 per cent of average daily initial margin called in either facility.

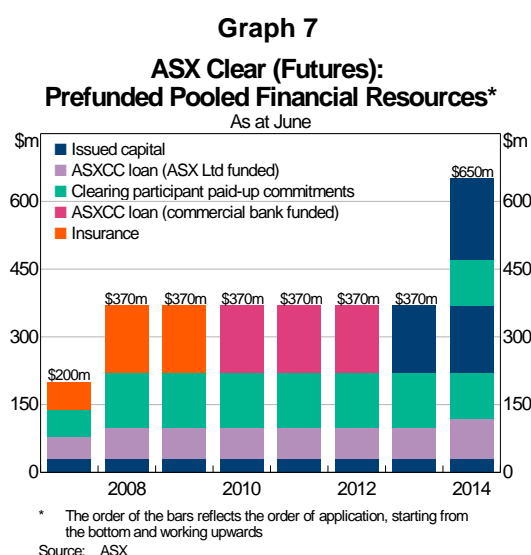
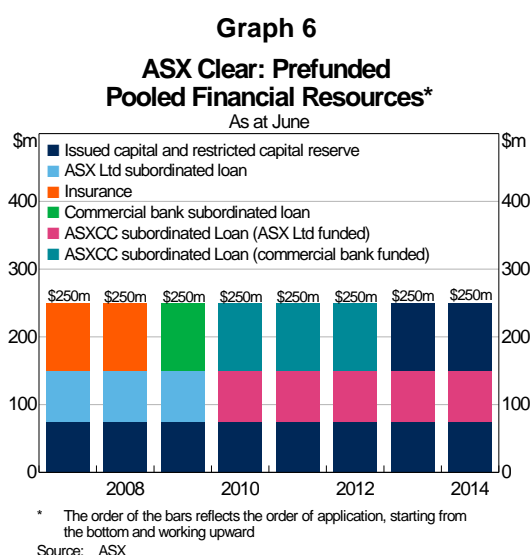
The CCPs conduct regular and ad hoc margin reviews to ensure that margin rates are set at levels appropriate to the prevailing risk environment. During the Assessment period, ASX Clear made four margin rate changes for its derivatives products and three changes to fixed margin rates for cash equities, while ASX Clear (Futures) made 10 changes to the price margin intervals ('price scanning range') of its five major futures contracts (SPI 200, 30-day interbank cash rate, 90-day bank accepted bills, 3-year government bonds and 10-year government bonds). To validate their margin rate settings, the CCPs compare margin rates with observed price movements. Backtesting arrangements are described in Section 4. On a day-to-day basis, margin breaches are recorded whenever mark-to-market losses exceed 30 per cent of initial margin collected. During the Assessment period, 23 margin breaches were recorded for ASX Clear and 174 breaches were called for ASX Clear (Futures). Breaches at ASX Clear (Futures) were predominantly due to volatility in contracts with low liquidity, such as electricity futures.

3.3.3 The maintenance of 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. Should this prove insufficient to meet the CCP's obligations, it may draw on a fixed quantity of pooled financial resources.

- During the Assessment period, ASX Clear's prefunded pooled financial resources totalled \$250 million (Graph 6). 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 (ASXCC). If exhausted, prefunded resources may be supplemented by 'emergency assessments' on surviving participants of up to \$300 million, which must be paid within a reasonable time frame if called.

- During the Assessment period, ASX Clear (Futures)' prefunded pooled financial resources increased from \$370 million to \$650 million (Graph 7). This was funded by own equity from a capital raising in June 2013 and contributions from OTC participants. At the end of the Assessment period, ASX Clear (Futures)' prefunded pooled financial resources included \$360 million of ASX capital, \$200 million of contributions from participants and a \$90 million subordinated loan from ASXCC. Changes to ASX Clear (Futures)' financial resources during the Assessment period are discussed in more detail in Section 3.7.



In order to assess the adequacy of its financial resources, ASX Clear performs daily capital stress tests which compare its available prefunded resources against the largest potential loss in the event of the default of a participant (and affiliates of the participant) under a range of extreme but plausible scenarios ('Cover 1'). Since 16 August 2013, ASX Clear (Futures) has stress tested the adequacy of its financial resources against requirements to meet obligations in the event of the default of the largest two participants and their affiliates (by exposure) in extreme but plausible circumstances ('Cover 2'). This reflects the Bank's supplementary interpretation of certain FSS, issued in the context of an EU regulatory equivalence assessment (see Sections 3.7 and 3.8).

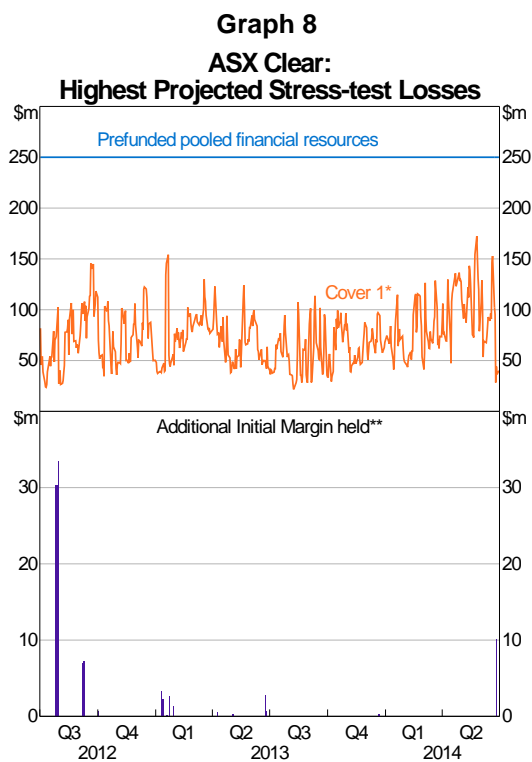
- ASX Clear's maximum projected stress-test losses remained well below the total prefunded pooled financial resources in 2013/14 (Graph 8).
- ASX Clear (Futures)' maximum projected stress-test losses exceeded the prefunded pooled financial resources for 12 days in 2013/14, peaking at \$96 million above the level of prefunded pooled financial resources (Graph 9). These results were investigated by ASX Clear (Futures), but since they were due to temporary trading activity by a small number of participants, an increase in pooled financial resources was not considered necessary.¹⁰

The CCPs call AIM when capital 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 internal credit ratings of participants. Since B-rated or lower-rated participants have STELs lower than the total prefunded

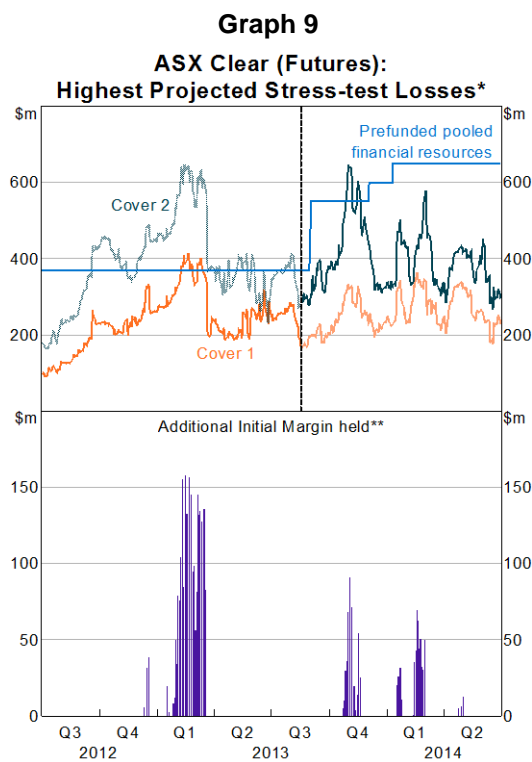
10 The adequacy of financial resources was compared against the largest potential loss in the event of the default of a participant and its affiliates prior to 16 August, and against the largest potential loss in the event of the default of the largest two participants and their affiliates thereafter.

resources at both CCPs, AIM can be called even when stress-test exposures do not exceed total resources.

ASX Clear (Futures) made STEL AIM calls on three participants across 49 days, with the largest call totalling \$69.5 million. ASX Clear made STEL AIM calls on three days against two participants, with the largest totalling \$10.1 million.



* Projected stress test losses include the assumed default of affiliated firms from 1 April 2013
 ** Additional Initial Margin is called whenever a participant's highest stress-test exposure exceeds its stress-test exposure limit; this does not include Additional Initial Margin called based on capital-based position limits
 Source: ASX



* Stress tests conducted on a Cover 1 basis prior to 19 August 2013, and a Cover 2 basis from that date
 ** Additional Initial Margin is called whenever a participant's highest stress-test exposure exceeds its stress-test exposure limit; this does not include Additional Initial Margin called based on capital-based position limits
 Source: ASX

The CCPs also perform daily liquidity stress testing in order to verify that they would have sufficient financial resources readily available to make payments in the event of a participant default.

- ASX Clear conducts separate liquidity stress tests based on a range of close-out scenarios to give a daily maximum potential liquidity requirement, which is then compared with the available financial resources (AFR).¹¹ To be considered a breach, a stress-test result must exceed the AFR for more than three consecutive days, reflecting the three-day cash market settlement cycle. During the Assessment period, stress-test results at ASX Clear exceeded the AFR for 28 days, although since none of these exceeded the AFR for more than three days no breaches were recorded.

11 Different assumptions currently apply to participants with an internal credit rating of A or B. ASX currently assumes that it would use liquidity from other participants provided via 'offsetting transaction arrangements' to meet cash market settlement obligations arising from a participant default (see Section 3.6.3).

- ASX Clear (Futures)' liquidity stress-test scenarios are based on the same scenarios as used in its capital stress tests. During the Assessment period, stress-test results exceeded the AFR for 16 days. These results were due to temporary trading activity by a small number of participants and ASX concluded that its financial resources were adequate.

3.3.4 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, 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 financial and operational information that participants are required to submit to the CCPs. The CCPs also determine and review participants' internal credit ratings, drawing in part on information provided by participants in their regular financial returns to ASX, and maintain a 'watch list' of participants deemed to warrant more intensive monitoring.

The CCPs have wideranging powers to sanction participants in order to preserve their financial and operational integrity. The CCPs may suspend or terminate a participant's authority to clear 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 may 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.

As an example of these risk management and compliance activities, during the Assessment period a participant in ASX Clear cleared a large concentrated cash market transaction that caused it to breach its capital-based position limit (CBPL). The CBPL limits the size of positions relative to capital that a participant is able to clear; a participant that breaches this limit is required to post additional collateral. Although the participant was able to meet its ordinary margin requirements on the trade, it did not have sufficient funds available to meet an additional CBPL-related margin call. ASX imposed restrictions on the participant's admission as an ASX Clear participant and it continues to engage with the participant on the adequacy of its governance framework and risk control systems. The apparent misconduct is subject to ongoing investigation. No participants were placed on ASX's watch list during 2013/14.

3.4 Operational Performance of the ASX Clearing and Settlement 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 a 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 7). System availability was 100 per cent for all systems except for Austraclear, while peak usage was below the target of 50 per cent for all systems.

Table 7: ASX CS Facility System Availability and Usage Statistics for 2013/14

Facility	Core system	Availability Per cent	Peak usage Per cent	Average usage Per cent
ASX Clear	DCS	100	30	13
ASX Clear (Futures)	SECUR/Genium	100	15	9
ASX Clear (Futures)	Calypso	100	3	1
ASX Settlement	CHESS	100	20	14
Austraclear	EXIGO	99.95	35	22

As indicated by the availability statistics for ASX's CS facilities, only Austraclear experienced disruptions to continuous service, discussed below. However, other facilities experienced minor incidents that did not interrupt service availability.

During the Assessment period, ASX upgraded its clearing system for exchange-traded derivatives at ASX Clear (Futures) from the SECUR system to the Genium system. ASX is also improving its capacity to directly manage operational risk at Austraclear through an insourcing project to take over all support of the core EXIGO system. The CS facilities must also manage operational interdependencies with their participants. These and other operational performance matters are described in the detailed assessment in Appendix A.

3.4.1 Minor incidents

There were two incidents affecting service availability in Austraclear during the Assessment period.

- On 13 September 2013, settlement messages in EXIGO were suspended for 42 minutes due to a failure of data to properly synchronise. All transactions that failed to settle during the incident were subsequently settled, and Austraclear and RITS performed a reconciliation of trades to ensure that both cash and securities legs had settled correctly. A workaround was developed, with a longer-term solution to be implemented as part of the EXIGO insourcing project (see Section 3.4.3).
- On 7 October 2013, participants were unable to connect to EXIGO for a period of 46 minutes, due to the expiration of a security certificate used for verification. Austraclear has since reviewed all deployed certificates and has updated its procedures for the management of security certificates. The outage occurred on a NSW public holiday, which limited its impact on the market.

Despite these two incidents, Austraclear was able to meet its availability target during the Assessment period.

In addition, the CS facilities experienced several incidents that did not affect system availability.

- On 12 September 2013, participants that rely on internet connectivity to access Austraclear were unable to log on due to a component failure at the primary operations site. Internet connectivity was restored 49 minutes later when ASX failed over to the secondary site.
- On 16 December 2013, settlement of a small number of newly listed fixed-interest securities series registered in Austraclear was disrupted due to the breach of a limit within the SECUR component of EXIGO. Austraclear resolved the issue by the end of the day. The SECUR component of EXIGO will be removed as part of the insourcing project described in Section 3.4.3.

- In January 2014, it was discovered that small errors had been made in calculating the margin requirements of participants in the ASX Clear (Futures) OTC derivatives clearing service. All of the affected participants were notified and interest was paid to participants that were over-margined. The issue was rectified on 28 January. ASX has implemented changes to its end-to-end testing approach for future projects in response.
- In December 2013, a processing error resulted in ASX Clear incorrectly excluding from exercise some in-the-money exchange-traded options held by a participant. ASX has since made changes to prevent this from reoccurring.

3.4.2 Genium clearing

On 19 May 2014, ASX Clear (Futures) upgraded its core clearing system for exchange-traded derivatives from SECUR to the Genium INET clearing system (Genium), which is a more recent system offered by the same vendor, NASDAQ OMX. Genium offers additional functionality and processing capacity relative to SECUR, which was of particular importance in supporting the transition to individual accounts for futures clients in July 2014 (see Section 3.6.2). The Genium system is covered by similar vendor support arrangements as those previously in place in respect of SECUR, in particular where changes to system components or underlying source code is involved. The implementation of Genium went smoothly, reflecting an extended period of pre-launch engagement and testing with both participants and vendors of participant systems (see Section 3.5.5).

3.4.3 EXIGO insourcing

EXIGO is the core system used by Austraclear. During 2011/12, Austraclear commenced an insourcing project to take over EXIGO's third-level operational and software support (requiring expert knowledge of the core system), which is currently provided by NASDAQ OMX. This project has the potential to significantly reduce 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 project will also significantly simplify the system architecture through the removal of legacy components, including the SECUR component discussed in Section 3.4.1. Finally, this simplified architecture is expected to improve operational and recovery procedures.

Insourcing EXIGO requires that ASX manage the transition process and adequately resource third-level support for Austraclear. ASX has recruited developers for this project and a senior developer from NASDAQ OMX was seconded to Sydney during the development phase. In addition, ASX staff have spent time at the vendor's offices to acquire the specialist knowledge required to provide advanced support for EXIGO. As a contingency, ASX has the option to extend existing third-party support arrangements for as long as required. This option was utilised to support a delay in the targeted completion date from the end of 2014 to the first quarter of 2015, in part to accommodate the resource requirements of projects supporting new services, such as the Foreign Currency Settlement Service and ASX Collateral (see Section 3.5.5).

3.4.4 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. Most notable were increases in participation in ASX Clear (Futures), reflecting new participants in the OTC derivatives service, and Austraclear, in part reflecting

increased participation by credit unions and building societies. Participation requirements and the effect of participation structures on operational risk management are discussed in Sections 3.5.5 and 3.5.6.

Table 8: ASX CS Facility Participation Levels

Facility	End June 2014	End June 2013	Comments
ASX Clear	36	39	At end of June 2014, there were 10 participants offering third-party or related-entity services; excludes inactive participants.
ASX Clear (Futures)	19	14	Participants are predominantly large foreign banks and their subsidiaries. Eight participants clear OTC transactions and 15 clear exchange-traded derivatives.
ASX Settlement	78	85	Excludes temporary special-purpose participants.
Austraclear	847	786	At the end of June 2014, there were 186 full participants, 199 associate participants, 322 public trust participants and 140 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 2012/13 Assessment. Some of these related to FSS that were initially subject to transitional relief and came into force during the 2013/14 Assessment period. These are discussed in Section 3.6. 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 2012/13 Assessment related to new FSS requirements governing model validation, stress testing and collateral processes, as well as the coverage of financial resources.

Model validation

The Bank's 2012/13 Assessment recommended that ASX Clear and ASX Clear (Futures) implement plans to strengthen the analysis of their margin and stress-testing models through comprehensive model validation processes. These include annual independent validation, backtesting, reverse stress testing, sensitivity analysis, and detailed regular reviews of model performance, scenarios and underlying parameters and assumptions. These processes are governed by ASX's internal Model Validation Standard, which was updated during the Assessment period to take into account enhancements to ASX's model validation approach. A new Clearing Risk Quantification (CRQ) department was established by ASX in late 2013 to maintain and validate risk and pricing models (see Section 3.5.2).

During the 2013/14 Assessment period, ASX has significantly enhanced its margin backtesting processes, including daily backtesting and more detailed periodic backtesting of margin models across a range of actual and hypothetical portfolios. These backtesting processes are supplemented by periodic sensitivity analysis to test the performance of its margin models beyond the boundaries of existing assumptions. Stress-testing scenarios used by both CCPs are also subject to monthly backtesting, while ASX has developed reverse stress tests that aim to identify the market conditions

or characteristics of portfolios that could result in a credit or liquidity exposure in excess of prefunded financial resources at each CCP. Collateral haircut models are also subject to formal annual review.

ASX has also engaged external experts, initially for a three-year period, to conduct independent validations of key risk models, including stress-test and margin models. These validations will be progressively rolled out and reported to the Boards of the CCPs during 2014/15 (with the exception of cash market margining (CMM), which will be validated in the following year). The first validation, for the capital stress-test models, is due to be completed in September 2014, with validations of all models expected to be completed by the end of the year.

A more detailed description and assessment of ASX's model validation approach, including recommendations for further enhancements to this approach, is set out in Section 4.

Stress testing and financial resources

ASX Clear (Futures) increased the level of its pooled financial resources from \$370 million to \$650 million during 2013/14. This increase reflects the launch of ASX Clear (Futures)' OTC derivatives clearing service, and a transition to stress testing capital adequacy against the default of the two largest participants plus their affiliates in order to meet the requirements of the Bank's supplementary interpretation of the FSS (see Section 3.8). The increase in ASX Clear (Futures)' pooled financial resources and the impact of changes to financial cover on participant STELs are discussed in the context of broader changes to risk management to accommodate the clearing of OTC derivatives in Section 3.7.

ASX Clear will review its liquidity stress-testing approach in light of the introduction of arrangements to source liquidity from participants for the settlement of cash market transactions (see Section 3.6.3). In particular, ASX Clear will implement planned enhancements to ensure that its liquidity stress testing can routinely provide more information on the degree to which prefunded liquid resources can be relied on to meet payment obligations on a participant default, without the need to utilise offsetting transaction arrangements.

ASX has also reviewed its policy relating to the availability of discounts on AIM calls under 'normal' market conditions. Previously, A-rated and B-rated participants at both ASX Clear and ASX Clear (Futures) have been eligible for a discount on AIM calls of up to 50 per cent of the projected stress-test loss in excess of the STEL (up to \$500 million). These discounts were removed in 2008 after volatility in the S&P/ASX 200 increased significantly above historical levels. During the 2013/14 Assessment period ASX determined that it would no longer apply these discounts even in normal market conditions, and will remove provisions for such discounts from internal standards and procedures in the coming Assessment period.

Collateral

In April 2014, ASX Clear and ASX Clear (Futures) made changes to their Operating Rules and Procedures to further restrict the use of bank guarantees and letters of credit as collateral. These changes ensure that the use of bank guarantees to meet margin obligations for derivatives transactions is at the discretion of ASX.¹² ASX intends to use this discretion sparingly to limit the use of bank guarantees, which is currently low. As a transitional measure until June 2016, participants may also use bank guarantees to meet cash market margin obligations, but only in exceptional circumstances and at the discretion of ASX. Changes to the ASX Clear (Futures) Operating Rules have removed the option for participants to use letters of credit to meet contributions to pooled financial resources.

12 A further amendment removed the ability of participants to use bank guarantees to meet core capital requirements.

ASX also performed a broader review of its collateral policies over the Assessment period, developing a formal policy and internal standard to govern its approach to collateral eligibility and the determination of haircuts for non-cash and foreign currency collateral. The Bank will continue to discuss with ASX its approach to monitoring collateral concentration risks.

3.5.2 Governance and comprehensive management of risks

A number of enhancements to the governance of risk and other aspects of the ASX CS facilities' activities have been implemented during the Assessment period. These enhancements address regulatory priorities identified in the 2012/13 Assessment as well as respond to broader changes in the governance requirements of the ASX Group.

Board structure

Prior to 2014, the boards of all four ASX CS facilities (the CS Boards) shared common directors, reflecting the group-wide approach to the governance and oversight of clearing and settlement activities. In January 2014, this arrangement was altered in favour of two overlapping but non-identical sets of boards. One set of boards governs clearing and settlement of equities and equity derivatives in ASX Clear and ASX Settlement ('Equity Boards'), while the other set of boards has oversight of clearing and settlement of OTC bonds and derivatives, as well as futures, in ASX Clear (Futures) and Austraclear ('OTC and Futures Boards'). Each set of boards has in common three independent directors that are not directors of ASX Limited, as well as three directors who also sit on the ASX Limited Board (including the CEO). However, the Equity Boards have one director who does not sit on the OTC and Futures Boards and the OTC and Futures Boards have two directors who do not sit on the Equity Boards. Two directors constitute a quorum on each board.

The restructure of the CS Boards was largely driven by the increasingly divergent agenda items between the Equity Boards and the OTC and Futures Boards since development of the OTC derivatives clearing service in ASX Clear (Futures). However, the restructure also provides a mechanism for handling potential conflicts created by cross-directorships within the ASX Group. The reduction in the number of common directors between each of the CS facilities and ASX Limited, coupled with the quorum of two directors, allows matters that raise potential conflicts of interest to be considered and voted on without the involvement of directors who are also on the ASX Limited Board.

Governance of risk management

In October 2013, ASX established the CRQ department within its Risk division, building on changes to the governance of risk management in the 2012/13 Assessment period that included the formation of an internal Clearing Risk Policy Committee and Risk Quantification Group. The CRQ department was created in October 2013 by separating some of the functions and staff from the Clearing Risk Policy department, and recruiting additional staff. CRQ staff have led the development of ASX's model validation approach, discussed in Section 4. Following these changes, the Clearing Risk Policy department was renamed Clearing Risk Strategy and Policy and given dual responsibilities that reflect its new name. The department's strategic work focuses on the clearing risk implications of longer-term initiatives and the high-level design of clearing services, while its policy work involves developing and maintaining the framework for clearing risk policy and maintaining compliance with regulatory obligations.

Settlement risk framework

In November 2013, the CS Boards approved a new ASX Settlement Risk Policy Framework, which provides a formal structure for the development, governance and review of settlement risk policies

and standards. The CS Boards delegated authority for reviewing and maintaining the Settlement Risk Policy Framework to a Settlement Risk Policy Committee (SRPC). The SRPC is responsible for reviewing and approving settlement-risk related policies and standards under the Settlement Risk Framework prior to submission to the CS Boards, including an annual review of the Framework. The SRPC meets as required to address settlement policy matters and is comprised of the Group Executive, Operations (chair), the General Manager of Clearing and Settlement Operations, the General Manager of Settlement Services and the Deputy General Counsel. ASX is currently in the process of formally documenting the policies and standards referenced in the Framework. The Bank will continue to monitor the implementation of those policies and standards.

ASX has also formed a SSF Risk, Operations and Compliance Committee (SROCC), which acts as a discussion and information-sharing body for risks affecting the SSFs related to systems, operations and compliance. The SROCC meets monthly and includes the Group Executive, Operations (chair), the Chief Risk Officer, the General Manager of Clearing Risk Management, the General Manager of Participant Compliance, the General Manager of Clearing and Settlement Operations and the General Manager of Regulatory Assurance. The SROCC reports informally to the ASX Compliance Board and the CS Boards.

User governance

ASX has continued work to establish and enhance formal mechanisms for user governance of its CS facilities. ASX's user governance arrangements for cash equities clearing and settlement, established under the Code, are described in 'Box A: Code of Practice'.

The Bank's 2012/13 Assessment identified the establishment of a participant Risk Committee for ASX Clear (Futures) as a regulatory priority, in the light of supplementary interpretation of the FSS issued in August 2013 (see Section 3.8). A Risk Committee featuring representatives of the 18 ASX Clear (Futures) participants was established in April 2014. The committee is consulted on changes to the margin methodology, the default fund, position or liquidity limits, participation criteria, new products, and other changes affecting either ASX Clear (Futures)' risk model or Operating Rules. The Risk Committee's proposals and recommendations are presented to the ASX Clear (Futures) Board, which is required to justify any decision not to follow the committee's advice. Following the 2014 launch of enhanced client clearing arrangements for OTC and exchange-traded derivatives in ASX Clear (Futures), ASX intends to expand membership of the Risk Committee to include representatives of clients.

During the Assessment period, the Bank discussed with ASX the case for establishing a similar participant risk committee for ASX Clear. ASX determined that establishing a separate participant risk committee at ASX Clear was not necessary, given the availability of alternative means of seeking participant feedback on risk matters. ASX receives feedback on risk matters relating to the cash market via the cash equities Forum and Business Committee (see 'Box A: Code of Practice'), while it receives feedback on risk matters relating to exchange-traded options (ETOs) through an ETO Advisory Committee, as well as regular engagement with the ETO subcommittee of the Stockbrokers Association of Australia. The ETO Advisory Committee, representing participants and clients, was established to advise ASX in its response to declining volumes in the ETO market, but it also provides a forum for broader user feedback, including on risk management matters. However, ASX would review the case for establishing a separate risk committee for ASX Clear if there were significant changes to the regulatory or market environment.

User governance for Austraclear has been enhanced through the establishment of the Austraclear Advisory Committee in March 2014, following requests for greater user engagement from the Australian Custodial Services Association. Meetings of the Committee are held at least quarterly,

providing users a forum to give feedback to ASX on the design, operation and development of Austraclear services, as well as providing ASX with a forum to report to users. The Committee is made up of up to 10 representatives of major Austraclear participants (currently eight participant representatives are on the Committee, accounting for 90 per cent of Austraclear securities holdings), a representative from the Bank and a representative from the Australian Financial Markets Association.

Box A: Code of Practice

ASX released the *Code of Practice for Clearing and Settlement of Cash Equities in Australia* (the Code) on 9 August 2013. The Code was developed in response to the conclusions of the CFR and ACCC's review of competition in the clearing of cash equities, published in February 2013.¹³ The review concluded that a decision on any licence application from a CCP seeking to compete in the Australian cash equity market should be deferred for two years, and recommended that ASX establish a code of practice in the meantime. The Code commits ASX to enhance user engagement through the establishment of an advisory Forum, and to maintain transparent and non-discriminatory pricing of, and terms of access to, cash equity clearing and settlement services.

User governance

The advisory Forum established under the Code comprises senior representatives from ASX's clearing and settlement participants and other industry stakeholders that use ASX's clearing and settlement services. It is supported by a Business Committee comprising representatives of clearing participants, settlement participants and alternative market operators with a working knowledge of clearing and settlement matters. The Business Committee provides business and operational advice on the forward work program of the Forum and issues that are of interest to the industry. In addition, the Forum may from time to time convene technical committees to examine and provide advice on particular issues.

The advisory Forum met for the first time in October 2013. Since then, the Forum and Business Committee have progressed three main workstreams:

- *International cost benchmarking.* The cost benchmarking exercise overseen by the Forum is discussed below.
- *T+2 settlement.* The Forum identified a move to a two-day (T+2) settlement cycle for cash equities from the current three-day cycle as a key priority. This mirrors similar moves underway in a number of jurisdictions internationally. ASX released a consultation paper to seek industry views on a move to T+2 settlement in February 2014 and received widespread industry support for this initiative. ASX intends to implement T+2 settlement in early 2016 and continues to engage the Forum, Business Committee and wider stakeholders on details of the proposal. One matter under consideration is any implications of a shorter settlement cycle for the cut-off time for submitting settlement instructions to the daily settlement batch. A move to delay this cut-off time, while providing more time for participants to process transactions for settlement, would reduce the time available to ASX and Payment Providers to address any problems or delays to settlement.

13 The government's response to the CFR's recommendations is available at <<http://www.treasury.gov.au/PublicationsAndMedia/Publications/2013/competition-of-the-cash-equity-market>>.

- *Replacement of the CHES system.* The Forum identified a move to global messaging standards as an important initiative. A Technical Committee convened by the Forum to consider the use of global messaging standards concluded that it would be most efficient and cost effective to adopt ISO 20022 standard messaging as part of a broader replacement of the CHES clearing and settlement system within the next three to four years.

Pricing

Under the Code, ASX has committed to a number of initiatives regarding transparent and non-discriminatory pricing.

- ASX released a cost allocation and transfer pricing policy ahead of the release of its 2012/13 financial accounts. At the same time it published management accounts for its cash market clearing and settlement businesses showing the allocation of costs between clearing and settlement services. Management account income statements for these businesses were also included in ASX's financial statements for the half year ended 31 December 2013 and will be included as part of future releases of ASX Group financial statements.
- A global cost benchmarking of cash market clearing and settlement services was carried out by Oxera in the first half of 2014, with the Forum providing input on the scope and methodology of the review. Oxera's final report was presented to the Forum on 23 June 2014, concluding that ASX's cash equity clearing and settlement costs were broadly in line with international exchanges of comparable size.¹⁴ Under the Code, ASX has committed to commissioning an annual benchmarking of its pricing of cash equity clearing and settlement.

Access

Among the commitments relating to transparent and non-discriminatory access to clearing and settlement services under the Code, ASX undertook to consult approved market operators and approved listing market operators on the service level and information handling standards set up under its Trade Acceptance Service (TAS) and Settlement Facilitation Service.¹⁵ In accordance with this commitment, ASX released a consultation paper seeking feedback on enhancements to the service arrangements for alternative execution venues in January 2014. Reflecting feedback from the consultation process, ASX made amendments to the TAS Legal Terms and the associated Operational and Technical Standards and Information Handling Standard.¹⁶ The amendments, which came into effect on 1 July 2014, included: removing the TAS annual service fee;¹⁷ improving service levels by providing minimum notice periods for details of technical enhancements and operational changes affecting the service; ensuring that the requirements for AMOs under the Operational and Technical

14 Oxera's cost benchmarking study is available at <http://www.asx.com.au/cs/documents/Global_cost_benchmarking_of_cash_equity_clearing_settlement_services_Final_20Jun14.pdf>.

15 The TAS enables trades of ASX-quoted securities executed on any Australian licensed trading platform to be cleared and settled by ASX Clear and ASX Settlement on the same basis as those executed on the ASX market. The Settlement Facilitation Service enables transactions in CHES-eligible securities quoted on an alternative listing market to be settled by ASX Settlement on the same basis as trades effected on the ASX market.

16 The consultation paper is available at <http://www.asx.com.au/documents/public-consultations/consultation_paper_TAS_and_SFS_23Jan14.PDF>; ASX's response to the consultation is available at <http://www.asx.com.au/documents/public-consultations/TAS_and_SFS_Consultation_Outcomes_-_ASX_Response_to_Feedback.PDF>.

17 ASX has waived the TAS annual service fee from the commencement of the Code on 9 August 2013, and has stated that it will not charge this fee while the current market structure and the Code remain in place.

Standards are equivalent to the requirements that apply to the ASX market and its participants; and updating the Information Handling Standard to restrict the disclosure of confidential information received by ASX in connection with the TAS.

3.5.3 Participant default rules and procedures

The ASX CCPs' Default Management Framework (DMF) is intended to assist in the management of a clearing participant default and covers each stage of a default from its identification through to its conclusion. In the 2012/13 Assessment period, ASX undertook a review of the DMF in light of new requirements of the FSS and the introduction of clearing for OTC interest derivatives at ASX Clear (Futures). In the current Assessment period, ASX has made further changes to the DMF to take into account enhancements to auction procedures in the event of an OTC derivatives participant default, and the introduction of client clearing arrangements for OTC derivatives. These changes are discussed in further detail in Sections 3.6.2 and 3.7.

3.5.4 Business and investment risks

Investment policy

As recommended in the Bank's 2011/12 Assessment, ASX carried out a review of its treasury investment policy during the 2012/13 Assessment period. In accordance with the treasury investment policy endorsed annually by the CS Boards, ASXCC invests both cash margin collected and pooled risk resources in short-dated highly rated assets. The policy establishes counterparty eligibility criteria and sets investment limits to control investment counterparty risk. The Bank had expressed concerns 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. The Bank also expressed concern that where an entity related to the issuer counterparty was also a clearing participant, the performance of investments in the portfolio could be correlated with the very default event against which the CCPs' financial resources sought to provide cover. ASX's review concluded that a gradual move towards lower concentration of investments in the major banks and a greater reliance on secured investments would be appropriate, and ASX took steps to reduce the unsecured limit on its exposures to the large domestic banks.

During the current Assessment period, ASX reduced the limits applicable to the large domestic banks in recognition of their participation in the new OTC derivatives clearing service, and applied a further reduction in limits as part of the annual review of the ASXCC Investment Mandate. In addition, ASX has taken steps to diversify its unsecured exposures to a broader range of highly rated investment counterparties and has introduced arrangements allowing it to invest cash with selected counterparties on a secured basis. ASX plans to review concentration limits to investment counterparties again in 2015 and is working to further strengthen its capacity to invest on a secured basis.

The Bank welcomes the progress made by ASX in reducing the concentration of its unsecured exposures to the large domestic banks. However, the Bank expects further progress before the ASX CCPs will be deemed to have fully observed the relevant standard. The Bank has opened a dialogue with ASX on the detail of its expectations around credit limits on unsecured exposures to non-government-related entities and the liquidity profile of the investment portfolio. This dialogue will reveal any practical issues or implementation challenges. It will also clarify a reasonable time frame over which a transition should be achieved.

Recommendation. To fully observe CCP Standard 15 (Custody and Investment Risks), ASX Clear (Futures) and ASX Clear should implement plans to further reduce the concentration of unsecured exposures to the large domestic banks under the ASXCC treasury investment policy. The Bank has opened a dialogue with ASX on the detail of its expectations for the credit and liquidity risk profile of ASXCC's investment portfolio, as well as the time frame over which these expectations should be met.

Business risk capital

In the first half of 2013, ASX revised its approach to business risk capital to take into account the requirements of the new FSS and requirements arising from its own strategic projects, including the introduction of the OTC derivatives clearing service. Under this approach, ASX holds business risk capital at the group level to ensure that it cannot be applied by facilities to meet losses caused by a participant default. Of this group-wide business risk capital, \$15 million has been attributed to ASX Clear, \$60 million to ASX Clear (Futures) and \$157 million across the two SSFs. A group-wide capital buffer provides protection to allocated business risk capital against potential losses sustained elsewhere in the group.

The Bank's 2012/13 Assessment recommended enhancements to ASX's intragroup legal agreements to explicitly clarify the allocation and availability of business risk capital to each of the CS facilities. During the current Assessment period, ASX made amendments to the ASX Group Support Agreement that place an obligation on ASX to maintain sufficient capital to support the continued operations of each of the CS facilities in the event of general business losses. These amendments support the legal certainty of the facilities' access to business risk capital as required.

The implications of planned enhancements to ASX's recovery plans for the business risk capital requirements of the CS facilities are discussed in Section 3.6.1.

3.5.5 Operations

During the Assessment period, ASX's arrangements for managing its operations were tested by the implementation of new services, and enhanced in response to events that highlighted interdependencies with participants and external service providers.

ASX Collateral

In July 2013, ASX launched a centralised collateral management service (ASX Collateral) for the Australian market. Impending regulatory changes and other market developments are increasing demands on a limited pool of high-quality collateral, giving market participants a strong incentive to optimise their use of collateral. ASX's new service automates the optimisation and allocation of collateral, with title remaining and settlement continuing to take place in the existing domestic securities settlement facilities. The Bank's 2012/13 Assessment described the operational and settlement arrangements of ASX Collateral. ASX Collateral supports management of collateral held in Austraclear, with an extension to collateral settled by ASX Settlement and links to global collateral pools planned in due course. Material use of the service did not commence until June 2014, although most users participated in pilot transactions during the first half of 2014.

New settlement services

During the first half of 2014, ASX worked with Bank of China's Sydney branch to develop a settlement service in Austraclear for Chinese renminbi payments. Interest in the offshore use of renminbi for both trade and financial market transactions has grown following Chinese reforms, including a gradual

move towards a more market-determined exchange rate and incremental liberalisation of the capital account. The service, launched on 28 July 2014, is also able to support payments in other approved foreign currencies and at any designated settlement bank. Since the service was initially developed as a joint venture with Bank of China, at the time of launch the service supported only renminbi payments settling at Bank of China.

The Foreign Currency Settlement Service is designed to operate independently of Austraclear's systemically important AUD settlement activity. Operationally, the service is designed so that an interruption to RMB settlement would not interfere with Austraclear's AUD activity. While users of the service remain exposed to risks associated with settlement in commercial bank money, ASX has obtained a legal opinion confirming that the finality of foreign currency settlements in Austraclear is protected under Part 2 of the *Payment Systems and Netting Act 1998*, and has taken steps to ensure that the residual risks assumed by users of the service are fully disclosed. The Bank will monitor developments in the Foreign Currency Settlement Service to ensure that money settlement arrangements remain appropriate for the level of activity in the service.

In May 2014, ASX launched the mFund Settlement Service as a means of managing payments for managed fund units through multilateral net settlement within the CHES batch. Payments would otherwise occur through manual or paper-based arrangements. As with other proposals that expand the use of the CHES batch beyond settlement of novated transactions (and related transactions to prime the settlement of novated trades), the Bank will continue to monitor the composition of the daily settlement batch to ensure that the failure of mFund transactions to settle would not materially disrupt the settlement of novated market transactions.

Resource management

In recent years, ASX has undertaken work on close to 60 projects, including major projects such as the OTC derivatives clearing service and enhanced client clearing arrangements in ASX Clear (Futures) and ASX Collateral. In addition to work on these projects, often to challenging time frames, ASX has undertaken extensive work to enhance its risk management policies and develop its model validation framework in order to meet the requirements of the new FSS (see Section 4). This has tested the capacity of ASX's existing resources. Although targeted deadlines for key projects have largely been met, the Bank observed in its 2012/13 Assessment that the focus on achieving deadlines for the launch of new products creates the risk that work to maintain and enhance the core risk management framework of the CS facilities could be compromised.

In order to mitigate the risks associated with the increased demand on its resources, ASX has taken steps to increase its resource levels through additional staff, the use of consultants and partnerships with external service providers. For example, ASX has employed additional staff in building its CRQ department to support ASX's quantitative framework for CCP risk management (see Section 4). ASX has also focused on the development of automated processes in its operational and risk management areas to maximise the availability of existing staff resources.

The Bank is satisfied that increased demands on ASX's staff resources have not compromised its business-as-usual operational and risk management functions. The Bank will nevertheless continue to monitor developments to ensure that this remains the case.

Operational interdependencies

During the 2012/13 Assessment period, ASX took initial steps to address operational interdependencies with vendors of third-party systems used by multiple participants and with

outsourcing arrangements affecting participants' own systems. This work has continued in the current Assessment period.

- ASX has recruited technology relationship managers responsible for liaison with vendors of key systems used by participants. Under ASX's vendor engagement program, vendors are consulted early in the life of a project to ascertain its impact on vendor systems. ASX also uses liaison with vendors to discuss long-term technology plans. The readiness of vendor systems to accommodate the Genium clearing system in ASX Clear (Futures) a month ahead of schedule demonstrates the benefits of ASX's vendor engagement program.
- ASX has continued regular monitoring of participants' outsourcing arrangements, particularly those involving offshore service providers. This includes site visits by ASX staff to offshore-based outsourcing providers. ASX is preparing a guidance note on participant outsourcing arrangements that is expected to be published later in 2014. The guidance note will build on industry standard controls for outsourcing arrangements, including those set out in the Australian Prudential Regulation Authority's prudential standard on outsourcing.

Cyber security

The potential impact of a cyber-related incident on FMIs and the financial system more broadly has received increasing attention in both domestic and international contexts. The interim report of the Financial System Inquiry highlighted the increasing prevalence of cyber attacks and the potential for such attacks to be a source of systemic risk.¹⁸ Internationally, a working group of the CPSS has been analysing the implications of cyber security issues for FMIs, while FMI overseers in other jurisdictions have focused on cyber security as a key priority. In particular, the Bank of England has published a framework for testing cyber resilience, as well as a report summarising the results of an industry-wide cyber simulation exercise held late in November 2013. Scenarios considered in this exercise included disruption to CCP clearing processes for fixed income products.

ASX addresses cyber threats through an information security policy based on best practice standards, including strategies for mitigating cyber intrusions developed by the Australian Signals Directorate. This policy governs ASX's approach to the prevention, detection and response to a cyber-related incident. ASX is also engaged in dialogue with international peers on cyber security matters. The Bank will further discuss ASX's approach to cyber security in the coming Assessment period, including its governance arrangements, mechanisms for prevention and detection of cyber intrusions, and plans to recover from a cyber-related incident.

3.5.6 Participation and access

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

Review of risk-based participation requirements

To demonstrate their ongoing capacity to meet their financial obligations, clearing participants in ASX Clear are required to maintain minimum levels of 'core capital'.¹⁹ During the 2013/14 Assessment period, these minimum levels were \$5 million for participants that do not clear for other brokers

18 The *Financial System Inquiry Interim Report* is available at <<http://fsi.gov.au/publications/interim-report/>>.

19 '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.

(Direct Participants) and \$20 million for participants that offer third-party clearing services (General Participants). Following consultation with participants in late 2013, ASX decided that a previously proposed increase in the minimum core capital requirement to \$10 million for Direct Participants was no longer appropriate. This reflected recent enhancements to ASX Clear's broader risk control framework, including the introduction of cash market margining.

In the same consultation, ASX sought participant feedback on a proposal to introduce tiered core capital requirements for General Participants. The proposal was implemented in August 2014 and requires that General Participants hold \$5 million in core capital for each trading participant for which it clears, up to a maximum of \$20 million. That is:

- a General Participant that clears only for itself or for one other trading participant is required to hold \$5 million in core capital
- a General Participant that clears for itself and one other participant, or on behalf of two third-party trading participants, is required to hold \$10 million in core capital
- a General Participant is required to hold an additional \$5 million in core capital for each additional trading participant that it clears for, to a maximum of \$20 million.

In the second half of 2013, ASX reviewed whether, in light of the increase in the minimum core capital requirement in recent years, there remained value in calculating a risk-based formula for capital requirements. Under the existing risk-based regime, participants must hold sufficient 'liquid capital' to cover counterparty risk, large exposure risk, position risk and operational risk (the so-called 'total risk requirement').²⁰ A decision on removing or altering the risk-based capital requirement was ultimately deferred.

In August 2013, participants were given the option to elect to be covered by an alternative capital regime that recognises compliance with the requirements of a prudential supervisor. Prior to this, only participants clearing futures transactions were able to utilise this alternative regime. This change was intended to encourage domestic authorised deposit-taking institutions (ADIs) to become active participants for the full range of products cleared by ASX Clear. At the end of the Assessment period all but two of ASX Clear's 38 participants were subject to the risk-based regime, with one participant subject to each of the alternative regimes.²¹

Monitoring indirect participation

The Bank's 2012/13 Assessment encouraged ASX Clear and ASX Clear (Futures) to investigate options to enhance their monitoring of risks associated with indirect participation. This monitoring is intended to identify instances where the activities of a large indirect participant could increase the probability of a participant default if not appropriately managed. During the Assessment period, ASX conducted a review of its concentration risk policy. This included further consideration of its approach to the risks arising from tiered participation. As a result of this review, ASX developed a formal Concentration Risk Standard, setting out a risk-based approach to monitoring tiered participation risks.

In developing its risk-based approach, ASX concluded that the risks from tiered participation arrangements in the cash market and for OTC derivatives were currently low and did not require active monitoring. This conclusion reflected the relatively low exposures generated by both services

20 'Liquid capital' is defined by ASX to comprise total tangible shareholders' funds held in liquid assets, net of any guarantees and indemnities.

21 The number of participants includes two inactive participants excluded for the purpose of Table 8, since these remain subject to capital requirements.

at present and the fact that client clearing arrangements for OTC derivatives had been introduced only relatively recently.

By contrast, ASX concluded that concentration risks in its exchange-traded derivatives clearing services in both CCPs, including those related to indirect participants, merited active monitoring.

- ASX Clear monitors indirect participation in the derivatives market on a daily basis, using concentration indicators based on initial margin.
- ASX Clear (Futures) reviews risks arising from tiered participation in exchange-traded derivatives on a daily basis using client-level data derived from daily beneficial ownership reports lodged by participants. Once clients commence use of individually segregated client accounts (see Section 3.6.2), ASX Clear (Futures) will on a daily basis monitor concentration indicators based on initial margin.

Since these indicators may return false positives, escalation of any breaches of triggers is based on a number of factors, including the materiality of the breach and the credit standing and activity profile of the relevant participant. The Bank will continue to monitor the operation of ASX's risk-based approach to monitoring concentration risks in tiered participation, particularly in light of the new individual account structure in ASX Clear (Futures).

Remote clearing

ASX Clear (Futures) is considering allowing the admission of participants that are incorporated and base their operations offshore, provided that they can demonstrate the capacity to meet all of the financial and operational requirements that apply to Australian-based participants and that no conflicts of law would arise as a result of their participation. ASX intends to run a pilot scheme prior to allowing such arrangements more broadly.

Agency settlement in Austraclear

In July 2013, Austraclear was required to address the appointment of an external administrator to a participant that provided agency settlement services for a number of Austraclear participants. Austraclear took steps to facilitate a transition to alternative arrangements for participants reliant on these agency services for settlement. The issue led Austraclear to conduct a broader review of agency settlement arrangements, resulting in the introduction of a number of enhancements to the requirements placed on agency settlement service providers.

3.5.7 Disclosure

The Bank's 2012/13 Assessment noted that ASX would be required to publish details of its operations in accordance with the Disclosure Framework set out in the CPSS-IOSCO *Principles for Financial Market Infrastructures: Disclosure Framework and Assessment Methodology*.²² This is intended to ensure that ASX provides comprehensive and detailed disclosures regarding each facility, demonstrating how its governance, operations and risk management framework meet the requirements of the Principles. In 2012/13, ASX published an initial version of a combined disclosure document for all of its facilities, including a summary of ASX's self-assessment of how its CS facilities met the applicable Principles. ASX published a revised version of this document during the current Assessment period, providing greater detail as to how the CS facilities meet the Principles and corresponding FSS. In August 2014, ASX published a further revision of its Disclosure Framework document to take into account changes to its

22 Available at <<http://www.bis.org/publ/cpss106.htm>>.

CS facilities during 2013/14 and to further enhance the level of detail in its responses. ASX plans to update this document quarterly and further enhance its disclosure as necessary from time to time.

ASX currently reports basic risk and activity data for the CS facilities via a monthly activity report, as well as through additional data published on both its main website and dedicated website on clearing and settlement of cash equities. In December 2013, CPSS and IOSCO published a draft set of quantitative disclosure standards for CCPs that are intended to complement descriptive disclosures under the Disclosure Framework. Once a finalised version of these standards comes into effect, the ASX CCPs will be expected to expand the range of quantitative risk and activity data that they publicly disclose. The Bank will continue to monitor steps by ASX to refine and enhance its disclosure, including in response to the forthcoming quantitative disclosure standards for CCPs.

ASX also publishes a range of information on its website to meet other aspects of its disclosure requirements. The 2012/13 Assessment encouraged ASX to consider a more centralised approach to presenting this information. During the Assessment period ASX redesigned its website, one element of which involved centralising links to information subject to disclosure requirements.

3.6 New Standards

While the majority of the FSS came into effect from the end of March 2013, the Bank granted transitional relief from a small number of sub-standards of the FSS for 12 months. This relief expired on 31 March 2014 and the relevant sub-standards came into effect on that date.

3.6.1 Recovery and resolution

In February 2012, the CFR recommended legislative change to further enhance the Bank's and ASIC's powers in the regulation of FMIs.²³ These recommendations included the capacity to appoint a statutory manager to a distressed FMI. In parallel, the Financial Stability Board (FSB) has been developing guidance on how its *Key Attributes of Effective Resolution Regimes for Financial Institutions* (the Key Attributes) should be applied to FMIs, while CPSS-IOSCO has been developing guidance on recovery plans and tools for FMIs (see 'Box B: CPSS-IOSCO Guidance on Recovery Planning').²⁴ Resolution refers to actions taken by public authorities to either return an FMI to viability or facilitate its orderly wind-down, while recovery refers to actions taken by a distressed FMI itself to return to viability. The Bank and other CFR agencies are supporting work led by the Commonwealth Treasury to develop proposals for an FMI resolution regime consistent with the Key Attributes. The transitional relief from recovery- and resolution-related sub-standards of the new FSS reflected that domestic and international work on recovery and resolution was in its early stages at the time the new FSS were determined.

Although the international guidance on recovery and resolution has still not yet been finalised (see below), two public consultation papers, existing guidance within the FSS, and discussions between

23 The CFR's letter to the Deputy Prime Minister and Treasurer is available at <<http://www.treasury.gov.au/ConsultationsandReviews/Consultations/2012/CFR-Financial-Market-Infrastructure-Regulation>>.

24 See FSB (2011), 'Key Attributes of Effective Resolution Regimes for Financial Institutions', October, available at <http://www.financialstabilityboard.org/publications/r_111104cc.pdf>; and CPSS-IOSCO (2013), 'Recovery of Financial Market Infrastructures: Consultative Report', August, available at <<http://www.bis.org/cpmi/publ/d109.htm>>.

ASX and the Bank have given ASX a sufficient basis to commence work towards observance of the recovery- and resolution-related sub-standards.

Accordingly, in early 2014 ASX developed a basic recovery plan based on the facilities' existing powers. The plan identifies scenarios that could threaten each facility's ongoing provision of critical clearing or settlement services and sets out how ASX would respond to such scenarios on the basis of its existing powers under each facility's Operating Rules and Procedures. The recovery plan sets out the likely sequence of actions that ASX would take under each identified recovery scenario, and analyses the advantages and disadvantages of tools available to ASX to respond to such scenarios.

ASX's analysis has identified that enhancements to the CCPs' existing Operating Rules will be required to ensure that the CCPs could fully address any uncovered credit losses and liquidity shortfalls and replenish financial resources following a participant default, and could fully address a non-default-related financial loss.²⁵ ASX has formulated a plan to enhance the CCPs' rules along these lines. It plans to consult on its proposed recovery approach later in 2014, with the aim of implementing necessary enhancements to its rules by mid 2015. ASX will consider whether there is a need for enhancements to the SSFs' Operating Rules to address non-default-related losses in light of the forthcoming CPSS-IOSCO guidance on recovery planning.

Once supporting rule changes are in place, ASX will update its recovery plan to take its enhanced powers into account. At that time ASX will need to review the level of business risk capital it holds for the CS facilities, to ensure that it remains adequate to fund implementation of the revised recovery plan.

In addition, the 2012/13 Assessment noted that 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. During the 2012/13 Assessment period, the CS facilities introduced standard clauses into their agreements with service providers requiring that they give the Bank notice 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.

During the 2013/14 Assessment period both ASX Clear and ASX Clear (Futures) introduced rules giving participants the right to terminate novated contracts in the event that the relevant CCP defaulted on its obligations, with calculation of a net obligation to or from each participant on termination ('close-out netting'). Close-out netting rights are a prerequisite for ADI participants to apply capital requirements to their net (rather than gross) trade exposures to CCPs, and similarly to report these exposures as net in their financial accounts. The rules do not interfere with ASX's existing liquidity management arrangements, and ASX will review the continued appropriateness of close-out netting rights in light of future developments in FMI recovery and resolution.

25 ASX Clear is already able to fully address any liquidity shortfall related to the settlement of cash equity transactions, following the introduction of offsetting transaction arrangements with participants in April 2014 (see Section 3.6.3).

Box B: CPSS-IOSCO Guidance on Recovery Planning

In August 2013, CPSS and IOSCO published a consultative report setting out draft guidance to FMIs on the development of recovery plans. This guidance supplements requirements of the PFMI relating to recovery plans, providing a menu of tools that FMIs could use to observe these requirements, which have also been adopted in the FSS. Following an extended period of consultation with industry, finalised guidance is expected to be published later in 2014.

The draft guidance notes that a comprehensive and robust recovery plan will be expected to contain the following elements:

- *Identification of critical services offered by the FMI.* These are services that are critical to financial stability or the smooth functioning of markets. The recovery plan should address how the continuity of critical services can be maintained, and identify how any non-critical services can be wound down in an orderly manner.
- *Identification of stress scenarios that may threaten the continued provision of the FMI's critical services.* These may include credit losses or shortfalls of liquidity caused by a participant default, or the realisation of non-default losses. The recovery plan should also define criteria that would trigger the implementation of recovery actions.
- *A range of tools to fully and effectively address threats to the FMI's viability.* These include tools to address losses associated with the default of a participant (discussed in more detail below), tools to address other losses, and tools to address structural weaknesses in governance or risk management that may have contributed to the losses suffered by the FMI.

Tools to address a participant default

The draft guidance notes that FMIs that assume credit and liquidity exposures to their participants as principal are required to maintain tools that allow them to fully allocate any losses and address liquidity shortfalls, and restore a matched book following a participant default. For the ASX CS facilities, this requirement is relevant only to the CCPs. The draft guidance considers:

- potential tools to allocate uncovered losses, including additional cash calls on participants (also known as assessments), or the haircutting of variation margin gains; additional cash calls may also be used to replenish a CCP's financial resources following a participant default
- the use of liquidity arrangements with participants or third parties to address a liquidity shortfall
- the merits of voluntary and compulsory tools to restore a CCP's matched book, including partial or complete termination of contracts, or forced allocation of contracts.

The strengths and weaknesses of different tools to address a threat to viability arising from a participant default are discussed in an article entitled 'Recovery and Resolution of Central Counterparties' published in the Bank's December 2013 *Bulletin*.²⁶

26 See Gibson M (2013), 'Recovery and Resolution of Central Counterparties', RBA *Bulletin*, pp 39–48.

Other tools

The draft guidance also discusses tools to address losses that are not caused by a participant default, including investment losses or general business losses. These include arrangements to allocate investment losses (e.g. to participants), recapitalisation arrangements, explicit arrangements with third party insurers, or indemnities from owners or participants.

Recommendation. To fully observe the requirements of CCP Standards 3.5 and 14.3, and SSF Standards 3.5 and 12.3, each ASX CS facility should implement plans to enhance its recovery plan consistent with forthcoming CPSS-IOSCO guidance on recovery planning, and ensure that the business risk capital it holds continues to be sufficient to fund the enhanced plan. As each facility further develops its recovery plan, it should also review and integrate its recapitalisation processes with its broader recovery planning arrangements. Further, to fully observe the requirements of CCP Standards 4.8 and 7.9, ASX Clear and ASX Clear (Futures) should implement mechanisms that would fully address any uncovered credit losses and replenish financial resources following a participant default, and that would fully meet any liquidity shortfall. Plans and mechanisms implemented to meet these requirements should be consistent with forthcoming CPSS-IOSCO guidance on recovery planning.

To continue to meet the requirements of CCP Standard 16.11 and SSF Standard 14.11, each ASX CS facility will need to review its operational arrangements in light of the proposed establishment of a special resolution regime for FMI in Australia. In particular, each facility will need to ensure that its operations are organised in such a way as to facilitate effective crisis management actions under that regime once finalised.

3.6.2 Segregation and portability

New sub-standards that came into effect in March 2014 require ASX Clear and ASX Clear (Futures) to have in place account structures that support the segregation of client positions and collateral from participants' proprietary ('house') positions and collateral. In addition, the CCPs are required to maintain effective arrangements for transferring client positions and collateral to another clearing participant in the event that their original participant was to default (known as portability). Together, these requirements aim to provide additional protection to clients against the default of their clearing participant, and to provide CCPs an alternative to closing out client positions in the event of such a default. A change to legislation in July 2013 removed a key legal impediment to portability, by allowing a CCP to transfer client collateral without the need to seek approval from a defaulting participant's external administrator.²⁷

ASX Clear (Futures)

In the 2012/13 Assessment, the Bank recommended changes to the account structure for futures products in ASX Clear (Futures) in order to meet the segregation and portability requirements of the FSS once transitional relief expired. The previous client account structure segregated client and house positions and collateral between a house account and a single omnibus account for clients, with margin applied to portfolios netted within each account. While this account structure achieved segregation, the margining of client positions on a net basis in the omnibus account left open the possibility that there could be insufficient collateral to support the transfer of individual client

27 The relevant legislation amended Part 5 of the *Payment Systems and Netting Act 1998*.

positions to alternative clearing participants. Individual segregation of client positions removes this possibility. The supplementary interpretation of the FSS issued by the Bank in the context of ASX Clear (Futures)' prospective application for recognition under EU regulation further clarifies that where a CCP clears a range of derivatives products with different characteristics and for a variety of participant and underlying customer types (such as ASX Clear (Futures)), it should offer a choice of account structures, including individual segregation (see Section 3.8). These requirements also apply to the client clearing service for OTC derivatives, which ASX Clear (Futures) introduced in April 2014.

To support its client clearing service for OTC derivatives, and provide the required choice of segregation models for futures clients, during the second half of 2013 ASX developed a new client segregation model for ASX Clear (Futures) to sit alongside the existing omnibus client account. In particular, clearing participants may offer individual client accounts, which separately record the positions of each client and related initial margin requirements. While initial margin is calculated on a gross basis at the level of each client account, it is managed by ASX Clear (Futures) as a commingled pool of collateral for each clearing participant. ASX Clear (Futures) guarantees clients that maintain individual client accounts the full value of initial margin posted against their positions in the event of the default of their clearing participant.²⁸ This supports portability by making it more likely that clients would have sufficient initial margin transferred with their positions to ensure that their full margin requirements could be met after transfer. Where a client that maintains an individual client account has posted non-cash collateral to its clearing participant, the value of the assets that may be passed on to ASX Clear (Futures) is guaranteed up to the amount of initial margin for that client's positions.

However, the return of the specific securities posted is not possible under the current segregation model. ASX Clear (Futures) is consulting stakeholders on potential enhancements to its segregation model that may permit the return of specific securities to a client in the event of the default of its clearing participant. ASX is also seeking stakeholder feedback on arrangements that would protect collateral posted in excess of initial margin requirements, and arrangements that would allow clients to hold excess collateral directly with ASX Clear (Futures). These enhancements are required under the Bank's supplementary interpretation of CCP Standards 13.2 and 13.3.

The new client clearing model alters the legal relationship between clients and ASX Clear (Futures). While participants remain responsible for day-to-day interactions with ASX Clear (Futures), including meeting margin and other obligations to the CCP on behalf of clients, clients have a contractual right to provide instructions to the CCP in the event of a participant default.²⁹ A client may nominate an alternative participant to which it would propose to transfer positions and initial margin in the event of a default. A client may also request a transfer to an alternative participant that has not been pre-nominated, but the absence of a prearrangement would reduce the likelihood of a successful transfer. ASX has allowed a window of up to 24 hours for the transfer of exchange-traded derivatives client positions and up to 48 hours for OTC derivatives client positions. If a transfer cannot be achieved within this time frame, the client's positions would be closed out under normal default management processes and any remaining margin would be returned to the client.

The new account structure was implemented for OTC derivatives in April 2014, and in July 2014 the individual client account structure was extended to futures clearing. To support an informed choice of segregation model by clients, ASX has developed a fact sheet outlining segregation and portability arrangements in ASX Clear (Futures) and the rights of clients in the event of a default.

28 If client positions are closed out rather than transferred, ASX Clear (Futures) would subtract any costs incurred from the close-out process prior to returning initial margin to clients.

29 This right is limited to clients that maintain individual client accounts and are not themselves in default.

ASX Clear

ASX Clear has offered individually segregated account structures for its derivatives products since prior to the introduction of segregation and portability requirements under the new FSS. These arrangements meet the new requirements.

By contrast, ASX Clear utilises commingled house/client accounts for cash market transactions. In July 2013, ASX sought the views of stakeholders on a proposal to introduce client omnibus segregation of cash market transactions. Participants raised concerns that this would be costly and deliver minimal benefits for client protection, in part due to legal impediments that prevent the lodgement of client collateral directly with ASX Clear to support cash market positions. In response to this feedback, ASX has instead developed alternative arrangements to offer clients enhanced protections that will be materially equivalent to the protections afforded by segregated house/client omnibus accounts. These are being implemented in two phases. Once both phases are complete, client assets and funds will remain in the beneficial ownership of clients up to the point of settlement.

ASX Clear implemented the first phase of these enhancements in April 2014. These took the form of rule changes clarifying that during the pre-settlement period:

- client securities due for delivery that are held in the participant's accumulation account remain the beneficial property of the client until they are placed into the participant's settlement account³⁰
- client monies to fund a purchase must remain in a segregated trust account until purchased stock is registered in the client's name.

The ASX Clear Operating Rules also require daily reconciliation by each participant of all stock held in the participant's accumulation account.

A second stage of enhanced protections is scheduled to come into effect during the first half of 2015. It will enable participants to pre-schedule movements of beneficially held client stock to their settlement account, allowing clients to retain beneficial ownership of stock due for delivery until the commencement of the CHES settlement batch process. Participants will be required to fund any movements of beneficially held client stock to the settlement account on the day that the movement occurs. For clients that have purchased stock, the changes to messaging that support pre-scheduled securities movements will also facilitate automated post-settlement allocation.

The second phase of implementation will require some supporting changes to the processes of Payment Providers, the agents that participants use to effect cash movements that support securities settlement. In particular, Payment Providers will be obliged to ensure that funds are allocated appropriately between participants' trust and general bank accounts. This dependence on Payment Providers highlights the importance of effective arrangements for ASX to influence change in the processing of settlement-related payments.

The scope for transfer of clients' cash market positions in the event of a participant default would be limited under any account structure due to the short (three-day) equity settlement cycle. ASX Clear does, however, have the capacity in its Operating Rules to transfer cash market positions.

30 Participants maintain 'accumulation' and 'settlement' accounts to manage the processing of securities for settlement. Client securities due for delivery are typically initially placed in accumulation accounts prior to transfer to the participant's settlement account, at which point the participant takes effective control over the use of securities. Securities are delivered to and from settlement accounts as part of ASX Settlement's batch settlement process.

Recommendation. To fully observe the requirements of CCP Standards 13.1, 13.2 and 13.3, ASX Clear should complete the second stage of enhanced client protections in its cash equity clearing service, while ASX Clear (Futures) should carry out plans to implement enhanced client segregation arrangements that support the lodgement of excess client collateral.

ASX Clear and ASX Settlement are also encouraged to introduce a framework to formally engage Payment Providers on changes to settlement processes in response to regulatory or market-driven change.

3.6.3 Liquidity risk

Both CCPs' prefunded liquid resources are currently sufficient to meet the required level of cover for liquidity exposures related to derivatives transactions under CCP Standard 7.3. However, in extreme but plausible market conditions, there may be circumstances in which ASX Clear's prefunded liquid resources need to be supplemented to ensure that total liquid resources are sufficient to cover the single largest liquidity exposure to a participant and its affiliates arising from the settlement of cash equity transactions. The size of the potential prefunded liquidity shortfall in the cash equity market averaged \$126 million during the Assessment period, ranging from zero to a peak of \$715 million. This estimated shortfall peaked at around \$3 billion at the height of the global financial crisis in 2008. The reason for this shortfall lies with a mismatch between the timing of payment obligations assumed by the CCP to purchase securities due to be delivered to a defaulted participant and the receipt of funds realised from the subsequent sale of these securities to close out the CCP's exposure. Given this timing mismatch (typically three days in accordance with the equities settlement cycle), ASX Clear's liquidity exposure to participants arising from cash equity transactions may be significantly greater than its credit exposure on the same transactions.

In April 2014, ASX introduced changes to its Operating Rules whereby participants commit to provide liquidity to ASX Clear to address any funding shortfall. Before initiating the use of these arrangements, ASX would first determine whether it could inject sufficient liquidity, from the existing \$300 million of available financial resources, to ensure that settlement of payment obligations occurred as expected. It is expected that available resources would first be injected. However, if it was not possible or prudent to rely solely on prefunded liquidity, ASX Clear would settle transactions by entering into 'offsetting transaction arrangements' with participants that were due to deliver securities to the defaulted participant.

These arrangements support the settlement of purchase transactions by a defaulted participant on the intended settlement date, funded by a simultaneous stock repurchase arrangement between the delivering participant and ASX Clear. The offsetting transaction would re-deliver to the participant the same securities that it delivered to ASX Clear, providing ASX Clear with the funds necessary to settle its payment obligation for the original trade. The offsetting transaction arrangement would unwind once ASX Clear was able to liquidate the securities and access the funds (see Table 9). By providing for these arrangements within the Operating Rules, ASX Clear recognises and formalises the role of participants in providing liquidity to allow settlement to occur as scheduled.

Although offsetting transaction arrangements ensure that ASX Clear would have sufficient liquidity to settle peak payment obligations for novated cash market transactions when due, use of these arrangements would have a corresponding liquidity impact on participants. ASX plans to make enhancements to ASX Clear's liquidity stress testing to routinely provide more information to management and the Bank on the degree of contingent reliance on offsetting transaction

arrangements with participants to meet settlement-related payment obligations in a participant default. The Bank will monitor these enhancements and discuss further with ASX how such information might best be disseminated to participants to support their liquidity management and planning. Since ASX Settlement relies on similar underlying calculations when addressing failed transactions in the settlement batch more broadly, the Bank will also discuss with ASX whether any additional information could be disclosed to participants on the potential liquidity impact of reconstitution of the ASX Settlement batch in scenarios that extend beyond the management of an ASX Clear participant default.

Table 9: Managing the Cash Equity Liquidity Impact of a Participant Default^(a)

Day	Previous Rescheduling Arrangements	New Offsetting Transaction Arrangements (OTAs)
T+3	<p>Selected settlements of non-defaulting participants to deliver stocks purchased by the defaulting participant would be rescheduled to T+4.</p> <p>ASX Clear would enter into close-out trades to sell stocks that it would receive once the rescheduled transactions settle. Close-out trades would typically settle on T+6.</p>	<p>All novated settlements would take place as originally scheduled.</p> <p>Selected non-defaulting participants due to deliver stocks purchased by the defaulting participant would be required to enter into an OTA with ASX Clear. Under this OTA, they would receive back stocks delivered to ASX Clear and provide funds required to allow original novated transactions to settle. The OTAs would exactly offset the payment obligations of the defaulting participant assumed by ASX Clear.</p> <p>ASX Clear would enter into a close-out trade to sell stocks that it would receive once the OTA unwinds. The close-out trade would typically settle on T+6.</p>
T+4	<p>If ASX Clear does not have sufficient liquidity to settle rescheduled transactions on T+4, these would be further rescheduled to T+5.</p>	<p>ASX Clear would settle the unwinding of OTAs, but if it does not have sufficient liquidity to settle its payment obligations on T+4, it would enter into replacement OTAs due to unwind on T+5. Replacement OTAs may affect a different set of participants.</p>
T+5	<p>If ASX Clear does not have sufficient liquidity to settle rescheduled transactions on T+5, these would be further rescheduled to T+6.</p>	<p>ASX Clear would settle the unwinding of OTAs, but if it does not have sufficient liquidity to settle its payment obligations on T+5, it would enter into replacement OTAs due to unwind on T+6.</p>
T+6	<p>ASX Clear would receive funds from the settlement of close-out trades and use these (and any other resources required to cover losses on the close-out trade) to settle rescheduled transactions.</p>	<p>ASX Clear would receive funds from the settlement of close-out trades and use these (and any other resources required to cover losses on the close-out trade) to unwind OTAs.</p>

(a) The process described in this table assumes prefunded liquid resources have not been applied or are not sufficient to meet ASX Clear's cash equity payment obligations assumed on behalf of the defaulting participant.

3.7 OTC Interest Rate Derivatives Clearing

ASX Clear (Futures) launched a clearing service for OTC interest rate derivatives on 1 July 2013. Initially, ASX limited its offering to the clearing of participants' proprietary positions in standardised Australian dollar-denominated interest rate swaps (IRS) referencing either the bank bill swap rate or the overnight indexed swap rate. As discussed in Section 3.6.2, ASX expanded the service to cover the clearing of client positions in these products in April 2014. Over time, ASX plans to expand its product

scope to Australian dollar-denominated IRS indexed to forward-rate agreements, and New Zealand dollar-denominated IRS. The key features of the OTC interest rate derivatives clearing service were described in Section 4.1 of the Bank's 2012/13 Assessment.

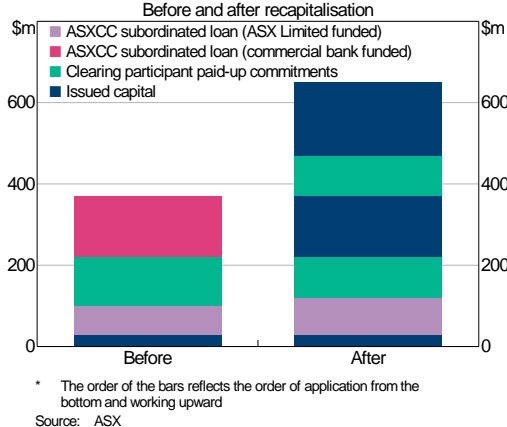
Over the course of late 2013 and early 2014, eight banks became participants of the OTC derivatives clearing service, four of which were not previously ASX Clear (Futures) participants. A ninth bank, which signed up to the service during the development phase as a Foundation Customer, is expected to become a participant of the service at a later date. At the end of the Assessment period, trades with a total notional value of \$126 billion had been cleared through the service.

Financial resources

ASX operates a single commingled pool of default resources to support ASX Clear (Futures)' OTC and exchange-traded derivatives clearing activities. ASX regards the commingling of financial resources as appropriate in light of the homogeneity of both the products to be cleared and the clearing participants: more than half of the risk (as measured by initial margin) currently managed by ASX Clear (Futures) is related to Australian dollar-denominated interest rate products; and the majority of ASX Clear (Futures) participants for futures transactions are active in the Australian dollar-denominated IRS market. Accordingly, the majority of participants already have some exposure to the default of a participant in this market and therefore the commingling of the default fund may not be a material incremental source of contagion between these markets. ASX has committed formally to reviewing the default fund arrangements annually, including considering whether a commingled default fund remains appropriate. An initial review was conducted in the first half of 2014 and presented to the ASX Clear (Futures) Risk Committee and Board. The review concluded that the commingling of financial resources remained appropriate, particularly in light of the currently small size of exposures generated by OTC derivatives relative to futures. ASX will conduct another review of default fund arrangements in late 2014; the Bank will continue to monitor the outcomes of this and subsequent reviews.

Over the course of the Assessment period, ASX Clear (Futures) increased the total size of its prefunded pooled resources to \$650 million, from \$370 million in June 2013 (Graph 10). Of the additional funds, \$180 million was sourced from a capital raising conducted in June 2013, increasing pooled financial resources to \$550 million on 16 August 2013. A further \$100 million was provided by participants of the OTC derivatives clearing service over the course of late 2013 and early 2014. This cover is calibrated to meet, with a high degree of confidence, ASX Clear (Futures)' obligations in the event of the default of any two participants plus affiliates in extreme but plausible circumstances ('cover two'). This is consistent with the Bank's clarification that ASX Clear (Futures) is considered 'systemically important in multiple jurisdictions', in part reflecting its provision of services to participants established in the EU and the need for recognition under EU regulation (see Section 3.8).

Graph 10
ASX Clear (Futures):
Prefunded Pooled Financial Resources
 Before and after recapitalisation



ASX has implemented amended stress-test scenarios that take into account the longer assumed close-out period for OTC derivatives positions (five days as opposed to one to two days for exchange-traded positions), as well as adding scenarios that consider the potential basis risk resulting from a change in the economic relationship between interest rate futures and IRS, particularly in stressed circumstances. In August 2013, it began stress testing the sufficiency of its financial resources on a cover two basis, adjusting the STELs of highly rated participants to ensure that these did not exceed half of ASX Clear (Futures) pooled financial resources. Initially this meant that both A-rated and B-rated participants had their STEL reduced to \$275 million, rising to \$325 million and \$295 million, respectively, once the full \$100 million of OTC participant contributions had been received. This ensures that participants are required to post additional collateral if their stressed exposures exceed half of ASX Clear (Futures)' total prefunded financial resources.

Default management

In managing a default involving an OTC participant, ASX Clear (Futures)' intention would be to hedge the defaulter's OTC derivatives portfolio (including any cross-margined futures), before auctioning the hedged portfolio to non-defaulting participants. To provide advice and assist with the hedging process, ASX would convene the OTC IRS Default Management Group (DMG), comprised of trading professionals drawn from non-defaulting OTC participants. During the Assessment period ASX Clear (Futures) expanded the size of the DMG to ensure that all OTC participants could be accommodated on the group. While ASX is not obliged to follow the recommendations of the DMG, it must justify any decision not to do so. The DMG is also involved directly in regular default simulations, including testing of the auction process, the first of which was held in June 2014. The Bank will continue to monitor the outcomes of default simulations involving the DMG.

One area remained outstanding at the time of launch of the OTC derivatives clearing service: the development of an appropriate mechanism for ensuring competitive bidding in an auction of a defaulting participant's positions. Competitive bidding in the auction is important since in the event that an auction fails, ASX's only option currently is to hold the hedged position until it can re-run the auction successfully or bilaterally negotiate a sale. To incentivise competitive bidding, in early 2014 ASX implemented a 'juniorisation' mechanism for ordering the allocation of losses against survivors' contributions to financial resources based on the quality of their bids; the contributions of the participants with the weakest bids would be used before those of the participants with the strongest

bids. Such a mechanism is particularly important when managing the default of a participant with a large or complex portfolio. In designing its recovery plans (discussed in Section 3.6.1), ASX will also need to consider the implications for participants' incentives in the auction process.

The order of application under the juniorisation mechanism is related to the size of participants' bids in the auction, so that the winner of the auction has its contribution applied last and the participant with the lowest bid has its contribution applied first, subject to bids exceeding a minimum threshold determined by ASX. Participants that are not required to take part in an auction (e.g. participants that lack the capacity to manage particular product types within the auctioned portfolio) would have their contributions applied at the same point as the winner of the auction. ASX Clear (Futures), in consultation with the DMG, could conduct the auction in one of the following forms:

- The defaulting participant's portfolio could be auctioned in a single pool to the single highest bidder, or split into multiple identical units auctioned off to several bidders. In the latter case, the order of application of participant contributions to losses would be based on the lowest bid for any unit within the pool.
- Alternatively, the defaulting participant's portfolio could be broken up into separate pools with shared characteristics (e.g. currency, product, tenor, carry or trade volume), with separate auctions in respect of each pool. Each of these pools could be auctioned off in a single unit or multiple identical units. The application of bidding participants' contributions to losses would be based on the ranking of bids in each of these pools, weighted according to the relative risk of each pool.

Other implementation matters

While implementation of the OTC derivatives clearing service has generally been smooth, the gradual growth in use of the service allowed ASX to address the margining error discussed in Section 3.4.1 without any material impact on risk coverage. The gradual growth has also allowed ASX to monitor its process for 'real-time' novation of IRS transactions submitted for clearing while intraday risk exposures from these transactions remain low. To manage the additional risk exposure arising from real-time novation, ASX Clear (Futures) has placed a limit on the acceptable size of new transactions, performs approximately hourly portfolio exposure checks, and has the ability to prevent further novation until an intraday margin call is met. ASX has determined that its real-time novation approach remains appropriate for the current level of activity in the service. However, ASX will need to review this approach in light of the potential future use of Swap Execution Facilities to deliver trades to the OTC derivatives clearing service. The use of multiple such facilities could pose challenges for monitoring intraday exposure limits. The Bank will continue to monitor the effectiveness of the risk management measures associated with real-time novation.

ASX Clear (Futures) also made various modifications and enhancements to its OTC derivatives clearing service during the Assessment period. Among these, ASX made minor adjustments to the range of contracts eligible for clearing, including extension of the service to swaps with a forward start date.

3.8 Cross-border Recognition

Under EMIR, non-EU CCPs that provide clearing services to participants established in the EU must obtain recognition from ESMA. Since three of ASX Clear (Futures)' participants are branches of European headquartered banks, ASX Clear (Futures) applied to ESMA for recognition in September 2013.

One of the preconditions for recognition in the EU is that the Australian regime for regulation of CCPs is assessed as equivalent to EU regulation. The Bank's FSS are designed to deliver outcomes

equivalent to EU standards, since both are based on the Principles. However, since the EU standards are drafted at a more detailed level, the Bank issued supplementary interpretation of a subset of standards to provide additional clarity in some areas. Currently, the supplementary interpretation applies only to domestically licensed derivatives CCPs in Australia that provide services to clearing participants established in the EU. The Bank has applied this interpretation of the relevant CCP Standards in its assessment of ASX Clear (Futures) for 2013/14.

Among the most substantive matters for interpretation is the requirement around the coverage of a CCP's financial resources. The relevant FSS require that a CCP considered to be systemically important in multiple jurisdictions maintain default resources and liquidity sufficient to cover obligations arising in the event of the default of its two largest participants (plus affiliates) in stressed circumstances. Under EMIR, by contrast, this cover two requirement applies to all CCPs. The proposed supplementary interpretation clarifies that recognition requirements in other relevant jurisdictions, including the EU, would be taken into account (alongside other factors) in judging whether a CCP was systemically important in multiple jurisdictions, and therefore subject to cover two requirements. ASX Clear (Futures) increased its financial resources in line with this interpretation with effect from 16 August 2014 (see Sections 3.5.1 and 3.7).

Another matter clarified in the Bank's supplementary interpretation is the requirement for CCPs to establish an independent risk committee to advise the CCP's board on risk matters, including representation from participants and, where appropriate, clients. As noted in Section 3.5.2, ASX Clear (Futures) established such a committee in April 2014.

ESMA published its conclusions on the equivalence of the Australian regime for CCPs in late 2013. In part reflecting the supplementary guidance, ESMA concluded that:

- Australian CCPs were subject to effective supervision and enforcement
- Australian legislation provided for recognition of foreign CCPs where they were subject to an equivalent regime in a manner consistent with EU regulation of CCPs
- the Australian regulatory framework, including the Bank's FSS, provided legally binding requirements equivalent to those required in the EU.

On the basis of this conclusion, the EC is proposing to adopt an Implementing Act, which will give legal effect to this equivalence decision.

ASIC and the Bank will also need to execute an MOU with ESMA on cooperation and supervision of Australian CCPs that provide clearing services to clearing participants in the EU, prior to any recognition decision. ASIC and the Bank executed a similar MOU with the CFTC in June 2014 in respect of supervision of cross-border CCPs.³¹

ASX Clear also recently submitted an application for EU recognition. Recognition by ESMA is a prerequisite to a CCP becoming a Qualifying CCP in the EU. Under the European implementation of the Basel III bank capital reforms, from December 2014 EU banks will have to hold more capital against exposures to a CCP that is not deemed to be Qualifying, including for exposures held via subsidiaries. If ASX Clear chooses to pursue this application and achieves EU recognition, then participants that are subsidiaries of EU banks would be able to apply lower capital charges for exposures to ASX Clear. The Bank is currently in dialogue with ASX, the EC and ESMA on the implications of ASX Clear's application and the degree to which the matters covered in the

31 The MOU is available at <<http://www.rba.gov.au/payments-system/legal-framework/pdf/memorandum-20140606.pdf>>.

supplementary interpretation would apply in the case of ASX Clear. Depending on the outcome of this dialogue, and if ASX Clear chooses to pursue its application, ASX Clear may become subject to additional aspects of the FSS in 2014/15, including in relation to the coverage of its financial resources and the form of its user governance arrangements on risk matters.

The CFTC currently requires non-US derivatives CCPs that offer swap clearing services to US persons to register as DCOs with the CFTC. However, on 6 February 2014 the CFTC granted ASX Clear (Futures) time-limited relief from the requirement to register as a DCO. This allows US participants of ASX Clear (Futures) to clear the participants' proprietary trades in Australian and New Zealand dollar-denominated interest rate swaps using its service. The relief will expire at the end of 2014, or earlier if ASX Clear (Futures) registers as a DCO or is granted an exemption from DCO registration. The CFTC has indicated it is considering an exemption regime that will place reliance on a CCP's home regulatory regime.

4. Special Topic – Model Validation

The Bank's 2012/13 Assessment recommended that ASX Clear and ASX Clear (Futures) implement plans to strengthen the analysis of their margin and stress-testing models through comprehensive model validation processes. These include annual independent validation, backtesting, reverse stress testing, sensitivity analysis, and detailed regular reviews of model performance, scenarios and underlying parameters and assumptions. The Bank's recommendation acknowledged the central role played by margin and stress-testing models in the management of CCPs' financial risks, as reflected in the Bank's FSS.

This section summarises the key model validation requirements in the FSS, the risk models used by the ASX CCPs, and the main features of the model validation framework employed by ASX to ensure the robustness of these models. Section 4.4 presents conclusions from the Bank's assessment of this framework, including ratings of how well the ASX CCPs have observed each of the relevant FSS requirements.

ASX has made significant progress in implementing enhancements to its model validation framework and the Bank has found that ASX now observes the majority of the requirements of relevant sub-standards. The results of model validation carried out by ASX to date indicate the overall sound performance of ASX's risk models while identifying steps to address some potential areas of weakness. The Bank is satisfied that ASX is using these results to identify appropriate refinements to its risk models.

4.1. Overview of FSS Requirements

The Reserve Bank's new FSS, which came into effect in March 2013, introduced more detailed model validation requirements for CCPs. These requirements apply to models for margin, stress testing and collateral haircuts and cover three key model validation processes. Extracts from the relevant sub-standards and guidance to the FSS are included in Table 13 (see Section 4.4).

- *Backtesting.* Backtesting seeks to verify the desired level of risk coverage by assessing how well the model forecasts the distribution of outcomes. CCPs are required to conduct daily backtesting using actual participant positions to identify any exceptions to initial margin coverage (CCP Standard 6.6). Where a CCP uses portfolio margining, it should continuously test the robustness of its methodology on both actual and hypothetical portfolios, and assess how correlations between products perform during periods of market stress (CCP Standard 6.5). CCPs should also carry out a comprehensive analysis of stress-testing scenarios, models and underlying parameters and assumptions at least monthly, and more frequently as required (CCP Standards 4.5 and 7.8). Collateral haircuts must also be regularly assessed and should reflect periodic stress testing that takes into account extreme price moves and changes in market liquidity (CCP Standard 5.3).
- *Sensitivity analysis.* This component of the model validation framework assesses the sensitivity of risk models to changes in underlying assumptions. CCPs should perform sensitivity analysis to assess margin coverage under various market conditions and determine the impact of varying model parameters and assumptions; margin sensitivity analysis should be performed on both

actual and hypothetical positions at least monthly, and more frequently in stressed market conditions (CCP Standard 6.6). CCPs should also perform reverse stress tests to identify the extreme scenarios in which total financial resources or liquid resources would not be sufficient to cover tail risk; this would require the modelling of hypothetical positions and market conditions that may go beyond what is considered extreme but plausible (CCP Standards 4.6 and 7.8).

- *Periodic internal and external review.* In addition to ongoing backtesting and sensitivity analysis of risk models, periodic end-to-end reviews of models seek to verify the continued appropriateness of the modelling approach. It is important that these reviews be carried out by experts that are independent of those responsible for developing and applying the relevant risk models. Where appropriate, this may include the use of experts external to the CCP. Margining methodology should be reviewed and validated by a qualified and independent party at least annually (CCP Standard 6.7). A full validation of risk management models should also be performed on at least an annual basis (CCP Standards 4.5 and 7.8). An independent validation of haircut procedures should also be carried out at least annually (CCP Standard 5.3).

In accordance with these standards, ASX implemented a number of enhancements to its risk management and model review capabilities during the 2012/13 Assessment period. The Bank reviewed these in its 2012/13 Assessment and made a number of recommendations for further enhancements in the areas of backtesting, sensitivity analysis (including reverse stress testing) and model review.

In response to these recommendations, ASX has further developed its model validation framework during 2013/14 by introducing enhanced daily and periodic margin backtesting, regular sensitivity analysis of margin models and monthly reverse stress testing. ASX has also engaged external experts to carry out annual external validation of key risk models. These developments are discussed in detail in Section 4.3.

4.2. Overview of Main ASX Models

ASX uses three main types of models in its management of risks arising from clearing activities:

- margin models are used to estimate potential future credit exposures to participants in normal market conditions
- stress-test models are used to estimate potential future credit and liquidity exposures in stressed market conditions
- collateral models are used to ensure that the value of collateral held to cover these exposures can be relied upon, even in stressed conditions.

4.2.1. Margin models

ASX Clear and ASX Clear (Futures) apply initial and variation margin to cover their credit exposures to participants. Variation margin is used to mark positions to market, preventing the build-up of current exposures, while initial margin estimates the potential future exposure of each CCP to participants within a targeted confidence level. Potential future exposure arises from the possibility of an adverse price change on a defaulted participant's positions before they can be closed out. The margin approach of both CCPs is discussed in more detail under CCP Standard 6 of Appendices A1.1 and A2.2.

SPAN

ASX Clear and ASX Clear (Futures) use a SPAN margin model for the margining of exchange-traded derivatives contracts.³²

SPAN uses a series of fixed parameters to calculate initial margin requirements that reflect the total risk of each portfolio. The model establishes the maximum loss from 16 hypothetical risk scenarios based on a range of changes in price and volatility. ASX specifies the scenarios in relation to a predetermined 'price scanning range' (PSR) for the underlying instrument, and a 'volatility scanning range' (VSR) for the implied volatility of options. The scanning ranges for a set of related contracts are calibrated to the higher of three standard deviations of a 60-day or 252-day sample distribution of price and volatility movements, using the higher of one- or two-day price movements. Both CCPs use CME SPAN software to perform these calculations.

ASX also applies a series of adjustments within CME SPAN to account for correlations and specific risks. An 'intra-commodity spread charge' is applied to the margin requirement for a set of related contracts to account for less-than-perfect correlation between contracts with different expiry dates. 'Inter-commodity spread concessions' are then applied to account for reliable and economically robust correlations between different sets of related contracts. ASX also applies adjustments to cover exposures on the day of contract expiry and to set a floor on margin for deep out-of-the-money options. ASX has calibrated settings in CME SPAN to cover 99.7 per cent of one- or two-day price moves.

Cash market margining

Cash market margining (CMM) is used by ASX Clear to calculate margin on cash securities transactions using a historical simulation of value at risk (HSVaR).³³ ASX uses two years of historical price returns to estimate the distribution of its future exposures to a participant's portfolio, setting initial margin to cover exposures to a 99 per cent confidence level. ASX applies a portfolio add-on factor in order to extend its coverage to at least 99.7 per cent of future price moves. This two-step methodology is preferred because the tail at this point in the distribution is sparsely populated by observations. An observation dropping out of the look-back period can therefore lead to large fluctuations in margin and exacerbate procyclicality. Procyclical changes in margin – in particular model-driven increases to margin requirements in response to increased volatility – may increase liquidity stresses faced by participants in stressed market conditions. The alternative methodology avoids procyclical fluctuations while approximating the desired confidence level. Model performance can then be assessed against the desired confidence interval through backtesting. ASX applies flat rate margins for securities that are less liquid or do not have a sufficient price history. 'Box C: Cash Market Margining' describes the CMM methodology in more detail.

32 For more detail on SPAN, see Appendices A1.1 and A1.2, CCP Standards 6.1 and 6.3. A more detailed description of the SPAN methodology is included in 'Box A: CME SPAN' of the Bank's 2011/12 Assessment, available at <<http://www.rba.gov.au/payments-system/clearing-settlement/assessments/2011-2012/pdf/report-2011-2012.pdf>>.

33 For more detail on CMM, see Appendix A1.1, CCP Standards 6.1 and 6.3.

Box C: Cash Market Margining

Since 7 June 2013, ASX Clear has used CMM to manage its credit exposures to participants on unsettled cash market transactions. Although a typical cash market transaction will settle within three days of a trade being executed, during this period ASX Clear could be exposed to replacement cost losses in the event of a participant default. If a participant were to default prior to settlement, ASX Clear would assume all obligations relating to the defaulting participant's outstanding transactions. ASX Clear would need to buy and sell securities to close out the exposure that it inherited from the defaulting participant; an adverse move in prices before these close-out trades were executed could therefore lead to losses. CMM is designed to protect ASX Clear against such potential losses in normal market conditions. The cover provided by CMM is supplemented by pooled prefunded financial resources, which are designed to cover losses in circumstances of extreme but plausible volatility. This box outlines ASX Clear's approach to CMM and the methodology used to calculate CMM obligations.

CMM obligations apply to novated transactions involving the buying or selling of equities, warrants and interest rate securities traded on the ASX and Chi-X markets. There are two components to the CMM obligation: initial (or 'risk') margin; and mark-to-market (MTM; or 'variation') margin. An overall CMM obligation is calculated for each participant at the close of each trading day, which is payable by each participant at 10.30 am the next day. While CMM is currently calculated only once per day, ASX will review the case for additional intraday margin runs during the coming Assessment period.

Initial margin

The calculation method for initial margin depends on the characteristics of the relevant security; namely, liquidity, the availability of price history and security type (e.g. warrant or equity). ASX's CMM approach employs two methods to estimate the initial margin required to cover future price movements to the desired confidence level: HSVaR and a flat rate methodology.

The HSVaR method estimates exposures from a sample distribution of daily historical price returns applied to the net unsettled obligations of each participant. These are based on closing prices for securities on each trading day from the preceding two years. While ASX targets 99.7 per cent coverage of the distribution of future exposures from CMM, as a first step ASX identifies the 99th percentile of the sample distribution. Since HSVaR requires reliable and uninterrupted price data, it is only applied to transactions in sufficiently liquid securities, namely those in the ASX 500 All Ordinaries. Even so, the small number of observations of price movements beyond the 99th percentile makes it difficult to construct reliable estimates of the desired 99.7 per cent margin coverage. ASX therefore applies a Portfolio Add-on Factor (currently 30 per cent) to the HSVaR estimate of potential future exposure at a 99 per cent confidence level to achieve the desired 99.7 per cent level of cover.

For all other securities (such as non-All Ordinaries shares, All Ordinaries shares with less than two years of price history, warrants and interest rate securities) a flat rate methodology is used to calculate initial margin. This methodology is less reliant on the liquidity of any particular security for the calculation of margin requirements. Instead, it applies a flat rate factor to the closing price of the relevant security. Bespoke flat rates are used for All Ordinaries securities that lack the required two years of price history to apply HSVaR. These flat rates are based on the past year of daily price changes for the relevant security (if available) or for a proxy security with similar characteristics. For other securities, the flat rate is selected based on the 'Risk Configuration Group' to which the security belongs. Risk Configuration Groups are used to group securities for margin purposes based on common risk characteristics. The flat rate factor for each Risk Configuration Group is calibrated to a

desired confidence level based on daily price changes in the past year: 99.7 per cent for top 200 All Ordinaries shares; 97 per cent for the next 300 All Ordinaries shares; and 95 per cent for all other securities. The lower confidence intervals for the latter two groups reflect the difficulty in constructing reliable estimates of the extremities of the distributions of price movements for securities with limited price history and/or liquidity. However, longer close-out periods of two days for next 300 All Ordinaries shares or three days for other securities are assumed. Backtesting seeks to verify that the flat rates for less liquid securities provide cover both to the target confidence interval and close-out period at an individual security level, and to at least a 99.7 per cent confidence interval at the portfolio level.³⁴

Mark-to-market margin

The second component of CMM is MTM margin. For securities in the All Ordinaries, MTM margin is calculated at the end of each business day during the three-day settlement cycle to cover actual daily price movements from the day that the transaction is initiated. A participant with a long (net buy) position in a security will have a MTM margin obligation equal to any fall in the price of that security, while a participant with a short (net sell) position in a security will have a MTM margin obligation equal to any rise in price. Participants are entitled to a credit for any MTM gains on their positions in All Ordinaries securities. Unlike variation margin, which is separately called from participants with a MTM loss and passed through to participants with a MTM gain, MTM margin gains or losses are used to adjust the overall CMM obligation of participants (see below).

For all other securities, where MTM margin does not apply, liquidity may not be adequate to reliably price ASX Clear's current exposure. ASX instead adjusts the underlying value to which the flat rate is applied depending on whether the participant has a net buy or net sell position.

- In the case of a net buy position, the total margin requirement is the lower of the participant's net settlement obligation in the relevant security (i.e. net securities due to be bought by the participant, valued at the traded price) or the flat rate margin rate applied to the participant's position in that security valued at the current price. In the event of default of a participant with a net buy position, ASX Clear would face an obligation to purchase the relevant securities. The size of that obligation would be capped at the amount that the defaulting participant had already committed to paying (i.e. the net settlement obligation). However, to close out its exposure, ASX Clear would execute a trade to sell the securities that it was due to receive. The margin call therefore need only cover the replacement cost risk of that trade (estimated by the flat rate). Taking the lower of the two allows the participant to receive credit for any MTM gains on the position without adversely affecting ASX Clear's ability to meet its obligations in the event of default.
- Where a participant has a net sell position, the flat rate is applied to the larger of the participant's net settlement obligation in the relevant security (at traded prices) or the value of the participant's net positions in the security (valued at current prices). Where a defaulting participant had a net sell position, ASX Clear would need to acquire sufficient shares to deliver to the non-defaulting party. By margining on the basis of the participant's position valued at the higher of the trade price (i.e. the net settlement obligation) or current market price, ASX Clear ensures that it is adequately covered against potential MTM losses on short positions.

34 Flat rates effectively assume independence of price movements between securities subject to flat rates. Unless a portfolio is highly concentrated in a small number of flat rate securities, it is likely that this assumption would lead to coverage at the portfolio level that exceeds the targeted confidence interval for individual securities.

Calculation of total CMM obligation

A participant's total CMM obligation is the sum of its CMM obligations for All Ordinaries securities margined on an HSVaR basis and all other securities margined on a flat rate basis.³⁵ MTM margin on All Ordinaries securities is added to initial margin and flat rate margin if prices have moved against the participant. If prices have moved in favour of the participant, an offset may be applied to the participant's initial margin requirement, but this is capped by the level of initial margin. The calculation of the total CMM obligation is then based on the higher of two scenarios: 'all outstanding' and 'assumed settlement'. The all outstanding basis calculates CMM requirements on the basis of all novated trades yet to settle – typically those entered on the three days prior to a margin call. The assumed settlement basis instead assumes that settlements due on the next trading day have already occurred and can be removed from calculation of the CMM obligation. This was introduced to address participant concerns that when settlement occurs there could be large swings in margin which could impact on liquidity needs. This could occur if a large position in the opposite direction to other unsettled trades was to settle, causing a significant change in the participant's net position. In practice, on any given trading day only around four participants typically have their margin calculated on an assumed settlement basis.

OTC IRS Historic VaR

ASX Clear (Futures) uses an HSVaR-based margin system for the margining of OTC interest rate derivatives – OTC IRS Historic VaR.³⁶ OTC IRS Historic VaR uses a volatility weighted five-year sample period with an assumed close-out period of five days and a 99.7 per cent confidence interval.³⁷ The stressed observations from the December 2008 quarter are also included in the sample period, to limit the need for procyclical changes. ASX uses Calypso margining software to calculate OTC IRS Historic VaR margin.

Derivatives Pricing System

ASX uses the Derivatives Pricing System (DPS) to establish the settlement value of exchange-traded options.³⁸ The deemed option prices are used in margin calculations.

The DPS analyses real-time market price information to generate an option's implied volatility; this is used to calculate the fair price of the option. Where traded price data are not available, implied volatility is calculated from untraded bids and offers. If there is insufficient price information for an option series, the DPS is able to interpolate or extrapolate the implied volatility from similar options or previous pricing periods. The DPS applies price corrections to ensure that all calculated prices are logical; for example, the system will ensure that the price of calls (puts) does not increase (decrease) as the strike price increases, and may adjust the fair option value if it would otherwise be lower than an active bid or higher than an active offer. Following recent enhancements, the DPS also applies smoothing to and imposes restrictions on the slope and convexity of deemed volatility curves. This is to ensure consistent daily settlement prices for exchange-traded equity options that eliminate the potential for arbitrage.

35 Separate HSVaR calculations are made for All Ordinaries securities in the top 200 and next 300; as a result, correlations between securities across these two groups are not taken into account in calculating overall CMM obligations.

36 For more detail on OTC IRS Historic VaR, see Appendix A1.2, CCP Standards 6.1 and 6.3.

37 Volatility weighting places greater emphasis on more recent observations in margin calculations based on a decay factor, currently 0.97 for OTC IRS Historic VaR in ASX Clear (Futures).

38 For more detail on DPS, see Appendix A1.1, CCP Standard 6.2.

4.2.2. Stress-testing models

ASX Clear and ASX Clear (Futures) carry out capital and liquidity stress testing to monitor their potential credit exposures and liquidity requirements under extreme but plausible market conditions, and to ensure that they maintain adequate financial resources to cover these exposures in the event of a participant default.

Capital stress testing

ASX conducts daily capital stress tests for each CCP to ensure that pooled prefunded financial resources are sufficient to cover either the single largest credit exposure to any participant and its affiliates (for ASX Clear), or the two largest credit exposures of any participants and their affiliates (for ASX Clear (Futures)) under a range of extreme but plausible market scenarios.³⁹

- *ASX Clear* runs 102 stress-test scenarios, each set to replicate extreme – once in 30 years – market movements. The scenarios cover extreme price and volatility shifts at the market-wide, sector and individual-stock levels, based on a 20-year sample distribution of price and volatility moves (subject to the availability of data).
- *ASX Clear (Futures)* uses a set of single- and multi-contract stress-test scenarios for both exchange-traded and OTC derivatives positions. There are 30 scenarios involving price and volatility movements across the four major futures contracts (the SPI 200 futures, 90-day bank accepted bill futures, 3-year bond futures, and 10-year bond futures), as well as the bank bill swap rate and Australian overnight interest rate curves. Twelve additional scenarios capture the potential change in the economic relationship between IRS and futures subject to cross-margining arrangements. Each scenario is calibrated to a once in 30 year event for single-asset and cross-margining scenarios, or a once in 100 year event for multi-asset scenarios, based on a sample distribution constructed from 20 years of price and volatility data (where available). Assumed holding periods are one day for exchange-traded contracts and five days for OTC positions.

Liquidity stress testing

ASX carries out daily liquidity stress testing to quantify the liquid resources that would be required to cover payment obligations arising from the joint default of any single participant and its affiliates for ASX Clear, or any two participants and their affiliates for ASX Clear (Futures).⁴⁰ The worst case liquidity stress-test value determines the daily 'default liquidity requirement' (DLR).

- *ASX Clear* currently applies different liquidity stress-test assumptions based on the internal credit rating of the participant. For A-rated and B-rated participants, liquidity stress-test results are derived directly from the capital stress test on the assumption that offsetting transaction arrangements with non-defaulting participants would be used to address payment obligations arising from settlement of cash market trades. This assumption is currently under review. For other participants, a bespoke liquidity stress test is used, which separately calculates stressed liquidity obligations from derivatives and cash market transactions. In particular, the cash market stress test applies three different scenarios to the timing of settlement for trades of the defaulting participant while the derivatives stress test applies three different scenarios regarding the ability to transfer client accounts. These are combined with market change scenarios similar to those used in the capital stress test. The stress tests use projected cash flows from settlement

39 For more detail on capital stress testing, see Appendices A1.1 and A1.2, CCP Standards 4.4 and 4.6.

40 For more detail on liquidity stress testing, see Appendices A1.1 and A1.2, CCP Standard 7.8.

and margin payments (including the use of initial margin of the defaulting participant) to calculate the cumulative liquidity requirement for each of the four days following a participant default under each scenario, adding the initial margin and actual (non-stressed) daily variation margin obligations of the relevant participants. The result used to determine the DLR is taken from the day with the largest cumulative exposure.

- *ASX Clear (Futures)*' liquidity stress tests are based on scenarios used in its capital stress-testing model. The DLR is calculated by summing the two largest capital stress-test results for affiliated groups for a given scenario, and adding the initial margin and actual (non-stressed) daily variation margin obligations of the relevant participants.

4.2.3. Collateral Models

Collateral haircuts

ASX accepts cash and certain non-cash collateral from participants to meet margin obligations and participant contributions to pooled financial resources in ASX Clear (Futures). To mitigate the market risk that would arise in the case of a participant default, ASX applies haircuts to non-cash (and foreign currency) collateral to cover a potential fall in the collateral value over a one-day period under extreme but plausible market conditions.⁴¹

- *ASX Clear* sets haircuts on eligible cash equity securities based on the largest price falls used in the corresponding capital stress-test scenarios (30 per cent for S&P/ASX 200 securities and the SPDR S&P/ASX 200 Fund).⁴²
- *ASX Clear (Futures)* accepts as eligible non-cash collateral Australian Government and some semi-government securities, US Treasury bills, bank bills and negotiable certificates of deposit from Australian ADIs. Haircuts on these instruments currently range between 1 and 8 per cent. The haircuts are calculated taking several factors into account, including: the relevant capital stress-test scenarios; haircuts applied by the Bank for the same or equivalent instruments; and market volatility data. Haircuts are also applied to collateral lodged against margin on products denominated in a currency other than that of the collateral (currently between 6 and 10 per cent, depending on the currency).⁴³

To reduce the need for procyclical adjustments, haircuts are calculated based on price and volatility changes observed in the past 20 years, which includes the extreme volatility observed during the 2008–09 financial crisis.

4.3. ASX Model Validation Framework

The ASX Model Validation Standard, developed in mid 2013 and updated in the June quarter of 2014, sets out ASX's internal framework for model validation. The framework identifies which models are to be validated, how model validation is carried out and the relevant governance arrangements. The remainder of this section sets out the key features of ASX's model validation framework, focusing in particular on enhancements to ASX's approach to backtesting and sensitivity analysis (including

41 For more details on collateral haircuts, see Appendices A1.1 and A1.2, CCP Standards 5.3 and 5.4.

42 A table of ASX Clear acceptable collateral is published on the ASX website at <http://www.asx.com.au/data/acceptable_stocks.pdf>.

43 A table of ASX Clear (Futures) acceptable collateral is published on the ASX website at <<http://www.asx.com.au/data/asxclf-acceptable-collateral-list.pdf>>.

reverse stress testing), and steps taken towards full independent validation of the models described in Section 4.2.

4.3.1. Governance

The Boards of ASX Clear and ASX Clear (Futures) (the 'Clearing Boards') are ultimately responsible for the management of risks arising from the clearing activities of both CCPs. In discharging this responsibility, the Boards have delegated the oversight of model validation to an expert Risk Quantification Group (RQG) within ASX. The RQG was formed in early 2013. Its membership includes the Chief Risk Officer (CRO) and key staff from the Clearing Risk Management, Clearing Risk Strategy and Policy, and Clearing Risk Quantification (CRQ) departments. The RQG meets at least monthly. ASX's overall model validation framework is reviewed at least annually by the RQG, which includes review of the Model Validation Standard. Any material changes to the Model Validation Standard arising out of the RQG review would be subject to approval by the Clearing Boards. The Clearing Boards are presented with summarised results from margin backtesting and reverse stress testing on a quarterly basis, and the RQG reviews summary results from these tests both on a monthly basis and as part of quarterly margin reviews.

It is ASX Internal Audit's responsibility to coordinate the independent validation of models, which includes the engagement of external experts to review key models (see Section 4.3.4). The results of independent validations are reported directly to the Clearing Boards. The Clearing Boards also have the right to request a full external model validation for models that have not been validated in this way.

The CRQ department was established in October 2013 by separating some of the functions and staff from the Clearing Risk Policy department, and recruiting additional staff. CRQ's primary purpose is the development and maintenance of ASX's risk models, including via model validation. In carrying out this aspect of CRQ's functions, CRQ staff led the development of the backtesting and sensitivity analysis processes described in Sections 4.3.2 and 4.3.3, and are continuing work to refine these processes. The general manager of CRQ reports directly to the CRO, and CRQ's reports and recommendations arising out of model validation processes are reviewed by the RQG.

The Model Validation Standard places particular emphasis on backtesting and sensitivity analysis. CRQ has developed guidance to document how ASX applies these processes, describing the methodologies and setting out key assumptions, the roles and responsibilities of ASX staff, and the frequency at which each validation process is carried out. In addition, CRQ has worked with Internal Audit to develop the scope of independent review of risk models, including the frequency of review by external experts.

4.3.2. Backtesting

Backtesting uses observed historical data to assess the performance of a model over a given time period (the validation period); that is, how well it predicted the distribution of outcomes. Backtesting may also be used to test individual fixed assumptions or inputs of a model.

Each model has a performance objective, typically summarised by a target level of coverage. For instance, ASX's margin models are designed to cover 99.7 per cent of potential changes in the value of underlying portfolios. The simplest backtest therefore involves recording the number of times the observed change in the value of a portfolio exceeded the value of margin held – that is, the number of 'exceptions' – and comparing this with the expected number of exceptions. The expected number of exceptions is calculated by multiplying the total number of observations (for a margin model, there

will by one observation per day for each portfolio subject to margining) by the significance level (one minus the model’s target confidence interval). In the case of a model targeting a confidence interval of 99.7 per cent, three exceptions would be expected across a sample of 1 000 observations (Table 10). If the number of observed exceptions is no more than the number of expected exceptions, the model can be regarded as performing in line with its objective.

In the example in Table 10, only a single exception was found, compared to three exceptions expected, so the model is found to have passed the backtest. This simple comparison has limitations, particularly where the number of observations (and therefore expected exceptions) is low. ASX is considering the use of more sophisticated statistical tests to supplement the comparison of actual and expected exceptions.

Table 10: Example Model Backtesting Report

Observations	1 000
Confidence Interval	99.7 per cent
Expected exceptions	3
Actual exceptions	1
Actual coverage	99.9 per cent

Margin models

ASX uses backtesting to test each of its margin models – CMM, OTC IRS Historic VaR and SPAN at ASX Clear and ASX Clear (Futures). As noted in Section 4.2.1, these margin models seek to ensure sufficient initial margin to cover adverse moves in the value of a portfolio over an assumed close-out period, in normal market conditions. Backtesting of margin models is used to assess the performance of a model on a purely statistical basis as well as to assess how well it performs in practice. The latter may differ due to discretionary adjustments made to model outputs in circumstances where ASX has concluded that the model has not adequately measured risk (e.g. by failing to capture forward-looking information).

ASX carries out backtesting using both dynamic and static portfolios.

- *Dynamic portfolio backtests.* The most straightforward backtesting approach is to compare the variation margin calculated on the actual portfolio of a representative participant or client (representing the change in its value over the relevant closeout period) to initial margin calculated on that portfolio. Where variation margin exceeded initial margin coverage an exception would be recorded. One limitation of using variation margin to model changes in the value of a portfolio over the close-out period is that it is influenced not only by market movements but also by changes in the composition of the portfolio. That is, observed variation margin includes the effects of new trades that alter the net risk exposure of participants, but it is only price movements that affect a CCP’s exposure in the event of default. As a result, the use of actual dynamic portfolios in backtesting may lead to both false positives, where exceptions result from changes in portfolio composition rather than price movements, and false negatives. False positives may be identified relatively easily by investigating the cause of exceptions revealed in backtesting. However, false negatives caused by position changes that offset adverse price movements cannot be identified without the use of an alternative modelling approach.
- *Static portfolio backtests.* To address the limitations of dynamic portfolio analysis, static portfolio backtests hold the portfolio composition constant over time. When static portfolios are used, ASX calculates hypothetical variation margin obligations for each day of the validation period based on

historical price movements, and compares these to initial margin on the static portfolio. The static portfolio used may be an *actual* portfolio held by a representative participant or client, or it may be a purely *hypothetical* portfolio, perhaps designed to examine the implications of directionality in positions or concentrations of exposures. The aggregation of daily backtesting results for a static portfolio is equivalent to the use of clean profit/loss calculations on a dynamic portfolio in place of variation margin.

ASX's CCPs offer different account structures, reflecting the particular characteristics of the underlying products as well as the profiles and preferences of clearing participants and their customers. In backtesting its margin models, ASX aims to use the most granular level of account detail available. For instance, backtesting is carried out at the level of individual client portfolios for options cleared through ASX Clear and margined using SPAN, while in the case of the CMM model, backtesting is carried out at the participant portfolio level. This reflects the level at which margin obligations are calculated and limitations on how margin could be applied to losses crystallising under different account structures. Backtesting of the SPAN model at ASX Clear, for example, is performed for four types of account structure, including the most granular individually segregated structure.

ASX has also implemented backtesting at different frequencies, to support different aspects of the ASX CCPs' broader risk management processes.

- *Daily backtesting.* ASX conducts margin backtesting of actual dynamic portfolios on a daily basis, supplementing this with analysis of actual static portfolios in the case of cash market positions and exchange-traded options at ASX Clear and OTC derivatives at ASX Clear (Futures). ASX plans to extend actual static portfolio analysis to exchanged-traded derivatives at ASX Clear (Futures) in the coming period. Daily backtesting involves a simple comparison of the number of observed exceptions against the number of expected exceptions for each margin model for the previous day and week. ASX has integrated the daily backtesting process with other automated risk management processes. A summary report is automatically generated and circulated to relevant staff in the Risk division. Further analysis is undertaken when an exception is recorded, both to investigate model performance and to investigate the potential financial implications of the exception given the particular participant and portfolio affected.⁴⁴ An exception indicates that a participant's margin coverage may be insufficient to cover a default at that time or, where it results from backtesting of a dynamic portfolio, may reflect a significant change in the composition of the portfolio. Further investigation determines whether any follow-up actions are required, such as the calling of additional margin or the managing down of positions. To gauge the materiality of exceptions, the maximum value of margin shortfall for any single exception is also noted. Daily backtesting reports are aggregated into a monthly backtesting report which compares the number of observed exceptions to expected exceptions for the previous month, quarter and year. This report, which also includes the results of sensitivity analysis (see Section 4.3.3), is reviewed by the RQG and used to identify the need for further investigation of margin model performance. RQG will take into account the frequency and magnitude of any breaches in determining whether to commission additional analysis from CRQ.
- *Periodic backtesting.* On a periodic basis, approximately every four months, ASX performs a more comprehensive backtesting analysis of each of its margin models. The periodic reviews allow ASX to examine potential weaknesses of the model in more detail and provide a basis for recommending

44 Where an exception is recorded against an individual client account, this investigation will proceed only if the dollar value of the exception breaches a materiality threshold. Further investigation will also take place if the actual number of exceptions exceeds the expected number.

changes to the model or further analysis. The reviews include analysis of model performance from a purely statistical standpoint as well as taking into account discretionary adjustments to model outcomes. Hypothetical portfolios extend the analysis, allowing ASX to test the performance of margin models when applied to portfolios with extreme characteristics that may be particularly adversely affected by market conditions during the validation period. Table 11 summarises results from ASX's initial periodic backtesting and sensitivity analysis (see also Section 4.3.3).

Table 11: Results of Periodic Margin Backtesting and Sensitivity Analysis

Model	Process	Portfolios / Parameters	Results and Recommendations
Cash Market Margining	Backtesting (April 2014)	Hypothetical portfolios	No exceptions observed for HSVaR rates or for the subset of flat rates that were tested. Recommendations included extending backtesting to actual static portfolios and performing sensitivity analysis.
	Sensitivity analysis (June 2014)	Hypothetical portfolios Confidence interval, close-out period, validation period, historical simulation period	There were no exceptions to margin cover for any combination of input values for flat rates that were tested. Exceptions for HSVaR-margined Top 200 stocks remained within expected levels. The HSVaR model for the Next 300 stocks generated more than the expected number of exceptions in several cases, primarily when the validation period was extended. ASX recommended additional testing of sensitivity to a longer validation period.
SPAN (ASX Clear)	Backtesting (April 2014)	Dynamic actual portfolios (clearing participant, client omnibus, house, and individual client account levels)	Observed exceptions for total margin were within expected levels for all account structures apart from individual segregation. Most exceptions were found to be the result of 'false positives' arising from the use of dynamic portfolios. CRQ therefore recommended the use of hypothetical portfolios for future backtesting.
		Total margin, PSR, VSR	Parameter-level tests generated more exceptions than expected, particularly for the VSR. These exceptions were generally concentrated in less liquid contracts. It was recommended that ASX consider introducing VSR floors (see below).
	Sensitivity analysis (April 2014)	Risk parameter inputs Parameter flooring, confidence interval, close-out period, validation period	The number of observed exceptions was greatly reduced when a floor was applied to the value of the VSR parameter. Applying a 25 per cent add-on to the VSR floor for less liquid securities further reduced the number of exceptions. It was recommended that ASX introduce a VSR floor of 20 per cent and consider a further add-on for less liquid securities.
SPAN (ASX Clear (Futures))	Backtesting and sensitivity analysis (May 2014)	Dynamic actual portfolios Parameter flooring, confidence interval, close-out period, validation period	PSR settings were found to be adequate for all interest rate products. It was found that the inter-commodity spread concession (ICC) did not take adequate account of potential twists affecting curvature of the yield curve. It was recommended that ASX consider whether ICC settings remained appropriate.
OTC IRS Historic VaR	Backtesting (March 2014)	Hypothetical portfolios	The number of exceptions was higher than expected, but the power of this test was considered to be low given both the limited number of OTC portfolio accounts and the limited history of actual portfolio positions used to support findings based on hypothetical portfolios. Model performance was found to be affected by the inclusion of the volatile June 2013 period. It was recommended that ASX consider extending the backtesting validation period from one to two years over the course of 2014, and consider using more sophisticated statistical tests to assess the number of exceptions.

Model	Process	Portfolios / Parameters	Results and Recommendations
	Sensitivity analysis (March 2014)	Hypothetical portfolios Confidence interval, close-out period, volatility weighting, historical simulation period	The ratio of observed to expected exceptions tended to increase at higher confidence levels and over longer holding periods, shorter simulation periods, and lower volatility weighting parameters. Excluding the period of increased volatility in June 2013, the model was found to estimate risk adequately across all confidence intervals and holding periods tested. It was recommended that ASX consider extending the historical simulation period when this becomes feasible, and conduct further analysis before considering a floor on the weighting of periods of stress in historical simulation. The report also noted upcoming enhancements to pricing models that would affect model estimates.

Actual static portfolios are used to complement actual dynamic portfolios in the daily backtesting of OTC IRS Historic VaR, CMM and SPAN at ASX Clear. Actual static portfolios are not used for daily backtesting of SPAN at ASX Clear (Futures) pending the take-up of individual client account segregation for futures products, introduced in July 2014. Table 12 summarises the backtesting approach applied to each of the key ASX margin models.

Table 12: Backtesting of ASX Margin Models

	ASX Clear cash market	ASX Clear exchange-traded derivatives	ASX Clear (Futures) exchange-traded derivatives	ASX Clear (Futures) OTC derivatives
Model name	CMM	SPAN	SPAN	OTC IRS Historic VaR
Confidence interval	99.7% ^(a)	99.7%	99.7%	99.7%
Close-out period	One day ^(a)	Two days	Two days	Five days
Account structure	Single house/client account	Individual client	House/client omnibus; individual client from July 2014	Individual client; house/client omnibus
Actual dynamic portfolios	Daily	Daily	Daily	Daily
Actual static portfolios	Daily and periodic	Daily and periodic	Periodic	Daily
Hypothetical portfolios	Periodic	Periodic	Periodic	Periodic

(a) Different confidence interval and close-out assumptions apply in the case of CMM flat rates.

In addition to backtesting the overall performance of margin models, ASX performs backtesting on risk parameter inputs to its margin models. In particular, on at least a quarterly basis, ASX reviews the fixed parameters of its SPAN models, such as the PSR, VSR and inter-commodity concessions, as part of a margin rate review. These margin rate reviews are conducted by ASX to determine whether any adjustments need to be made to the fixed parameters of margin models. ASX can also conduct ad hoc reviews if backtesting indicates potential issues with margin coverage (see Appendices A1.1 and A1.2, CCP Standard 6.6). Backtesting of fixed parameters involves comparing the parameter against observed market outcomes. When an observed market outcome is in excess of the model parameter, an exception is recorded and, as is the case for the other forms of backtesting, the actual number of exceptions is compared with the expected number. Where backtesting reveals that a parameter has not sufficiently covered observed movements in relevant variables over the validation period, ASX will consider changes to the parameter to improve coverage. This ensures that the framework remains robust notwithstanding that backtesting of the overall model has not identified any concerns.

In conducting these margin rate reviews, ASX combines backtesting of parameters with sensitivity analysis (see Section 4.3.3). For example, backtesting of the SPAN model's main parameter inputs, the PSR and VSR, for ASX Clear generated more than the expected number of exceptions, particularly for the VSR. CRQ recommended consideration of a floor on the VSR parameter to improve margin coverage and reduce procyclicality of the model. The impact of introducing such a floor was later tested through sensitivity analysis (see Table 11 and Section 4.3.3).

Stress testing and collateral models

On a monthly basis, ASX also reviews the scenarios that underpin the capital and liquidity stress testing regimes for both ASX Clear and ASX Clear (Futures). Where actual changes in price, volatility or interest rate curves are in excess of the stress-test scenarios, an exception is recorded. Each of ASX's stress-test scenarios involve market movements that represent an event that is no more frequent than one in thirty years, so exceptions are expected to be extremely rare. Since any exception would constitute an event beyond what was previously considered to be extreme but plausible market conditions, it is likely that the exception would be reported to the Clearing Boards and could lead to a revision of the relevant stress scenario.

Collateral haircuts are calibrated to the same stress scenarios as are used in the stress testing regime. Accordingly, the ongoing review of the capital stress-test scenarios also verifies the appropriateness of haircut rates. A more comprehensive and targeted review of collateral haircuts is undertaken annually (see Section 4.3.4).

ASX may also review collateral haircut settings on an ad hoc basis. Such a review was conducted for foreign exchange haircuts in June 2014. It investigated the stress scenarios used to calibrate foreign currency haircuts and concluded that many of these reflected structural changes to the foreign exchange market (such as the float of the Australian dollar) that were unlikely to be repeated. ASX made adjustments to its foreign currency haircuts to exclude the effect of these outliers.

4.3.3. Sensitivity analysis

Backtesting is an important means of establishing whether a model is performing as intended. However, it cannot directly test the validity of assumptions underlying the model or the effects on model performance if an assumption is varied. Sensitivity analysis allows ASX to test the performance of a model beyond the boundaries of its existing assumptions, potentially also examining the implications of assumptions that might not reasonably be expected to hold.

Margin models

ASX analyses the sensitivity of its margin models as part of its quarterly margin rate reviews for SPAN and CMM. Although margin rate reviews for CMM are conducted only for flat rates, sensitivity analysis of the HSVaR component of CMM is carried out at the same time as the flat rate margin review and sensitivity analysis. For the OTC IRS Historic VaR margin model, which does not have any manual rate settings requiring review, sensitivity analysis is carried out in conjunction with the periodic backtesting analysis described in Section 4.3.2.

ASX has developed internal guidance setting out its approach to sensitivity analysis for margin models. This highlights three main assumptions considered as part of the analysis: the confidence interval, close-out period and look-back period. In addition, in the case of SPAN, ASX investigates the impact of varying the historical simulation period and the application of floors to model parameters. Parameters such as the PSR and VSR, although fixed, are set based on rolling historical price and volatility data. Setting these parameters purely based on model recommendations could introduce procyclicality to

overall SPAN margin settings, since the PSR and VSR (and hence overall margin requirements) would tend to increase and decrease in line with the prevailing degree of market stress. One way to mitigate this procyclicality while retaining a degree of responsiveness to changes in risk levels, is to place a floor on the setting of fixed margin parameters. This ‘flooring’ is one means by which ASX can limit the procyclicality of its margin settings (see Appendices A1.1 and A1.2, CCP Standard 6.3 for further discussion of procyclicality). The use of the higher margin obligation calculated from both 60- and 252-day look-back periods also limits procyclicality in the SPAN model.

In applying sensitivity analysis, ASX performs a range of backtests (using the same base portfolios as used in the backtesting analysis), sequentially varying one or more model parameters. If varying particular inputs reveals weaknesses in the model, as evidenced by a larger number of exceptions than expected, ASX considers whether to make adjustments to the model.

Sensitivity analysis to test the effect of floors involves comparison of how many exceptions would occur if alternative floors on parameters such as the PSR or VSR were applied.

Similar to backtesting, sensitivity analysis can be used to test the performance of both model outputs and fixed model inputs under a range of assumed model parameters. As part of ASX’s quarterly margin rate review, sensitivity analysis is used to test the PSR, VSR and inter-commodity spread concession (ICC) inputs into the SPAN model at both CCPs, as well as the flat margin rates used for some cash market securities. Testing of the ICC parameter is used to verify the reliability of assumed correlations between products in the SPAN margin models. Where sensitivity analysis identifies potential weaknesses in margin models, the RQG will consider recommended changes to address these. For example, sensitivity analysis revealed that the number of exceptions recorded for SPAN margining at ASX Clear was greatly reduced when a floor was set on the value of the VSR parameter in this model. As a result, a recommendation that a VSR floor be set in this model was adopted by the RQG (Table 11).

While, in contrast to SPAN, the HSVaR-based margin models do not use defined parameters to model the correlation between products in a portfolio, the use of historical data implicitly assumes that the future correlation of risks across products will reflect observed correlations during the historical simulation period. For the OTC IRS Historic VaR margin model, varying the length and composition of the historical simulation period tests the effect on margin coverage of changing correlations across products over time. In particular, the inclusion of periods of stress in the historical simulation period tests whether changes in the relationship between products in times of stress can affect margin coverage. For the HSVaR component of the CMM model, ASX has identified that the direction of participant portfolios is a more significant contributor to the HSVaR margin settings than implicit price correlations.

Reverse stress testing

For the capital and liquidity stress test models, ASX uses reverse stress testing as its primary means of sensitivity analysis. Reverse stress testing aims to identify market conditions or characteristics of portfolios that could result in a credit or liquidity exposure that exceeded the pooled financial resources at each CCP. ASX conducts monthly reverse stress tests to confirm the sufficiency of pooled financial resources and to cross-validate the capital and liquidity stress-test scenarios. The key assumptions tested via reverse stress testing are: the size and direction of extreme but plausible market movements, including correlated movements across products; the number of participants entering default; and the size and directionality of the defaulting participants’ portfolios. ASX’s general approach to reverse stress testing involves taking plausible fixed combinations of the above assumptions and allowing a single assumption (the magnitude of market movements) to vary until

pooled financial resources would be exhausted. The reverse stress testing approach for each CCP reflects the underlying mix of products cleared.

- *ASX Clear (Futures)*. ASX has developed a reverse stress testing methodology for ASX Clear (Futures) that takes into account the impact of systematic shocks across multiple contracts and considers changes to other model assumptions. For instance, an assumed change in equity prices (up or down), which affects the size of exposures on SPI-200 positions, is combined with an assumed change to the level or shape of the interest rate curve (e.g. to steepen, twist or effect a parallel shift up or down) which affects the three major interest rate futures contracts. In developing these combinations of market movements, ASX considers the prevailing capital stress-test scenarios, and observed historical and statistical relationships between the relevant market variables. The reverse stress test then simulates a level shift to this fixed combination of market movements to discover the point at which pooled financial resources would be exhausted. Since stress scenarios are common across both capital and liquidity stress tests for ASX Clear (Futures), the same reverse stress testing approach is used in sensitivity analysis of both models.
- *ASX Clear*. ASX Clear introduced its reverse stress test in June 2014. Currently, the ASX Clear reverse stress test assumes a uniform movement in equity prices and does not consider scenarios in which the prices of different securities or contracts change in different directions or at different rates. This is, in part, because ASX judges that in stressed circumstances the price of individual securities would be mostly driven by market-wide rather than idiosyncratic factors. The ASX Clear reverse stress test therefore simulates a uniform equity price move to the point at which pooled prefunded financial resources have been exhausted. ASX will consider enhancements to the ASX Clear reverse stress test over time, in light of its analysis of results using the current approach. Possible enhancements may include placing additional structure on simulated price movements to take into account imperfect correlations among individual stocks or market segments, or more tailored testing of individual contract scenarios. ASX is also considering its approach to reverse stress testing of liquid resources in ASX Clear. An extension to its current approach to reverse stress testing will be required to take into account assumptions relating to the timing of settlement for cash market positions and the porting of derivatives positions. The finalisation of a liquidity reverse stress test for ASX Clear will depend on ongoing enhancements to the capital stress test (including any that may result from the external validation described in Section 4.3.4), as well as planned enhancements to the liquidity stress test to take into account the availability liquidity from offsetting transaction arrangements with participants.

In order to test the sensitivity of the stress-test models to other model assumptions, the reverse stress tests in each CCP are repeated for a wide range of scenarios. These include assuming the default of multiple participants (beyond the one or two assumed in regular stress testing), and varying assumptions on the size, concentration or directionality of participants' portfolios. To test these assumptions, reverse stress tests are applied to participant portfolios that exhibit certain characteristics, such as concentrated exposure to certain products or a highly directional interest rate exposure. ASX also conducts tests of extreme hypothetical portfolios that would generate losses sufficient to exhaust pooled financial resources under plausible market scenarios.

In interpreting the results of reverse stress testing, ASX considers the plausibility of any scenarios that could exhaust pooled financial resources. Any recommended changes to stress-test scenarios or pooled financial resources would first be considered by the RQG and then escalated to the Clearing Boards for approval. A summary of reverse stress testing outcomes is reported alongside the monthly margin and capital stress test backtesting reports and included in quarterly risk management reports to the Clearing Boards.

4.3.4. Periodic internal and external review

Backtesting and sensitivity analysis are used both to regularly monitor the performance of margin models and as an input into periodic model reviews. As discussed in Sections 4.3.2 and 4.3.3, periodic reviews use a range of static and hypothetical portfolios and apply sensitivity analysis to provide additional information on the performance of margin models. Periodic reviews provide a more comprehensive test of the margin models, while margin rate reviews are used to test the suitability of the fixed parameters used in the SPAN margin models and flat rates used in CMM.

Stress-test scenarios are reviewed annually by the Clearing Boards, taking into account developments within the market. While monthly backtesting alerts ASX to any immediate problems affecting the stress-test scenarios, the annual review allows for a more comprehensive analysis, including consideration of longer term trends. For each stress test, ASX examines movements in price and volatility for the relevant markets and, for multi-asset scenarios, also considers the degree of price correlation across products. For ASX Clear, part of the stress test review includes determination of which individual stocks are to be used for single-stock scenarios; ASX makes this determination on the basis of ETO exposures over the year. In considering OTC stress-test scenarios, ASX consider factors such as the changes in spread risk between referenced interest rates.

Collateral haircuts are also reviewed annually by the Clearing Boards, with the first such formal review completed in January 2014. Since collateral haircuts reference the capital stress tests, the review of collateral haircuts is reliant on the validation of the capital stress tests.

Each of the regular internal reviews discussed above are conducted by CRQ, but the ASX Model Validation Standard requires that all models critical to ASX's operations also undergo a full independent validation. This may be undertaken by independent internal experts that are not involved in the development of the models in question, or by external experts. A full model validation involves a more fundamental examination of the theoretical underpinnings, performance and ongoing suitability of the model being validated and includes benchmarking and comparisons against risk models used by international peers. ASX has in recent years commissioned independent external validations of the DPS and OTC IRS Historic VaR models, the latter in the context of implementation of ASX Clear (Futures)' OTC derivatives clearing service.

In establishing the appropriate frequency of review, and whether a particular model should be subject to external validation, ASX considers the overall criticality of the model to its risk management processes. To do this, ASX assigns each of its risk models a weighted risk score, based on factors such as the internal and external impact of the model, frequency of use and complexity. On this basis, ASX has elected to externally validate the DPS, SPAN, capital stress test and liquidity stress-test models on an annual basis. The OTC IRS Historic VaR and CMM models will be externally validated bi-annually in alternating years, beginning with OTC IRS Historic VaR during 2014/15.

Other models will be independently validated once every three years, by an internal expert. Internal validations are coordinated by ASX's Internal Audit department, making use of suitable internal experts. This includes a review of model processes, inputs and outputs, as well as validation of data used by the model. CRQ also requires that such reviews be conducted by staff who were not involved in developing the model. Internal Audit reports the findings of internal reviews directly to the ASX Clearing Boards. The Clearing Boards have the right to request a full external model validation if issues of concern are identified. Given the currently relatively low aggregate usage of non-cash collateral across the two CCPs, the collateral haircut model will be subject to this type of internal independent review, with the first such review scheduled to be carried out in the 2014/15 Assessment period.

Model validations in 2014/15

ASX has engaged external experts, initially for a three-year period, to conduct model validations for the capital and liquidity stress test models, DPS, SPAN, OTC IRS Historic VaR and CMM. These validations will be progressively rolled out and reported to the Clearing Boards during 2014/15 (with the exception of CMM, which will be validated in the following year). The first validation, for the capital stress test models, is due to be completed in September 2014, with validations of all models expected to be complete by the end of the year.

Once each model has been fully validated for the first time, subsequent annual validations during the three year period will focus on the resolution of any issues from the initial validation, changes to the models (e.g. to assumptions, use, inputs, outputs, policy parameters, operating environment and market conditions) and how any changes have been implemented. ASX's ongoing testing regime and the governance structure around the models will also be considered. A subset of data analytics will be performed and the benchmarking work would be repeated only if the models or broader market environment had undergone material change.

4.4. Conclusions and Recommendations

ASX has made significant progress in implementing enhancements to its model validation framework and the Bank has found that ASX now observes the majority of the requirements under relevant sub-standards. In particular, ASX now carries out daily and periodic backtesting of the CCPs' margin models, and regularly backtests their stress-testing models. In addition, ASX performs sensitivity analysis as part of quarterly margin reviews or alongside periodic reviews of the margin models applied by both CCPs, and carries out monthly reverse stress tests. A programme of full external model validations has commenced and initial results will be reported to the Clearing Boards during the coming year. The Bank has been kept informed of the results of model validation carried out by ASX, which demonstrate the overall sound performance of ASX's risk models while identifying potential areas for further enhancement (see Table 11). The Bank is satisfied that ASX is using these results to identify appropriate refinements to its risk models.

There remain two areas in which ASX has been found to broadly observe the requirements of the FSS.

- ASX has been found to broadly observe the FSS requirements related to independent validation of key risk models. It is expected that ASX will fully observe these requirements once the first year of the current programme of external model validations is complete. The Bank will remain in dialogue with ASX during this process and monitor actions taken in response to findings from the external review.
- ASX has been found to broadly observe the FSS requirements related to the reverse stress testing of ASX Clear's liquidity stress test models. To fully observe these requirements, it is recommended that ASX enhance its sensitivity analysis approach to allow it to systematically examine the effect of underlying assumptions. This should include assumptions on the porting of client derivatives positions and the degree to which timely settlement can be achieved without the use of offsetting transaction arrangements.

In the spirit of continuous improvement, there are additional steps that ASX could consider to further enhance its model validation approach. In particular:

- Since ASX's backtesting, sensitivity analysis and reverse stress testing approaches have been implemented only relatively recently, ASX is encouraged to continually refine and enhance both the methodologies applied and their integration into existing risk management processes.

- Specifically, ASX is encouraged to implement further enhancements to its reverse stress tests in ASX Clear to model the impact of systematic shocks across multiple products. Similarly, ASX is encouraged to continue refinements to its margin backtesting and sensitivity analysis approach, including to broaden the range of actual and hypothetical portfolios used in analysis.

Table 13 summarises the Bank’s assessment of the ASX CCPs against the specific sub-standards of the FSS that address matters related to model validation, applying the rating system described in Section 2.2. Table 13 includes the Bank’s recommendations and identifies areas in which the Bank will continue to monitor developments during the 2014/15 Assessment period.

Table 13: ASX Model Validation Ratings and Recommendations

Standard	Rating	Recommendation
<p>4.5. Stress-test model analysis</p> <p>... On at least a monthly basis, a central counterparty should perform a comprehensive and thorough analysis of stress-testing scenarios, models and underlying parameters and assumptions used to ensure they are appropriate for determining the central counterparty’s required level of default protection in light of current and evolving market conditions. A central counterparty should perform this analysis of stress testing more frequently when the products cleared or markets served display high volatility, become less liquid, or when the size or concentration of positions held by a central counterparty’s participants increases significantly. A full validation of a central counterparty’s risk management model should be performed at least annually.</p>	Broadly observed	<p>ASX should complete the full validation of its capital stress-test models by external experts. The Bank will monitor the outcome of this validation process.</p> <p>The Bank will monitor the ongoing implementation of ASX’s monthly stress testing review process.</p>
<p>4.6. Reverse stress testing</p> <p>In conducting stress testing, a central counterparty should consider the effect of a wide range of relevant stress scenarios in terms of both defaulters’ positions and possible price changes in liquidation periods. Scenarios should include ... a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions.</p> <p><i>Guidance 4.6.2.</i> A central counterparty should also conduct, as appropriate, reverse stress tests aimed at identifying the extreme scenarios and market conditions in which its total financial resources would not provide sufficient coverage of tail risk. Reverse stress tests require a central counterparty to model hypothetical positions and extreme market conditions that may go beyond what are considered extreme but plausible market conditions... A central counterparty should develop hypothetical very extreme scenarios and market conditions tailored to the specific risks of the markets and of the products it serves.</p>	Observed	<p>ASX Clear is encouraged to consider further enhancements to its reverse stress testing approach that take into account the impact of systematic shocks across multiple products.</p> <p>Both CCPs are encouraged to continually refine and enhance their reverse stress testing methodologies and their integration into existing risk management processes. The Bank will continue to monitor these developments.</p>
<p>5.3. Validation of collateral haircuts</p> <p>A central counterparty should... develop haircuts that are regularly tested and take into account stressed market conditions.</p>	Observed	The Bank will continue to monitor ASX’s ongoing review of collateral haircut rates.

Standard	Rating	Recommendation
<p>6.5. Portfolio margining</p> <p>In calculating margin requirements, a central counterparty may allow offsets or reductions in required margin across products that it clears... if the risk of one product is significantly and reliably correlated with the risk of the other product ...</p> <p><i>Guidance 6.5.1 ... Following the application of offsets, the central counterparty needs to ensure that the margin continues to meet or exceed the single-tailed confidence level of at least 99 per cent with respect to the estimated distribution of the future exposure of the portfolio. If a central counterparty uses portfolio margining, it should continuously review and test offsets among products. It should test the robustness of its portfolio method on both actual and appropriate hypothetical portfolios. It is especially important to test how correlations perform during periods of actual and simulated market stress to assess whether the correlations break down or otherwise behave erratically ...</i></p>	Observed	The Bank will continue to monitor the outcome of ASX's sensitivity analysis to verify assumptions used in portfolio margining.
<p>6.6. Margin backtesting and sensitivity analysis</p> <p>A central counterparty should analyse and monitor its model performance and overall margin coverage by conducting rigorous daily backtesting and at least monthly, and more frequent where appropriate, sensitivity analysis. A central counterparty should regularly conduct an assessment of the theoretical and empirical properties of its margin model for all products it clears. In conducting sensitivity analysis of the model's coverage, a central counterparty should take into account a wide range of parameters and assumptions that reflect possible market conditions, including the most volatile periods that have been experienced by the markets it serves and extreme changes in the correlations between prices.</p>	Observed	<p>ASX Clear (Futures) is encouraged to carry out plans to further enhance its margin backtesting and sensitivity analysis to test coverage of actual participant portfolios.</p> <p>Both CCPs are encouraged to continually refine and enhance their margin backtesting and sensitivity analysis methodologies and their integration into existing risk management processes. The Bank will monitor the ongoing implementation of ASX's daily, monthly and periodic backtesting and sensitivity analysis processes.</p>
<p>6.7. Review and validation of margin methodology</p> <p>A central counterparty should regularly review and validate its margin system.</p>	Broadly observed	ASX should complete the full validation of its SPAN, DPS and OTC IRS Historic VaR margin models by external experts and carry out plans for these external experts to perform a full validation of the Cash Market Margining model within the next two years. The Bank will monitor the outcome of these validation processes.

Standard	Rating	Recommendation
<p>7.8. Stress test model analysis</p> <p>... In conducting stress testing, a central counterparty should consider a wide range of relevant scenarios. Scenarios should include ... a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions. Scenarios should also take into account the design and operation of the central counterparty ... and, where appropriate, cover a multiday period.</p> <p><i>Guidance 7.8.2</i> ... on at least a monthly basis, a central counterparty should perform a comprehensive and thorough analysis of stress-testing scenarios, models and underlying parameters and assumptions used to ensure they are appropriate for achieving the central counterparty's identified liquidity needs and resources in light of current and evolving market conditions... A full validation of a central counterparty's liquidity risk management model should be performed at least annually.</p> <p><i>Guidance 7.8.3</i> ... A central counterparty should conduct, as appropriate, reverse stress tests aimed at identifying the extreme default scenarios and extreme market conditions for which the central counterparty's liquid resources would be insufficient ... A central counterparty should develop hypothetical very extreme scenarios and market conditions tailored to the specific risks of the markets and of the products it serves.</p>	<p>Broadly observed</p>	<p>ASX should complete the full validation of its liquidity stress-test models by external experts. The Bank will monitor the outcome of this validation process.</p> <p>ASX Clear should enhance its sensitivity analysis approach for its liquidity stress test to allow it to systematically examine the effect of underlying assumptions. This should include assumptions on the porting of client derivatives positions and the degree to which timely settlement can be achieved without the use of offsetting transaction arrangements.</p> <p>ASX Clear (Futures) is encouraged to continually refine and enhance its liquidity reverse stress testing methodology and its integration into existing risk management processes. The Bank will continue to monitor these developments.</p>

Abbreviations

ADI	authorised deposit-taking institution	CPMI	Committee on Payments and Market Infrastructures
AFR	available financial resources	CPSS	Committee on Payment and Settlement Systems
AIM	Additional Initial Margin	CRM	Clearing Risk Management
ALMO	Approved Listing Market Operator	CRO	Chief Risk Officer
AMO	Approved Market Operator	CROCC	CCP Risk, Operations and Compliance Committee
AONIA	Australian overnight index average	CRPC	Clearing Risk Policy Committee
APCA	Australian Payments Clearing Association	CRQ	Clearing Risk Quantification
APRA	Australian Prudential Regulation Authority	CS	clearing and settlement
ASIC	Australian Securities and Investments Commission	DBOR	Daily Beneficial Ownership Report
ASXCC	ASX Clearing Corporation	DCO	Derivatives Clearing Organization
BBSW	bank bill swap rate	DCS	Derivatives Clearing System
BCL	Banque Centrale du Luxembourg	DLR	default liquidity requirement
CALCO	Capital and Liquidity Committee	DMC	Default Management Committee
CBPL	capital-based position limit	DMF	Default Management Framework
CCMS	Centralised Collateral Management Service	DMG	Default Management Group
CCP	central counterparty	DMSG	Default Management Steering Group
CDI	CHESS Depository Interest	DNS	deferred net settlement
CEO	Chief Executive Officer	DPS	Derivatives Pricing System
CFO	Chief Financial Officer	DvD	delivery versus delivery
CFR	Council of Financial Regulators	DvP	delivery versus payment
CGS	Commonwealth Government securities	EC	European Commission
CHESS	Clearing House Electronic Sub-register System	EMIR	<i>European Regulation on OTC derivatives, central counterparties and trade repositories</i>
CMaX	Collateral Management Exchange	EPSC	Enterprise Portfolio Steering Committee
CME	Chicago Mercantile Exchange	ERMC	Enterprise Risk Management Committee
CMM	cash market margining	ESA	Exchange Settlement Account
CMSA	Collateral Management Services Agreement	ESAS	Exchange Settlement Account System

ESMA	European Securities and Markets Authority	PFMI	<i>Principles for Financial Market Infrastructures</i>
ETO	exchange-traded option	PID	participant identifier
FMI	financial market infrastructure	PIRC	Participant Incident Response Committee
FSB	Financial Stability Board	PMO	Project Management Office
FSS	Financial Stability Standard	PSNA	<i>Payment Systems and Netting Act 1998</i>
GE	Group Executive	PSR	price scanning range
HLE	High-level Expectation	PvP	payment versus payment
HSVaR	historical simulation of value at risk	RITS	Reserve Bank Information and Transfer System
ICC	inter-commodity spread concession	RQG	Risk Quantification Group
ICR	Internal Credit Rating	RTGS	real-time gross settlement
IOSCO	International Organization of Securities Commissions	SOF	Swift Oversight Forum
IRS	interest rate swap	SPAN	Standard Portfolio Analysis of Risk
MOU	Memorandum of Understanding	SROCC	SSF Risk, Operations and Compliance Committee
MTM	mark-to-market	SRPC	Settlement Risk Policy Committee
NBB	National Bank of Belgium	SSF	securities settlement facility
NTA	net tangible asset	STEL	stress-test exposure limit
OG	Oversight Group	SWIFT	Society for Worldwide Interbank Financial Telecommunication
OTA	offsetting transaction arrangement	TAS	Trade Acceptance Service
OTC	over-the-counter	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 Pty Limited (ASX Clear) and ASX Clear (Futures) Pty Limited (ASX Clear (Futures)) have complied with the *Financial Stability Standards for Central Counterparties* (CCP Standards), and how well ASX Settlement Pty Limited (ASX Settlement) and Austraclear Limited (Austraclear) have complied with the *Financial Stability Standards for Securities Settlement Facilities* (SSF Standards) during the year to 30 June 2014 (the 2013/14 Assessment period).⁴⁵ In setting out its assessment, the Bank has applied the rating system used in the Committee on Payment and Settlement Systems' (CPSS) and the Technical Committee of the International Organization of Securities Commissions' (IOSCO) *Principles for Financial Market Infrastructures: Disclosure Framework and Assessment Methodology*.⁴⁶ Under this framework, the Bank has assessed each of the ASX CS facilities' observance of the requirements of each of the applicable CCP Standards or SSF Standards (together the FSS) 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

45 The full text of the detailed assessments of each of these CS facilities is available at <<http://www.rba.gov.au/payments-system/clearing-settlement/assessments/2012-2013/index.html>>.

46 Available at <<http://www.bis.org/publ/cpss106.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 (Futures) has 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 August 2013.⁴⁷ This supplementary interpretation of the CCP Standards applies to any domestically licensed derivatives CCP that provides services to participants established in the EU, 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 (ASX). In the ASX corporate structure, the two central counterparties (CCPs) – ASX Clear and ASX Clear (Futures) – are subsidiaries of ASX Clearing Corporation Limited (ASXCC), while the two securities settlement facilities (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, while another subsidiary, Australian Securities Exchange Limited, is the licensed operator of the ASX 24 market. The ASX market provides a trading platform for ASX listed securities and equity derivatives, while ASX 24 is an exchange for

47 The Bank's letter to ASX is available at <<http://www.rba.gov.au/payments-system/clearing-settlement/pdf/supplementary-guidance-domestic-derivatives-ccps.pdf>>.

futures products. ASX Clear and ASX Settlement provide clearing and settlement services for the ASX market, and ASX Clear (Futures) provides clearing services for the ASX 24 market.⁴⁸

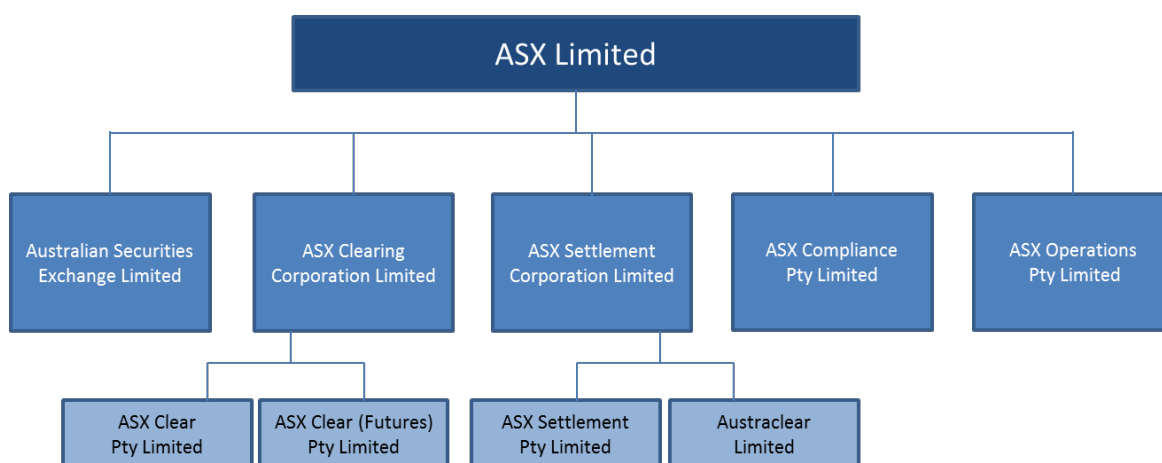
ASX Limited is a listed company. The ASX Limited Board is responsible for overseeing the processes for identifying significant risks to ASX and ensuring that appropriate policies as well as adequate control, monitoring and reporting mechanisms are in place. In addition, ASX Limited’s Board assigns certain 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 two 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.

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

- ASX Operations Pty Limited (ASX Operations) provides most operational resources required by the CS facilities, including services to enable ASX Compliance to perform its services.
- ASX Compliance Pty Limited (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.

Figure 1: ASX Group Structure



48 ASX Clear and ASX Settlement also provide clearing and settlement services for markets other than ASX; these are noted in Section 3.1.

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 Chief Executive Officer (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 Strategy and Policy – develops and maintains policies and standards related to CCP risk management, with a focus on longer term strategic initiatives.
- Clearing Risk Quantification – maintains and validates CCP risk and pricing models.
- Clearing Risk Management – implements CCP risk management policies and standards, and maintains effective procedures for carrying out those policies and standards.
- 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 Chief Risk Officer 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 CS Board submission.
- 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.

- Default Management Committee (DMC) – coordinates ASX’s response to a clearing participant default, and conducts the review and testing of the CCPs’ default management approach.

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 CS Board submission.
- SSF Risk, Operations and Compliance Committee (SROCC) – discusses and shares information across relevant operational, compliance and risk management departments.
- Participant Incident Response Committee (PIRC) – coordinates ASX’s response to a settlement participant incident, and provides input into policy determinations and settings as necessary in response to such incidents.