Assessment of ASX Clearing and Settlement Facilities

September 2019

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Executive Summary

Purpose

In accordance with its responsibilities under the *Corporations Act 2001*, the Reserve Bank of Australia (the Bank) presents its annual Assessment of the ASX clearing and settlement (CS) facilities. ASX operates four CS facilities: two central counterparties (CCPs) – ASX Clear Pty Limited and ASX Clear (Futures) Pty Limited – and two securities settlement facilities (SSFs) – ASX Settlement Pty Limited and Austraclear Pty Limited. The report details the CCPs' and SSFs' compliance with the Bank's *Financial Stability Standards for Central Counterparties* (CCP Standards) and *Financial Stability Standards for Securities Settlement Facilities* (SSF Standards) (together, the Financial Stability Standards or FSS), as well as the facilities' more general obligation to do all other things necessary to reduce systemic risk. The assessment is as at the end of June 2019; however, where relevant, developments after this time are discussed.

Conclusion

It is the Bank's assessment that the CS facilities 'observed' or 'broadly observed' all relevant requirements under the FSS as at 30 June, with the exception of the General Business Risk Standard (CCP Standard 14, SSF Standard 12), which was rated as 'partly observed' in each facility. On balance, the Bank has concluded that the facilities have conducted their affairs in a way that causes or promotes overall stability in the Australian financial system. However, the facilities will need to place a high priority on addressing the recommendations related to general business risk.

Progress towards previous priorities

ASX has made material progress against the Bank's regulatory priorities identified in its 2018 Assessment report:

- *Governance and operational risk management*. ASX has implemented the majority of the recommendations of an external review of its operational risk management and technology governance carried out at the instigation of the Bank and the Australian Securities and Investments Commission (ASIC). ASX's Building Stronger Foundations program established to implement these recommendations also incorporates other ASX initiatives that were already underway in these areas.
- *Intraday exposures*. ASX Clear (Futures) reviewed the margin buffer used to cover potential variation margin exposures created in the overnight session. ASX Clear (Futures) also implemented a risk-visualisation tool to aid monitoring and management of intraday exposures on a near real-time basis.
- *CCP Resilience Guidance.* The ASX CCPs have progressed a work plan designed to align financial risk management practices with the CCP Resilience Guidance. Key changes include the implementation of a more comprehensive credit stress testing approach at ASX Clear (Futures) and the removal of the assumption that clients in ASX Clear could be ported in the event that their clearing participant defaulted.
- *Liquidity add-ons*. ASX Clear (Futures) implemented plans to scale up margin requirements for larger portfolios based on estimated liquidation costs. ASX is continuing work to develop its approach to liquidity add-ons at ASX Clear.

Other material developments

Other material developments relevant to the supervision of the ASX CS facilities that occurred during the assessment period include:

- *Clearing House Electronic Sub-register System (CHESS) replacement*. ASX continued its work on a project to replace CHESS, the clearing and settlement system that supports the cash equities market. ASX released its response to consultation on the business requirements of the new system and has commenced the build phase of the project.
- *Liquid resources.* ASX completed a review of the adequacy of liquid resources held by the ASX CCPs as part of its annual default fund review. ASX Clear plans to increase its prefunded liquid resources in the coming assessment period.

Priorities for the next assessment period

The Assessment includes recommendations aimed at enabling the ASX CS facilities to either observe or continue to observe the requirements under particular FSS. These recommendations relate to:

- strengthening ASX's processes for identifying and managing legal risks
- embedding enhancements to governance arrangements
- aligning financial risk management practices with international guidance on CCP resilience
- managing intraday exposures through real-time monitoring and management, and the calibration of default fund buffers
- resuming the review of margin offset parameters in ASX Clear (Futures)
- reviewing client segregation arrangements in ASX Clear after implementation of the CHESS replacement system
- strengthening the legal basis of facilities' access to general business risk capital
- implementing plans to strengthen operational risk management arrangements
- ensuring core systems fully support risk management functionality.

The Assessment also identifies areas that will be an important part of the Bank's supervisory engagement with ASX over the next assessment period. These include:

- work to formalise controls for legal risks
- the ongoing adequacy of liquid resources at both CCPs
- the project to replace CHESS
- continued enhancement of the CS facilities' cyber resilience arrangements.

1. Summary of Regulatory Priorities

This section summarises actions taken by the ASX CS facilities during the 12 months to June 2019 (the assessment period) in relation to recommendations identified in the Bank's 2018 *Assessment of ASX Clearing and Settlement Facilities* (the 2018 Assessment), and summarises the recommendations identified by the Bank in its 2019 Assessment of the facilities against the FSS. Further detail is provided in section 2, which describes the material developments in the CS facilities relevant to the FSS; section 3, which provides the results of a detailed assessment conducted by the Bank of the facilities' legal basis.

1.1 Progress against 2018 Recommendations

In the Bank's 2018 Assessment, the ASX CS facilities were rated 'observed' or 'broadly observed' for all FSS, with the exception of the Operational Risk Standard (CCP Standard 16, SSF Standard 14), which was rated as 'partly observed' in each facility. The 2018 Assessment made recommendations for steps to be taken for the CS facilities to observe or to continue to observe various standards. Table 1 summarises actions taken by the facilities in relation to these recommendations during the assessment period.

The Bank's 2018 Assessment also identified a number of areas of supervisory focus for the current assessment period. Material developments in each of these areas are described in sections 2 and 3 (see Appendix A for a mapping of these sections to each area of supervisory focus).

1.2 2019 Assessment and Regulatory Priorities

It is the Bank's assessment that the CS facilities 'observed' or 'broadly observed' all relevant requirements under the FSS as at 30 June 2019, with the exception of the General Business Risk Standard (CCP Standard 14, SSF Standard 12), which was rated as 'partly observed' in each facility (Table 2).[1] On balance, the Bank has concluded that the facilities have conducted their affairs in a way that causes or promotes overall stability in the Australian financial system.[2] However, the facilities will need to place a high priority on addressing the recommendations related to general business risk. Compared to the 2018 Assessment, the Bank has raised each of the CS facilities' ratings for Operational Risk (CCP Standard 16 and SSF Standard 14) to 'broadly observed' and lowered each of the facilities' ratings for General Business Risk (CCP Standard 14 and SSF Standard 12) to 'partly observed', reflecting issues identified as part of the Bank's detailed review of ASX's legal basis (see section 3).

1 In undertaking its Assessment, the Bank has applied the rating system used in the *Principles for Financial Market Infrastructures: Disclosure Framework and Assessment Methodology* produced by the Committee on Payments and Market Infrastructures and the International Organization of Securities Commissions in December 2012. See Appendix C for more detail on this system.

2 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.

Table 1: Summary of Progress against 2018 Recommendations to Observe or Continue Observing the FSS

Recommendation	Standard	Facility	Actions
Governance. The ASX CS facilities should take the following steps to strengthen their governance arrangements in line with the FSS and consistent with the CCP Resilience Guidance: • as part of ASX's Building Stronger Foundations program, the facilities should implement plans to more clearly define their risk appetite and embed this in business processes and decision-making throughout the organisation • as part of ASX's Building Stronger Foundations program, the facilities should implement plans to clarify responsibilities under ASX's three-lines-of-defence model, improve first-line risk ownership and increase resourcing for the second-line risk function • ASX Clear and ASX Clear (Futures) should ensure that roles and processes in relation to the governance of financial risk management are appropriately formalised and documented in order to ensure that the CS Boards have sufficient information to effectively oversee the CCPs • ASX Clear and ASX Clear (Futures) should ensure that their arrangements for disclosure to, and soliciting feedback from, stakeholders cover all relevant aspects of the CCPs' risk management frameworks, including margin sensitivity analysis, reverse stress testing and management of procyclicality.	CCP and SSF Standard 2	All facilities	*Partly addressed.* ASX revised its risk appetite statement to categorise risks at a more granular level and define key risk indicators (KRIs) that quantify the Board's risk tolerance for a range of key risk metrics. ASX has started to develop business unit level KRIs to help embed the Board-defined risk appetite in its day-to-day operations. ASX updated its Enterprise Risk Management Policy to clarify roles and responsibilities of its second-line risk function and recruited additional staff. ASX also implemented a 'risk champion' program to promote group-wide risk initiatives, and introduced more explicit risk management goals into its review of senior executive performance. ASX plans to continue to promote stronger first-line risk ownership in the coming assessment period. Towards the end of the assessment period, ASX implemented a range of measures intended to formalise and document roles and processes in relation to the governance of risk management. ASX plans to conduct further work in the coming assessment period to formalise and document these roles and processes. ASX plans to update its policy to include the disclosure and feedback requirements set out in the CCP Resilience Guidance in the coming assessment period.
CCP Resilience Guidance. To align financial risk management practices with the CCP Resilience Guidance the ASX CCPs should implement plans to: • enhance the comprehensiveness of stress testing to ensure risks are appropriately identified, captured and stressed • enhance analysis and justification of assumptions used in stress testing models so that risks are adequately captured • remove assumptions made by ASX Clear that customer positions will be able to be ported and that excess collateral will not be withdrawn or decreased during periods of stress to more accurately reflect the extreme but plausible conditions appropriate for stress testing.	CCP Standards 4 and 7	Both CCPs	*Partly addressed.* The ASX CCPs established a multi-year work program to address this recommendation. Key enhancements to date include the implementation of a more comprehensive credit stress testing approach at ASX Clear (Futures) and the removal of the assumption that clients in ASX Clear could be ported in the event their clearing participant defaulted.

Recommendation	Standard	Facility	Actions
Intraday exposures. ASX should introduce a process for ongoing review and resizing of its margin buffer to cover potential variation margin exposures created during ASX 24's Night Session. By 30 June 2020, ASX Clear (Futures) should put in place arrangements to be able to monitor and manage intraday exposures created during ASX 24's Night Session on a near real-time basis, or take other steps to ensure comprehensive management of intraday exposures created during ASX 24's Night Session.	CCP Standard 6	ASX Clear (Futures)	*Partly addressed.* ASX Clear (Futures) reviewed its margin buffer to cover potential variation margin exposures created in the overnight session. ASX plans to enhance its backtesting approach to verify whether initial margin is sufficient to cover variation margin exposures during the Night Session and plans to remove the overnight margin buffer once this can be validated. ASX Clear (Futures) implemented a risk-visualisation tool to aid monitoring and management of intraday exposures on a near real-time basis. ASX has introduced a prototype checklist to review these data against a set of risk metrics, which may then trigger a review of relevant risk management arrangements.
Liquidity add-ons. ASX Clear and ASX Clear (Futures) should complete the implementation of add-ons to manage liquidity risk for cash market products and products margined using the CME SPAN model.	CCP Standard 6	Both CCPs	*Partly addressed.* ASX Clear (Futures) has implemented plans to scale up margin requirements for larger portfolios based on estimated liquidation costs. ASX is continuing work to develop its approach to liquidity add-ons at ASX Clear.
Operational risk management. The ASX CS facilities should implement plans under ASX's Building Stronger Foundations program to: • consolidate and develop a consistent enterprise-wide view of systems, policies, procedures and controls to identify, monitor and manage operational risks • improve systems and processes supporting change management and incident management • enhance knowledge management and embed additional resource in order to reduce reliance on key individuals.	CCP Standard 16, SSF Standard 14	All facilities	*Partly addressed.* ASX implemented the first phase of an Enterprise Risk, Internal Audit and Compliance Application intended to improve the way that it captures, consolidates and analyses operational risk data. ASX also made progress towards development of standardised risk dashboards to report key risk metrics. ASX has performed a stocktake of key business policies, procedures and controls as well as underlying business processes to identify where improvements to documentation are necessary to provide a consistent end-to-end view of its operations. ASX implemented the first phase of an IT service management tool to support the management of incidents and issues, and provide a centralised knowledge management functionality. ASX also increased its resourcing for first-line and second-line risk management and compliance functions in order to reduce reliance on key individuals.

Table 2: Ratings of FSS Observance[(a),(b)]

Standard	ASX Clear	ASX Clear (Futures)	ASX Settlement	Austraclear
CCP and SSF Standard 1: Legal Basis	Observed (→)	Observed (→)	Observed (→)	Observed (→)
CCP and SSF Standard 2: Governance	Broadly observed (→)	Broadly observed (→)	Broadly observed (→)	Broadly observed (→)
CCP and SSF Standard 3: Framework for the Comprehensive Management of Risks	Observed (→)	Observed (→)	Observed (→)	Observed (→)
CCP and SSF Standard 4: Credit Risk	Broadly observed (→)	Broadly observed (→)	N/A	N/A
CCP and SSF Standard 5: Collateral	Observed (→)	Observed (→)	N/A	N/A
CCP Standard 6: Margin	Observed (→)	Broadly observed (→)	---	---
CCP Standard 7 and SSF Standard 6: Liquidity Risk	Broadly observed (→)	Broadly observed (→)	Observed (→)	Observed (→)
CCP Standard 8 and SSF Standard 7: Settlement Finality	Observed (→)	Observed (→)	Observed (→)	Observed (→)
CCP Standard 9 and SSF Standard 8: Money Settlements	Observed (→)	Observed (→)	Observed (→)	Observed (→)
SSF Standard 9: Central Securities Depositories	---	---	Observed (→)	Observed (→)
CCP Standard 10: Physical Deliveries	N/A	Observed (→)	---	---
SSF Standard 10: Exchange-of-value Settlement Systems	---	---	Observed (→)	Observed (→)
CCP Standard 11: Exchange-of-value Settlements	Observed (→)	Observed (→)	---	---
CCP Standard 12 and SSF Standard 11: Participant Default Rules and Procedures	Observed (→)	Observed (→)	Observed (→)	Observed (→)
CCP Standard 13: Segregation and Portability	Observed (→)	Observed (→)	---	---
CCP Standard 14 and SSF Standard 12: General Business Risk	Partly observed (↓↓)	Partly observed (↓↓)	Partly observed (↓↓)	Partly observed (↓↓)
CCP Standard 15 and SSF Standard 13: Custody and Investment Risks	Observed (→)	Observed (→)	N/A	Observed (→)
CCP Standard 16 and SSF Standard 14: Operational Risk	Broadly observed (↑)	Broadly observed (↑)	Broadly observed (↑)	Broadly observed (↑)
CCP Standard 17 and SSF Standard 15: Access and Participation Requirements	Observed (→)	Observed (→)	Observed (→)	Observed (→)
CCP Standard 18 and SSF Standard 16: Tiered Participation Arrangements	Observed (→)	Observed (→)	Observed (→)	Observed (→)
CCP Standard 19 and SSF Standard 17: FMI Links	Observed (→)	Observed (→)	Observed (→)	Observed (→)
CCP Standard 20 and SSF Standard 18: Disclosure of Rules, Key Policies and Procedures, and Market Data	Observed (→)	Observed (→)	Observed (→)	Observed (→)
CCP Standard 21 and SSF Standard 19: Regulatory Reporting	Observed (→)	Observed (→)	Observed (→)	Observed (→)

(a) The arrows in brackets indicate the change in ratings from last year: a horizontal arrow indicates no change; a single vertical up arrow indicates a single upgrade (e.g. from 'broadly observed' to 'observed'); a single vertical down arrow indicates a single downgrade (e.g. from 'observed' to 'broadly observed'); and a double vertical down arrow indicates a downgrade by two grades (e.g. from 'observed' to 'partly observed'). Green text is used for upgraded ratings and red text for downgraded ratings.

(b) 'N/A' means that the Bank has determined that the standard is not applicable to the ASX facility; '---' means that an equivalent standard does not exist for the type of facility (e.g. for CCP Standard 6: Margin, there is no equivalent standard for SSFs).

The Bank has made recommendations that the CS facilities should address to observe or continue to observe relevant requirements in the FSS. This includes recommendations to strengthen ASX's processes for identifying and managing legal risks, strengthen the legal basis of the CS facilities' access to general business risk capital, ensure that ASX Clear provides appropriate client segregation after implementation of the CHESS replacement system, and continue to address issues identified in ASX's governance arrangements and operational risk management. These recommendations are set out in Table 3 and will be a key part of the Bank's regulatory priorities in the next assessment period.

Table 3: 2019 Recommendations to Observe or Continue Observing the FSS

Recommendation	Standard	Facility
Legal Basis. The ASX CS facilities should take the following steps to strengthen their legal basis: • ASX Clear (Futures) should take all possible steps to achieve designation as a settlement system in New Zealand and develop a procedure supporting the repatriation of New Zealand dollar (NZD) collateral • the ASX CCPs should implement changes to their operating rules to enhance the legal certainty of default management actions • the ASX CS facilities should review and update processes and procedures governing the commissioning, reviewing and updating of legal opinions • the ASX CS facilities should establish a periodic review, to be carried out at least every five years, of operating rules and procedures for all CS facilities to ensure they are clear and understandable and are consistent with industry standards and market protocols. For more information, see section 3.	CCP and SSF Standard 1	All facilities
Governance. The ASX CS facilities should continue to implement plans to strengthen their governance arrangements in line with the FSS and consistent with the CCP Resilience Guidance: • as part of ASX's Building Stronger Foundations program, the facilities should complete implementation of plans to embed their risk appetite in business processes and decision-making throughout the organisation • as part of ASX's Building Stronger Foundations program, the facilities should complete implementation of plans to improve first-line risk ownership • ASX Clear and ASX Clear (Futures) should ensure that roles and processes in relation to the governance of financial risk management are appropriately formalised and documented in order to ensure that the CS Boards have sufficient information to effectively oversee the CCPs • ASX Clear and ASX Clear (Futures) should ensure that their arrangements for disclosure to, and soliciting feedback from, stakeholders cover all relevant aspects of the CCPs' risk management frameworks, including margin sensitivity analysis, reverse stress testing and management of procyclicality. For more information, see sections 2.1.1 and 2.3.	CCP and SSF Standard 2	All facilities
CCP Resilience Guidance. To align financial risk management practices with the CCP Resilience Guidance the ASX CCPs should continue to implement plans to: • enhance the comprehensiveness of stress testing to ensure risks are appropriately identified, captured and stressed • enhance analysis and justification of assumptions used in stress testing models so that risks are adequately captured • remove the assumption made by ASX Clear that excess collateral will not be withdrawn or decreased during periods of stress to more accurately reflect the extreme but plausible conditions appropriate for stress testing. For more information, see section 2.1.	CCP Standards 4 and 7	Both CCPs

Recommendation	Standard	Facility
Cover 2 breaches. ASX Clear and ASX Clear (Futures) should formalise thresholds for the frequency and magnitude of Cover 2 stress test breaches that would result in a recalibration of the overall default fund or additional initial margin (AIM) buffer. For more information, see section 2.1.	CCP Standard 4	Both CCPs
Intraday exposures. By 30 June 2020, ASX Clear (Futures) should embed, review and refine its arrangements to monitor and manage intraday exposures created during ASX 24's Night Session on a near real-time basis, or take other steps to ensure comprehensive management of intraday exposures created during ASX 24's Night Session. For more information, see section 2.1.2.	CCP Standard 6	ASX Clear (Futures)
Liquidity add-ons. ASX Clear should complete the implementation of add-ons to manage liquidity risk for cash market products and products margined using the CME SPAN model. For more information, see section 2.1.2.	CCP Standard 6	ASX Clear
Inter-commodity spread concessions (ICCs). ASX Clear (Futures) should complete the review of its methodology for calibrating ICCs used in its margining model and resume reviews of ICCs on a regular basis. For more information, see section 2.1.2.	CCP Standard 6	ASX Clear (Futures)
Segregation and portability. ASX Clear should conduct an assessment of whether the protections from arrangements utilising a commingled house/client account structure remain materially equivalent to those provided by omnibus or individual client segregation. ASX should consult with the Bank on the outcome of this assessment within 12 months of the CHESS replacement system going live. For more information, see section 3.	CCP Standard 13	ASX Clear
General business risk. The ASX CS facilities should implement changes to the ASX Group Support Agreement to ensure that business, operational and investment risk capital is available to the CS facilities when required, including in circumstances where the financial standing of the CS facilities or the ASX Group entities holding the capital is in doubt. For more information, see section 3.	CCP Standard 14 and SSF Standard 12	All facilities
Operational risk management. The ASX CS facilities should complete implementation of plans under ASX's Building Stronger Foundations program to: • consolidate and develop a consistent enterprise-wide view of systems, policies, procedures and controls to identify, monitor and manage operational risks • improve systems and processes supporting change management and incident management • enhance knowledge management in order to reduce reliance on key individuals. For more information, see section 2.3.	CCP Standard 16, SSF Standard 14	All facilities
Risk management systems. ASX should establish a long-term plan to ensure that its core systems have the functionality to fully support its risk management approach, including migrating risk management systems currently operated on non-core systems to core systems. For more information, see section 2.1.3.	CCP Standard 16	Both CCPs

In addition to recommendations to enable the facilities to observe or continue to observe the FSS, the Bank has identified several areas that will be an important part of its supervisory engagement with ASX in the next assessment period. These include a broader review of the ASX Group Support Agreement covering aspects outside the scope of the 2018/19 special topic assessment of the CS facilities' legal basis, and are summarised in Table 4.

Table 4: 2019/20 Areas of Supervisory Focus

Development	Standard	Facility
Planned work by the ASX CS facilities		
Legal basis. Completion of work to enhance, formalise and document business-as-usual (BAU) controls for legal risks. For more information, see section 3.	CCP Standard 1 and SSF Standard 1	All facilities
Settlement finality. Implementation of planned changes to operating rules for all CS facilities to clarify that changes to operating hours are exceptional and require individual justifications. For more information, see section 3.	CCP Standard 8 and SSF Standard 7	All facilities
CCP Resilience Guidance. Implementation of ASX's plans to address gaps against the CCP Resilience Guidance that are minor but indicative of good practice in financial risk management. For more information, see section 2.1.	CCP Standards 2, 4, 5, 6, 7 and 15	Both CCPs
Liquid resources. The implementation of the additional liquidity facility by ASX Clear. For more information, see section 2.1.1.	CCP Standard 7	ASX Clear
CHESS replacement. The development of the new clearing and settlement system for cash market transactions, including how the new system aligns with the requirements in the FSS and supports ASX's risk management capabilities, and the clarity, effectiveness and documentation of default management processes. For more information, see section 2.4.	CCP Standard 14	ASX Clear and ASX Settlement
Cyber resilience. Continued enhancement of ASX's cyber resilience via: • the implementation of actions identified in ASX's Cyber Strategy roadmap • ASX's evaluation of current and emerging technology that could lead to further enhancements to the abilities of ASX to recover from cyber attacks in a timely manner. For more information, see section 2.4.	CCP Standard 16, SSF Standard 14	All facilities
Other		
ASX Group support agreement. The Bank will conduct a broader review of the ASX Group Support Agreement, covering aspects outside the scope of the 2018/19 special topic assessment of the CS facilities' legal basis. For more information, see section 3.	CCP Standard 14 and SSF Standard 12	All facilities
Collateral concentration limits. The Bank will discuss with ASX Clear its conclusion that it is not necessary to impose concentration limits for equity collateral.	CCP Standard 5	ASX Clear

In addition to the recommendations and supervisory focus, the Bank expects ASX to work towards continual strengthening of its risk management arrangements. This is in accordance with the general obligation on CS facilities to do all things necessary to reduce systemic risk. ASX recognises this and has governance arrangements in place to motivate and encourage continuous improvement. As part of its ongoing supervisory engagement, the Bank will continue to discuss with ASX areas where there may be opportunities for improvement.

2. Material Developments

This section discusses material developments relevant to the ASX CS facilities that have occurred during 2018/19. Developments between the end of 2018/19 and the finalisation of this report on 27 August are also discussed, where relevant.

To complement this section, background information on activity and participation in the facilities, and governance and risk management in the facilities is set out in Appendix B. A detailed assessment of how the facilities met each of the FSS at the end of 2018/19 is presented in Appendix C.

2.1 Clearing Risk Management

During the assessment period ASX implemented a wide range of enhancements to its management of risks arising from its CCPs' clearing activities. A number of these enhancements were in response to a report issued by the Committee on Payments and Market Infrastructures (CPMI) and International Organization of Securities Commissions (IOSCO), *Resilience of central counterparties (CCPs): Further guidance on the PFMI* (CCP Resilience Guidance).[3] These enhancements are set out in Box A below. Other enhancements have been made to the ASX CCPs' management of credit and liquidity risks (see section 2.1.1), margining arrangements (see section 2.1.2), and data and risk systems (see section 2.1.3).

2.1.1 Credit and liquidity risk

Credit stress testing approach in ASX Clear (Futures)

The CCP Resilience Guidance sets out more detailed expectations with respect to the development of extreme but plausible scenarios in credit stress testing. In November 2018, ASX implemented a revised credit stress testing approach for ASX Clear (Futures) intended to address gaps identified against these expectations, as well as to reflect additional areas of improvement identified by ASX. The key changes are summarised below.

- *Comprehensiveness and plausibility.* ASX conducted analysis to identify where the existing set of stress scenarios might not fully capture the range of extreme but plausible price movements. Extreme stress events were then added to the set of stress test scenarios to fill identified gaps and enhance the comprehensiveness of credit stress testing. ASX also sought to focus its theoretical and hypothetical scenarios on more plausible points of vulnerability in stress events, placing greater emphasis on aligning its scenarios with observed correlations between products during stressed periods.

3 The CCP Resilience Guidance is available at <https://www.bis.org/cpmi/publ/d163.pdf>

Box A: Progress implementing CCP Resilience Guidance

In July 2017, CPMI-IOSCO published the CCP Resilience Guidance, which provides further guidance on the Principles and Key Considerations in the *Principles for Financial Market Infrastructure* (PFMI) regarding financial risk management by CCPs. At the time the CCP Resilience Guidance was published, the Bank noted that it would take this guidance into account in its interpretation of the FSS. In its 2018 Assessment, the Bank reviewed the ASX CCPs' practices against the CCP Resilience Guidance and concluded that they were either consistent or broadly consistent with that guidance.

To achieve full consistency with the CCP Resilience Guidance, the Bank set a recommendation for the ASX CCPs to implement plans to align certain aspects of their financial risk management and governance practices with those described in the CCP Resilience Guidance. The ASX CCPs have established a multi-year work program to address these recommendations and other minor gaps identified by the Bank in its assessment of the ASX CCPs against the CCP Resilience Guidance. This box summarises the work ASX completed as part of this program during the assessment period.

- In November, ASX implemented a revised credit stress testing approach for ASX Clear (Futures). The new approach focuses on improving the comprehensiveness and plausibility of scenarios and ensuring that no historical stress periods are excluded purely based on their age (see section 2.1.1). ASX intends to implement similar enhancements to credit stress testing for ASX Clear in the coming assessment period.
- In order to address gaps in testing of the sufficiency of NZD liquidity resources, liquidity-specific scenarios covering the NZD obligations of ASX Clear (Futures) were implemented in January.
- In July 2018, ASX removed the assumption that clients in ASX Clear could be ported in the event that their clearing participant defaulted. This change more accurately reflects the extreme but plausible market conditions used in stress testing.
- ASX updated its Liquidity Stress Testing and Liquidity Requirement Standard to more comprehensively identify potential sources of liquidity risk, including events that could affect the CCPs' ability to make intraday payments. The documentation also more comprehensively sets out the basis and thresholds for classifying risks as material or not for stress testing purposes.
- In July 2018, ASX set aside a new and separate pool of capital to cover general business risk for the CCPs and restricted its previously combined pool of CCP capital so that it is available solely for the purposes of covering custody and investment risk.
- In October 2018, ASX increased the margin period of risk (MPOR) from one day to two days for products margined using the Historical Simulation Value at Risk (HSVaR) model and for ASX 200 products margined on a flat-rate basis. These changes were a result of ASX's broader analysis of MPOR assumptions used in initial margin models which was conducted during the previous assessment period and align to the Bank's supplementary interpretation of CCP Standard 6.3 (section 2.5.1). The two- or three-day MPORs used for remaining flat-rate products remained unchanged.

Recommendations. To align financial risk management and governance practices with the CCP Resilience Guidance the ASX CCPs should continue to implement plans to:

- enhance the comprehensiveness of stress testing to ensure risks are appropriately identified, captured and stressed
- enhance analysis and justification of assumptions used in stress testing models so that risks are adequately captured
- remove the assumption made by ASX Clear that excess collateral will not be withdrawn or decreased during periods of stress to more accurately reflect the extreme but plausible conditions appropriate for stress testing
- ensure that roles and processes in relation to the governance of financial risk management are appropriately formalised and documented in order to ensure that the CS Boards have sufficient information to effectively oversee the CCPs
- ensure that their arrangements for disclosure to, and soliciting feedback from, stakeholders cover all relevant aspects of the CCPs' risk management frameworks, including margin sensitivity analysis, reverse stress testing and management of procyclicality.

- *Historical scenarios.* The CCP Resilience Guidance clarifies that a CCP is expected to include all of the most extreme scenarios observed unless the CCP determines, based on a comprehensive, rigorous analysis, that it is implausible that a particular scenario can reoccur. In light of this clarification, ASX reviewed its historical stress scenarios to ensure that no historical stress periods have been excluded purely because they occurred more than 20 years ago. Historical stress periods are now excluded by ASX only if they have been superseded by more recent market events, or if there are specific reasons to consider the historical event to no longer be plausible.
- *Intraday price changes.* In its previous stress testing approach, ASX used the worst intraday/intra-period price return over the close-out period to calibrate its stress testing scenarios. That approach is consistent with requirements set out in the CCP Resilience Guidance; however, ASX considers the approach implausible because it assumes that ASX would close out the entire portfolio of a defaulted participant at the single worst price. In ASX's view, a volume-weighted average price (VWAP) based on observed activity in stressed periods most accurately reflects ASX's preferred close-out strategy and would still incorporate extreme (including intraday) price moves. However, ASX has instead used the worst close-to-close price return over the close-out period, which its analysis indicates is more conservative than VWAP. The Bank has requested that ASX conduct further analysis to demonstrate that the outcome of its chosen approach is consistent with the CCP Resilience Guidance.

Based on data for the 2017/18 financial year, ASX estimated that the changes outlined above reduce ASX Clear (Futures)' average stress test exposures by around 17 per cent. ASX plans to conduct a similar comprehensive review of its stress testing approach for ASX Clear in the second half of 2019.

Annual review of ASX CCPs' default resources

The ASX CCPs are required to set the size of their prefunded financial resources to cover the default of the two participants (and affiliates) that give rise to the largest credit and liquidity exposures in extreme but plausible market conditions (Cover 2 requirement; see Appendix B.3 for further detail). ASX conducts an annual review of the ASX CCPs' prefunded default resources to assess their adequacy, composition and compliance with Cover 2 requirements. The review for the year ending December

2018 concluded that ASX Clear (Futures)' financial resources were adequate but that liquidity resources should be increased from $150 million to $230 million for ASX Clear. This conclusion was driven by two factors. First, in the period covered by the annual review there were five instances in which projected liquidity resources available for cash markets fell below the target minimum allocation of $100 million. Second, ASX's review of the average liquidity requirement for cash markets over the past three years concluded that the target minimum allocation to cash markets should be increased from $100 million to $130 million. ASX implemented the increase to the target minimum allocation to cash markets on 1 July 2019 and expects to implement an additional $80 million liquidity facility later in 2019 to meet its new target level of liquidity resources.

During the assessment period, the ASX CCPs experienced two breaches of their Cover 2 requirements (one each at ASX Clear and ASX Clear (Futures)). There were an additional three breaches immediately before the assessment period (two at ASX Clear and one at ASX Clear (Futures)), in June 2018. The stress test exposure limits (STELs) imposed on participants at each CCP are set conservatively relative to the size of the default fund, with any exposure beyond these limits resulting in a call for stress test AIM. This effectively introduces a buffer for Cover 2 purposes and protection against large positions that are built up gradually. However, all the recent breaches resulted from large intraday changes in the positions held by participants, so the buffers were not sufficient to address movements of the magnitude experienced on these days. While ASX has a process in place to review default fund sizing, including the size of the AIM buffer, it has not established any criteria for the size or frequency of Cover 2 breaches that would trigger an adjustment to the default fund or AIM buffer. ASX is developing supplementary metrics on the frequency and magnitude of Cover 2 breaches to support the Board's existing KRI on default fund adequacy (see section 2.3.1).

Recommendation. ASX Clear and ASX Clear (Futures) should formalise thresholds for the frequency and magnitude of Cover 2 stress test breaches that would result in a recalibration of the overall default fund or AIM buffer.

The annual review also included a review of ASX's approach to the use of offsetting transaction arrangements (OTAs), in light of a recommendation made by the International Monetary Fund (IMF, see Box B). OTAs allow ASX Clear to generate additional liquidity by selling securities that are due to be delivered to a defaulting participant back to the seller of the securities under a rules-based repurchase agreement that reverses at a later date (see Appendix C.1, CCP Standard 7.3). They are used to address the additional liquidity exposures generated by the delay between closing out a securities trade and its settlement on T+2. ASX's review concluded that it was not necessary to increase and diversify qualifying liquid resources to move the use of OTAs to a later stage in the default waterfall because its analysis of hypothetical scenarios showed that usage of OTAs is limited to a small proportion of these. However, ASX will give further consideration to potential alternative sources of liquidity in the coming assessment period since OTAs are more likely to be required for larger defaults and typically comprise around half of projected total liquidity resources used to meet Cover 2.

Box B: Findings from the 2018 Financial Sector Assessment Program

In February 2019, the IMF published a technical note outlining its findings from a 2018 assessment of the supervision, oversight and resolution planning of Australian FMIs under its Financial Sector Assessment Program (FSAP).[4] The assessment included a review of elements of ASX Clear's governance and risk management framework against the CPMI-IOSCO *Principles for Financial Market Infrastructures* (PFMI). The recommendations are summarised below.

- *Increase and diversify qualifying liquid resources to move the use of OTAs to a later stage in the waterfall.* The IMF recommended that ASX Clear should consider increasing its liquidity resources other than OTAs, for example via additional commercial bank liquidity facilities, in order to delay the point at which the CCP relies on OTAs to meet its liquidity obligations in a default. The IMF noted that fixed liquidity facilities provide greater upfront transparency to liquidity providers and participants regarding the size of their potential liabilities than is possible for OTAs, which depend on the size and composition of the defaulter's portfolio. ASX has considered this recommendation as part of the 2019 annual review of the ASX CCP's default resources (see section 2.1.1).
- *Expansion of eligible collateral and application of concentration limits to collateral.* The IMF recommended that ASX Clear should consider allowing participants to provide government and semi-government bonds as non-cash collateral for their margin obligations. ASX considered this recommendation but concluded that there is insufficient demand from participants to post bonds as collateral and that the operational costs of accepting these bonds outweighed the benefits. The IMF also recommended that ASX applies concentration limits to equity collateral to ensure that it can be liquidated without significant adverse price effects during stressed conditions. ASX does not plan to address this recommendation given that its monthly monitoring of clearing risk does not demonstrate significant or persistent concentration risk in equity collateral and that the large number of individual client accounts makes it difficult to implement concentration limits at the participant level.
- *Procyclicality of margin models and collateral haircuts*. The IMF recommended that ASX's annual model validation process include consideration of the procyclicality of its margin models. ASX plans to assess the procyclicality of its margin models as part of its work plan to address gaps against the CCP Resilience Guidance (see Box A).
- *Replace the CHESS system.* The IMF noted the age of the CHESS system and recommended that it be replaced with modern technology to increase operational reliability and support compliance with financial risk management requirements. ASX had commenced a project to replace the CHESS system prior to the IMF review (see section 2.4.1). Since CHESS does not support segregation of house and client cash equity positions, the IMF recommended that the replacement system support operationally segregated accounts at ASX Clear. ASX has included this in the Day 1 business requirements for the CHESS replacement system. The Bank has raised a similar recommendation in the context of the Legal Basis special topic (see section 3.5).
- *Point of settlement finality.* The IMF recommended that ASX clarify the point at which settlement is final in the ASX Clear and ASX Settlement operating rules. ASX has concluded that the rules are

4 The IMF report is available at: <https://www.imf.org/~/media/Files/Publications/CR/2019/1AUSEA2019005.ashx>

sufficiently clear on this point but, following discussion with the Bank, has agreed to improve the way in which the point of settlement finality is described on its website.

- *Group interdependencies*. The IMF recommended that ASX Clear's recovery plan should more fully address interdependencies with other entities in the ASX Group. ASX will consider interdependencies that are not already addressed in its next annual review of its recovery plan.
- *Group structure*. The IMF recommended that ASX consider ring-fencing the CS facilities within its overall group structure through a dedicated risk management framework, committees, staff and risk management systems. ASX considers that splitting its risk management function in this way could reduce its effectiveness in managing enterprise-wide risks. The Bank will further consider this recommendation in the context of the proposed resolution regime for CS facilities.

Liquidity lines for G4 currencies in ASX Clear (Futures)

Participants in ASX Clear (Futures) are able to post cash collateral in any of the G4 currencies (USD, EUR, GBP, JPY) in addition to AUD. ASX Clear (Futures) has in place a requirement that all collateral in G4 currencies must be held in highly liquid investments so that it can cover all intended day-to-day liquidity requirements, such as the return of cash collateral to participants. In order to meet this requirement, collateral is invested as cash (at call) or in reverse repos secured by G4 government securities. During the assessment period, ASX Clear (Futures) established intraday liquidity facilities with two commercial banks of $200 million each to facilitate same-day repayment of G4 cash collateral. In the absence of a default, ASX Clear (Futures) may use these facilities to repay collateral to participants before receiving the proceeds from the investments in which the collateral is held, a process which might otherwise be delayed by currency cut-off times in international payment systems. In the event of a default, ASX Clear (Futures) may also use the facilities to fund the G4 currency leg of a foreign exchange swap, which could be used to raise AUD cash ahead of the same-day receipt of investment proceeds from the corresponding collateral.

2.1.2 Margin

Overnight margining and real-time risk monitoring

To address the potential for participant exposures to build up during the ASX 24 Night Session, ASX Clear (Futures) runs a 2.00 am intra-day margin call for participants that are most active in the Night Session. Since the systems used for payment of AUD margin (Austraclear and the Reserve Bank Information and Transfer System (RITS)) are closed overnight, these margin calls are made in USD and settled via the US banking system. To avoid the risk of calling variation margin in USD overnight then having to fund a matching outgoing variation margin payment in AUD the following day, ASX does not typically include variation margin obligations as part of this call. Instead, participants are required to maintain a margin buffer to cover potential variation margin obligations arising from overnight price moves.

The 2018 Assessment included a recommendation for ASX Clear (Futures) to introduce a process for ongoing review and resizing of its margin buffer. During the assessment period ASX completed a review which concluded the current buffers are generally more than sufficient and indeed could be reduced. The review also found increased initial margin levels might be more effective than the buffer for protecting against exposures. In order to demonstrate the sufficiency of initial margin, ASX plans to enhance its backtesting approach to recognise intraday margin collections and identify the most conservative point of default assumption. Once this enhanced backtesting approach is implemented ASX plans to reassess the need for overnight buffers.

The 2018 Assessment also recommended that, by 30 June 2020, ASX Clear (Futures) should put in place arrangements to be able to monitor and manage intraday exposures created during ASX 24's Night Session on a near real-time basis. ASX implemented a risk-visualisation tool in December 2018 which calculates intraday exposures at 10-minute intervals. For the Day Session, ASX has implemented a prototype checklist prompting staff to measure exposure and erosion of resources against internal thresholds several times a day. For the Night Session, ASX plans to implement automated alerts to escalate potential issues for further review. ASX expects to formalise and document this approach later this year.

Recommendation. By 30 June 2020, ASX Clear (Futures) should embed, review and refine its arrangements to monitor and manage intraday exposures created during ASX 24's Night Session on a near real-time basis, or take other steps to ensure comprehensive management of intraday exposures created during ASX 24's Night Session.

Changes to ASX Clear (Futures) margining approach

In November 2018 ASX implemented a number of changes it made to its Margin Policy in the previous assessment period. ASX increased the frequency with which it recalibrates margin parameters from quarterly to monthly, and extended the historical sample period used to calibrate margin parameters for exchange-traded derivatives at ASX Clear (Futures) from one year to five years. ASX considers that these changes, together with extensions to the MPOR for less liquid products made in the last assessment period and the introduction of a liquidity add-on at ASX Clear (Futures) (see below), will provide a more robust estimate of potential future exposure. As a result, ASX was comfortable reducing the target level of initial margin coverage at ASX Clear (Futures) to a confidence level of 99.5 per cent from 99.7 per cent.

Liquidity add-ons

The 2018 Assessment included a recommendation that ASX Clear and ASX Clear (Futures) should complete the implementation of add-ons to manage liquidity risk for cash market products and products margined using the CME Standard Portfolio Analysis of Risk (SPAN) model. In November 2018, ASX Clear (Futures) introduced a liquidity add-on for exchange-traded derivatives margined using CME SPAN (see CCP Standard 6.3). This add-on is based on the size of a participant's portfolio relative to a 'base' portfolio in a product. The base portfolio is set at a size that would allow it to be liquidated within the product's MPOR with minimal market impact, based on historical trading volumes. ASX is continuing work to develop its approach to liquidity add-ons at ASX Clear.

Recommendation. ASX Clear should complete the implementation of add-ons to manage liquidity risk for cash market products and products margined using the CME SPAN model.

Electricity product inter-commodity spread concession

In November 2018, ASX reduced the range of ICCs for electricity contracts in ASX Clear (Futures). ICCs allow for a reduction in initial margin requirements where offsetting positions are held in correlated contracts. ASX removed ICCs for peak, cap and options contracts; ASX Clear (Futures) now only offers ICCs for electricity contracts for base contracts. ASX estimated the impact of these changes was an approximately 20 per cent increase in margin requirements for electricity products. Margin offsets on electricity products played a role in losses sustained in the default of a clearing participant at Nasdaq Clearing AB in September 2018 (see Box C).

Box C: Nasdaq Clearing AB Member Default

In September 2018, a private trader clearing as a direct participant defaulted at Scandinavia-based CCP Nasdaq Clearing AB. The participant defaulted because he could not meet a margin call related to a spread position on German and Nordic power futures contracts. Nasdaq Clearing conducted a closed auction to return the CCP to a matched book. The resulting losses consumed all of the participant's collateral and a large share of the mutualised default fund. This default attracted considerable attention from other CCPs, their participants and regulators because of the large impact a single trader had on Nasdaq Clearing's financial resources. In contrast, when Lehman Brothers defaulted in 2008, CCPs were able to return to a matched book without exhausting the collateral Lehman had provided (with one exception).[5]

Following the default, Nasdaq Clearing announced plans to enhance its risk management framework.[6] In broad terms, these plans included: increasing initial margin requirements; improving the auction process used to manage defaults; enhancing participant eligibility requirements; and increasing the amount of its own capital at risk in a default. Nasdaq Clearing has also highlighted focusing on improving market liquidity.

During the assessment period ASX conducted a review of its risk management framework against the key lessons learned from the Nasdaq Clear default. For each of the issues identified, ASX concluded it already had measures in place or is working to implement measures to address them.

- ASX Clear (Futures) had already increased its MPOR for electricity products from two to three days, and in November 2018 implemented a liquidity add-on and reduced the number of offsets available for electricity products (section 2.1.2).
- On 1 July 2019, ASX implemented a market-making scheme to improve liquidity for electricity derivatives. ASX is also exploring introducing auctions for electricity derivatives as an alternative default-management tool (see section 2.2.1).
- Participants in the ASX CCPs must be corporations that hold an Australian Financial Services Licence; individual traders may not participate directly.
- ASX contributions make up the majority of each ASX CCP's default fund.

ASX Clear (Futures) expects to complete a broader review of its methodology for calibrating ICCs in the coming assessment period. Regular monthly reviews of ICCs have been suspended until that review is completed.

5 See BIS (2018) *Two defaults at CCPs, 10 years apart* at < https://www.bis.org/publ/qtrpdf/r_qt1812x.htm>

6 See Nasdaq Commodities: Strategic Initiatives for 2019, available at <https://business.nasdaq.com/trade/commodities/who-we-are/strategy-2019.html>.

Recommendation. ASX Clear (Futures) should review its methodology for calibrating ICCs used in its margining model and resume reviews of ICCs on a regular basis.

2.1.3 Data and risk systems

Data issues

CCP Standard 21.2 requires that the ASX CCPs provide detailed information on margining and stress testing to the Bank on at least a quarterly basis. At the end of the previous assessment period, ASX identified errors in the data it provides to the Bank, leading to the revision of a number of data series related to core measures of financial risk management, including credit and liquidity stress testing. Investigations into the underlying causes of the data issues revealed that there were no errors in the underlying data. However, there were issues related to the querying and manipulation of data, inconsistency of ASX's practices with its approved liquidity stress testing model and documentation, and incorrect reporting of liquidity stress testing results to relevant governance committees. In response to these issues, ASX initiated a series of remedial actions to improve the integrity of its data, internal controls and governance processes. The key changes were an increase in the transparency of reporting in internal clearing risk management reports and the development of a Risk Verification Engine that verifies that raw data from production systems is consistent with data reported to internal and external stakeholders.

During 2018/19, a further issue was identified relating to the methodology used to determine the selection of Cover 2 participants in credit stress testing. The methodology used by ASX selected Cover 2 participants based on their stress test exposures before accounting for AIM held. However, this approach did not always result in the correct identification of the two clearing participants that would lead to the maximum Cover 2 exposure after taking into account collateral posted to meet AIM requirements, potentially understating the CCP's exposure in the event of default. The flaw in methodology was corrected in November 2018. No additional breaches in Cover 2 were identified during the assessment period, however an additional historical breach was identified in the 2017/18 assessment period. In response to this issue, and in light of the issues noted above, ASX commissioned an independent professional services firm to validate all credit and liquidity stress test reporting to provide assurance that there were no additional issues.

Enhancements to risk management systems

During the assessment period, ASX Clear (Futures) implemented a risk-visualisation tool that facilitates a near real-time view of risks (see section 2.1.2). It has also implemented enhancements to its credit stress testing system (see section 2.1.1) and liquidity add-ons (see section 2.1.2) for ASX Clear (Futures). Further system changes are planned to implement other changes to support ASX's plans to align its risk management practices with those described in the CCP Resilience Guidance (see Box A).

In order to support timely implementation of risk management system enhancements, such as those outlined above, ASX has implemented a number of its risk management enhancements in ad hoc systems that sit outside of its core systems. This has been done because in some cases ASX's core systems lack the capability to implement more sophisticated risk management techniques. ASX has a longer-term aspiration to ensure that all its risk management functionality operates in core systems, but does not yet have a defined plan to achieve this.

Recommendation. ASX should establish a long-term plan to ensure that its core systems have the functionality to fully support its risk management approach, including by migrating risk management systems currently operated on non-core systems to core systems.

2.2 Default Management and Recovery

2.2.1 Enhancements to fire drills

Electricity auctions

During the previous assessment period, as part of its work to conduct and document analysis of MPOR assumptions used in initial margin models, ASX found that electricity derivatives were less liquid than previously understood. In response, ASX increased the MPOR from two to three days for all energy derivative contracts at ASX Clear (Futures) and adjusted its margin methodology to remove the assumption of a normal distribution of price returns. ASX has taken further steps to improve its ability to manage positions in electricity derivatives in the event of default. In July 2019, ASX implemented new market-making arrangements for Australian electricity futures to encourage greater liquidity in these products. ASX is also encouraging end users to put in place secondary clearing arrangements to support the porting of client positions in the event of a default and therefore mitigate the risks associated with the concentration of clearers. Lastly, ASX has been developing a framework for conducting auctions of electricity derivatives, including end users as bidders, to broaden the range of options available in its default management process.

ASX is conducting a two-stage default management fire drill to test these new arrangements. In the first stage, completed in June 2019, ASX conducted a liquidity polling exercise, involving both clearing participants and end users. The purpose of this stage was to identify the extent to which participants are able and willing to provide liquidity in the event of a clearing participant default that originates in electricity markets. It also tested the capacity of each end user to fund replacement initial margin with a second clearer if its primary clearer is in default. The next stage of the fire drill, expected to be carried out in the second half of 2019, will test the operational processes of conducting a default management auction, including processes for transmitting information to bidders.

OTC auction testing

During the assessment period, ASX implemented a series of enhancements to default management fire drill exercises in respect of its OTC derivatives service. To comprehensively test the default management process from end to end, the coverage and scope of OTC fire drill exercises was expanded to include the default event, a review by ASX's internal default management committee of the hedge recommended by the participant Default Management Group, and the transfer of the auctioned portfolio in a test system environment. ASX also introduced a biannual auction fire drill that tests participants' operational readiness to take part in the auction phase of default management (e.g. to quickly and accurately price an auction portfolio).

2.2.2 Termination of BBY's participation

In March, ASX Clear, Austraclear and ASX Settlement formally terminated the participation of BBY Limited (BBY). BBY was a broker participant that entered external administration in May 2015, and was suspended by ASX Clear and, subsequently, Austraclear and ASX Settlement, during the process of default management and its later insolvency proceedings. BBY's default is described in the 2015 Assessment, with additional lessons learned in the Default Management special topic in the 2016 Assessment.

2.3 Building Stronger Foundations

During the previous assessment period, ASX commenced a three-year program (Building Stronger Foundations) to address the findings of an independent external review of ASX's technology governance, operational risk and control frameworks (the Review). The program also incorporates ASX initiatives and projects to improve enterprise risk management and governance practices that had been identified by ASX prior to the Review. The Review was conducted by KPMG at the instigation of the Bank and ASIC, identifying 36 recommendations to address gaps identified in ASX's risk management, technology governance, enterprise architecture and incident management. The 2018 Assessment acknowledged that ASX had engaged constructively with the Review process and accepted all of the recommendations set out in the report. These recommendations were also incorporated into ASX's three-year enterprise risk management (ERM) plan that had been developed in late 2017 to address gaps (covering many of the areas later identified in the Review) in ASX's ERM approach identified in a January 2016 review commissioned by ASX Internal Audit.[7] During the assessment period, ASX also conducted a self-assessment of its governance and risk management practices against the findings of the Australian Prudential Regulation Authority's (APRA's) 2018 Prudential Inquiry into the Commonwealth Bank of Australia (CBA), concluding that the gaps identified would be addressed by the implementation of the Building Stronger Foundations program and the ERM plan (Box D).

The 2018 Assessment recommended that the ASX CS facilities complete a number of the actions planned as part of the Building Stronger Foundations program in order to fully observe requirements of the FSS relating to Governance (CCP and SSF Standard 2) and Operational Risk (CCP Standard 16 and SSF Standard 14) (see section 1.1, Table 1). Sections 2.3.1 to 2.3.4 summarise the progress made by ASX in addressing the Bank's recommendations, and its broader progress in each of the four work streams in the Building Stronger Foundations program. At the end of the assessment period ASX had closed 28 of the Review's 36 recommendations and addressed 95 per cent of the underlying deliverables in the Building Stronger Foundations program.[8]

7 For more information on the ERM plan, see section 2.3.2 of the September 2018 Assessment.

8 The closure of these recommendations was approved by an ASX executive steering group. KPMG reviewed these closure decisions at 30 June, confirming that the necessary conditions had been met for closure.

Box D: Self-assessment against Findings of APRA's Prudential Inquiry into the Commonwealth Bank of Australia

In April 2018, APRA released the final report on its Prudential Inquiry to examine the frameworks and practices in relation to the governance, culture and accountability within the CBA group. The report identified weaknesses in the framework for managing non-financial risks (operational, compliance and conduct risks), a lack of clear understanding or ownership of these risks, and that senior leadership was slow to recognise and address emerging threats to CBA's reputation. The report made a series of recommendations grouped around the following themes:

- more rigorous Board and Executive Committee level governance of non-financial risks
- exacting accountability standards reinforced by remuneration practices
- a substantial upgrading of the authority and capability of the operational risk management and compliance functions
- injection of the 'should we' question in relation to all dealings with and decisions on customers
- cultural change from reactive and complacent to empowered, challenging and striving for best practice in risk identification and remediation.

In June 2018, APRA wrote to the boards of 36 of its larger regulated institutions asking them to gauge whether the weaknesses uncovered by the CBA Prudential Inquiry also existed in their own companies. APRA published a summary of its findings from these self-assessments in May 2019, noting that, while the quality of the self-assessments varied, some consistent findings included that:

- non-financial risk management requires improvement
- accountabilities are not always clear, cascaded and effectively enforced
- acknowledged weaknesses are well known and some have been long-standing
- risk culture is not well understood, and therefore may not be reinforcing desired behaviours.

While there are no APRA-regulated entities within the ASX Group, ASX carried out a self-assessment against the CBA Prudential Inquiry findings on a voluntary basis in order to benchmark its risk management practices and culture against industry better practice. The self-assessment was carried out by ASX Internal Audit and presented to the ASX Limited Audit and Risk Committee in November 2018.

In carrying out the review, ASX Internal Audit interviewed ASX employees and ASX's external auditor, and reviewed the results of previous staff and customer surveys, as well as materials from relevant ASX meetings. The self-assessment identified a number of gaps, but concluded that the most significant of these were already being addressed via the Building Stronger Foundations program or other initiatives already in progress.

2.3.1 Risk management

Defining and embedding risk appetite

The Review found that ASX's risk appetite statement required additional detail on risk tolerance levels in order for management to effectively implement consideration of the risk appetite into day-to-day operations. In response, the ASX Limited Board has endorsed a revised risk appetite statement that divides the risks faced by ASX into seven categories (from the previous two): operational; technology;

financial; counterparty; legal/regulatory; reputation; and strategic risk. The revised risk appetite statement is accompanied by a set of 30 Board-level KRIs that quantify the Board's risk tolerance for a range of key metrics across each of the seven risk categories. The relevant KRIs are monitored by business unit management on a monthly basis and reported quarterly to the executive-level Risk Committee, the CS Boards and the ASX Limited Board Audit and Risk Committee. In order to ensure a consistent adoption of the Board-defined risk appetite across the organisation, ASX is developing business unit level KRIs that provide a more detailed breakdown of the Board-level KRIs and define comparable tolerances for other related risks. The first such set of business unit level KRIs have been developed in respect of ASX's technology risks. ASX will review its risk appetite statement annually in light of future changes to its business strategy and lessons learned from embedding the use of KRIs in its day-to-day operations.

Strengthening the three lines of defence and risk culture

The Review found that ASX's three-lines-of-defence model for risk management and, in particular, the risk management and compliance functions for operations and technology had been under-resourced and lacked clarity regarding roles and responsibilities for risk activities across the organisation.[9] ASX has progressed work, also identified in its three-year ERM plan, to strengthen and mature its first- and second-line risk management. This includes the recruitment of additional headcount into first-line risk management for operations and technology, and across the second-line risk management function. In addition, ASX updated its ERM policy to clarify the roles and responsibilities of its second-line risk function, and describe the role of the Risk Committee.

The work to strengthen ASX's three-lines-of-defence model is linked to other work streams designed to more thoroughly embed improvements in risk management into ASX's culture. For example, ASX has introduced more explicit risk management goals into its review of senior executive performance, and plans to extend this approach to other staff in future years. Another work stream has been the implementation of a 'Risk Champion' initiative, under which individuals across the range of ASX's business units have been nominated to promote group-wide risk initiatives (including the roll-out of new risk systems described below) and support senior management in their risk and compliance responsibilities. Among other aims, these work streams are intended to promote stronger first-line risk ownership and consistent standards of risk management across the organisation.

Operational risk measurement and monitoring

The Review indicated that one of the reasons for the previously limited analysis of information provided to executive and board forums was the limitations of ASX's systems to measure and monitor operational risks. A key part of ASX's response to this finding is the implementation of an Enterprise Risk, Internal Audit & Compliance Application (ERICA) that will allow ASX to capture, consolidate and analyse risk, compliance and audit data more effectively and support more effective risk reporting. By the end of the assessment period ASX had completed the first phase of implementation of ERICA, but many of the benefits of the system are expected to be delivered in subsequent phases that utilise features such as risk dashboards reporting on business unit level KRIs, and with the development of a richer history of risk and compliance data as the system is used over a longer time horizon. Upgrades

9 Under the three-lines-of-defence model, the first line is risk management within the business functions themselves; the second line is an independent risk management and compliance function that develops risk management policy and oversees risk management in the first line; and the third line is independent assurance (i.e. internal and external audit).

to ASX's IT service management tool are also expected to improve the quality and coverage of incident data across the organisation over time (see section 2.3.4).

While ASX's work to improve its systems to measure and monitor operational risks remains ongoing, it has taken steps to improve the reporting of risk data that are available in its current systems. This includes the development of standardised risk dashboards to report key risk metrics, such as performance against the Board-level KRIs. These risk metrics and other risk and operational performance reporting is included in quarterly reports from the first and second lines to the executive-level Risk Committee and Technology, Operations and Security Committee, as well as the Board Audit and Risk Committee.

2.3.2 Technology governance

The Review identified that ASX's IT strategy had historically focused on individual projects rather than an overarching vision of the IT function, and therefore recommended that ASX define a technology strategy and roadmap that provide this vision. In response, ASX has refreshed its technology strategy and developed a new technology operating model. The model includes nine 'domains' that cover both functional (e.g. trading, or derivatives and OTC markets) and cross-functional (e.g. cyber, digital) aspects of ASX's operations. Four of these domains had been established by the end of the assessment period, including the domains relating to cyber, digital, trading, and derivatives and OTC markets. These domains define ASX's current technology capabilities along with an implementation plan to reach ASX's target state.

2.3.3 Enterprise architecture

The Review identified that a contributing factor to ASX's absence of an overarching IT strategy was that ASX lacked a true end-to-end view of its IT architecture (i.e. its enterprise architecture). The Review recommended that ASX clarify the role of enterprise architecture within its strategic planning for technology. In response, ASX has established an enterprise-level 'Design Authority' intended to ensure that governance and decision-making over IT projects takes into account the broader system architecture. ASX has also completed a capability review of the existing enterprise architecture function and recruited additional resource to that team. ASX engaged an external consultant to assist in developing a comprehensive view of ASX's critical systems and documenting 'blueprints' of the target state for ASX's enterprise architecture.

2.3.4 Incident management

The Review observed limitations in ASX's analysis of incident data, as well as the lack of a defined system for managing identified incidents and issues. It also observed a heavy reliance on subject matter knowledge experts within ASX, in part resulting from the lack of a centralised knowledge repository that could provide an end-to-end view of system operations. On 1 July 2019, ASX implemented the first phase of an IT service management tool to support the management of incidents and problems, and provide centralised knowledge management functionality. In future phases ASX will develop the tool's functionalities for change management and include additional technology capabilities to improve the quality of incident data over time. ASX also reviewed and identified key business processes in technology and operations that require documentation to provide an end-to-end view of ASX's operations.

To complement the incident management functionality of the IT service management tool, ASX has implemented a crisis communication tool to support more timely delivery of updates and instructions to ASX's crisis management team and other key stakeholders while managing incidents with extreme or widespread impact.

2.3.5 Conclusions and recommendations

The actions described in sections 2.3.1 to 2.3.4 represent significant progress towards addressing the recommendations relating to the Review and implementation of the Building Stronger Foundations program in the 2018 Assessment. Taking this progress into account, the Bank's assessment is that each of the ASX CS facilities broadly observes the standards on Governance (CCP and SSF Standard 2) and Operational Risk (CCP Standard 16 and SSF Standard 14).

Recommendation. The ASX CS facilities should continue to implement plans under ASX's Building Stronger Foundations program to:

- embed their risk appetite in business processes and decision-making throughout the organisation
- improve first-line risk ownership
- consolidate and develop a consistent enterprise-wide view of systems, policies, procedures and controls to identify, monitor and manage operational risks
- improve systems and processes supporting change management and incident management
- enhance knowledge management in order to reduce reliance on key individuals.

2.4 Operations and Technology

2.4.1 CHESS replacement

During the assessment period, ASX continued its work on replacing CHESS, its core system for clearing, settlement and other post-trade services for the Australian cash equity market. ASX is working with Digital Asset (DA), a New York-based technology company to develop the system that will replace CHESS.

In September 2018, ASX released its response to an earlier consultation on the proposed functionality of the CHESS replacement system. Its response also clarified what functionality ASX expects to make available from Day 1 and set out a draft implementation timeline. This included an extension of the earliest commencement date for the new system by six months to the first half of 2021.

The new system will be built incorporating elements of distributed-ledger technology (DLT). However, ASX's application of DLT in the CHESS replacement system differs significantly from the arrangements of other systems such as Bitcoin and other cryptocurrencies that also use DLT. ASX will use a private, permissioned network application of DLT. Under this approach, ASX will operate, and control access to, the network according to ASX rules, creating a trusted network of nodes. The distributed ledger will provide the single source of truth regarding transactions on the market, with ASX providing access to users allowing each to see elements of the ledger relevant to them. Participants will be able to connect to the system either by taking a node via a 'Ledger Application Programming Interface', or by using a message-based protocol. ASX is developing messages utilising the international ISO 20022 message protocol for users who choose to connect to the system via messages.

User engagement

ASX and DA are currently developing the software for the CHESS replacement system. This work is expected to be completed by June 2020, ahead of a period of industry-wide testing. ASX has been progressively releasing portions of the software into a Customer Development Environment, allowing users to test new functionality as it is developed. These releases have been accompanied by technical information on the functionality of the new system, connectivity and messaging specifications, testing information and support details. ASX has also released information on the costs to access the replacement system for clearing and settlement participants once the new system commences.

The replacement of the core post-trading system for the Australian equities market will have a significant impact on a range of users across the market, including clearing and settlement participants and their service providers, investors, issuers, registries and market operators. Consistent with the *Regulatory Expectations for Conduct in Operating Cash Equity Clearing and Settlement Services in Australia* (Regulatory Expectations) set out by the Council of Financial Regulators (CFR) and Australian Competition and Consumer Commission (ACCC), ASX has therefore established a number of forums through which users can provide input and feedback on the CHESS replacement project.[10] One such forum for stakeholder input is the ASX Business Committee, which meets on a quarterly basis. During the assessment period, ASX expanded the membership of this committee to include representatives from share registries along with the Governance Institute of Australia, Australasian Investor Relations Association and the Australian Shareholder Association. ASX has also convened a Technical Committee focused on the adoption of ISO 20022 messaging, a Connectivity and Integration Working Group, and an Implementation and Transition Working Group to seek stakeholder input on the technical requirements of the replacement system, as well as its transition strategy. Smaller focus group meetings have been arranged to discuss specific functionality. During the assessment period ASX convened nine meetings of the Technical Committee, 11 meetings of the Connectivity and Integration Working Group, 12 focus group meetings and established the Implementation and Transition Working Group.

Also consistent with the Regulatory Expectations, ASX has committed to providing access to its clearing and settlement infrastructure on transparent and non-discriminatory terms. ASX currently provides several non-ASX markets with access to its clearing and/or settlement services and will continue providing this access. ASX has specifically committed to ensure that its new platforms and technology will not be designed in such a way as to raise barriers to access to operators of other markets, or to any competing CS facilities that might emerge in the future.

In recognition of the challenges associated with delivering a large-scale technical project at the same time as effectively engaging users and other stakeholders (including regulators), ASX has increased the resourcing dedicated to project management in recent months. This includes complementing its project management team with the appointment of a new Project Director with the responsibility for delivering the agreed scope of the project.

Regulatory engagement

The Bank has continued to engage with ASX on its progress in building the new system together with members of a CFR and ACCC working group focused on the implications for competition in cash equities clearing and settlement (including how the Regulatory Expectations are being met). The Bank will continue to focus its engagement on the operational resiliency of the new system, and understanding

10 Available at: <https://www.cfr.gov.au/publications/policy-statements-and-other-reports/2016/regulatory-expectations-policy-statement/pdf/policy-statement.pdf>.

how the new business requirements align with the requirements in the FSS and can support ASX's risk management capabilities. This includes engagement on planned functionality to support segregation between a participant's clients' positions and collateral from the participant's own positions and collateral (see section 3.4).

2.4.2 Secondary data centre

During the assessment period, ASX progressed work to replace its current secondary data centre with a new site, including completion of the detailed design of the data centre and specification of hardware requirements. ASX plans to commence a phased migration of its back-up systems to the new site from late 2019 and expects to complete the migration of ASX systems by mid 2020.

2.4.3 Cyber enhancements

During the previous assessment period the Bank assessed ASX against the CPMI-IOSCO *Guidance on Cyber Resilience for Financial Market Infrastructures* (the Cyber Resilience Guidance), concluding that ASX's practices are consistent or broadly consistent with the guidance, apart from in relation to the expectation that ASX is able to recover critical operations safely within two hours following an extreme cyber attack.[11] The Cyber Resilience Guidance recognises that it may take time for FMIs to meet this expectation. During the assessment period, ASX has made further enhancements to its cyber security practices in line with actions identified in its Cyber Strategy roadmap and is obtaining independent expert reviews to confirm the effectiveness of key elements of these enhancements.

2.5 Other Developments

2.5.1 Cross-border regulatory developments

United Kingdom

In October 2018, the Bank of England (BoE) wrote to non-UK CCPs, including ASX Clear and ASX Clear (Futures), that provide services in the UK, providing information on the process for applying for recognition in the UK if the UK withdraws from the EU.[12] The letter also explains that CCPs applying for UK recognition that were already recognised within the EU at the date of exit would be subject to a temporary recognition regime allowing them to continue to provide clearing services in the UK for up to three years while the CCP's application is being assessed. ASX submitted applications for recognition for both ASX CCPs in March, making them eligible for the temporary recognition regime on account of their existing EU recognition.

European Union

The EU is also updating its approach to the supervision of recognised non-EU CCPs, including the ASX CCPs. The proposed changes will result in non-EU CCPs being placed in one of two tiers depending on their degree of systemic importance to the EU. CCPs determined to be systemically important by the European Securities and Markets Authority (ESMA) will be subject to additional requirements and a greater degree of supervision than CCPs that are judged not to be systemically important to the EU. The

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11 The CPMI-IOSCO Guidance on Cyber Resilience for Financial Market Infrastructures is available at <https://www.bis.org/cpmi/publ/d146.pdf>.

12 The BoE's letter to non-UK CCPs is available at <https://www.bankofengland.co.uk/letter/2018/update-to-ccps>.

proposed changes are due to take effect later in 2019, after which a decision will be taken by EU authorities as to which tier of systemic importance the ASX CCPs will be allocated to.

ASX Clear increased its minimum MPOR for cash equities from one to two days in October in order to align with the Bank's supplementary interpretation of CCP Standard 6.3 for domestically licensed derivatives CCPs that provide services to participants that are either established in the EU or subject to EU bank capital regulations. This supplementary interpretation was issued in the context of ESMA's assessment of the equivalence of the Australian regime for regulation of CCPs with that established in the EU.

New Zealand

ASX Clear (Futures) has submitted an application for designation as a Designated Settlement System in New Zealand. If successful, designation would provide additional protection for the finality of ASX Clear (Futures)' settlements in New Zealand, addressing risks to the finality of settlements identified in respect of participants that operate a New Zealand branch (see section 3.2). ASX Clear (Futures) would also be subject to oversight by the Reserve Bank of New Zealand (RBNZ) and the New Zealand Financial Markets Authority (NZFMA). The New Zealand Government is currently consulting on proposals to enhance the oversight regime for FMIs which, if legislated, would provide the RBNZ and NZFMA with additional regulatory powers that apply to designated FMIs. These powers include the ability to set regulatory standards for designated FMIs, powers to oversee their rules, investigative and enforcement powers, and crisis management powers.

2.5.2 Money settlements

NZD payment arrangements

ASX Clear (Futures) settles its NZD obligations, including variation margin for NZD OTC and exchange-traded derivatives, via an arrangement with ASX Clearing Corporation Limited (ASXCC). Under new arrangements introduced during the assessment period, ASX Clear (Futures) now uses Payments NZ's High Value Clearing System to facilitate the settlement of NZD margin payments through the RBNZ's Exchange Settlement Account System (ESAS). The payments are settled between ASXCC's RBNZ ESAS account and the RBNZ ESAS accounts of ASX Clear (Futures) participants or their Participating ESAS account holders. Previously, ASXCC settled these obligations across its exchange settlement account with the RBNZ, with payments initiated in ESAS via the RBNZ's central securities depository, NZClear. The change in arrangements follows the decommissioning of the cash payment functionality in NZClear.

USD settlement in Austraclear

Austraclear's foreign currency settlement service allows participants to make RMB payments in commercial bank money, across the books of Bank of China. In November, Austraclear extended its foreign currency offering to include the settlement of cash transactions in USD. Similar to Austraclear's arrangements for RMB, settlement of the USD payment occurs in commercial bank money across the books of JP Morgan, which was approved as a foreign currency settlement bank for the purposes of USD cash payments in Austraclear.

3. Special Topic – Legal Basis

3.1 Introduction

A CS facility's legal basis defines the rights and obligations of the facility, its participants, and other parties (e.g. clients or service providers), and underpins assumptions made in risk management systems about the manner and time at which these rights and obligations arise. If the legal basis is inadequate, uncertain or unclear then the facility may face unintended, uncertain or unmanageable credit, liquidity or operational risks, which may create or amplify systemic risk.

This section provides an overview of the Bank's assessment of the ASX CS facilities against the standard relating to the Legal Basis (CCP and SSF Standard 1). ASIC staff also contributed to this review. In addition to reviewing potential sources of legal risk at the CS facilities, the assessment examined the controls ASX has in place to mitigate legal risk. The Bank also reviewed two secondary topics that are related to ASX's legal basis:

- settlement finality (CCP Standard 8 and SSF Standard 7), which depends on the legal certainty that settlement cannot be subsequently unwound
- segregation and portability of client positions and collateral (CCP Standard 13), which depends on the legal effectiveness of segregation arrangements and the identification of potential legal obstacles to timely transfer.

The Bank has also reviewed ASX against aspects of the General Business Risk Standard (CCP Standard 14 and SSF Standard 12), where this was relevant to a particular legal risk identified by the review.

The Bank's review of the ASX CS facilities' legal basis was supported by the provision of extensive legal analysis by ASX, including a number of external legal opinions. The Bank also conducted a desk-based review of relevant ASX procedures and policies and engaged with ASX on a number of follow-up questions.

The remainder of this section provides an overview of the key elements of the standards on Legal Basis, Settlement Finality, and Segregation and Portability. It describes the key legal risks identified via the review, how these are mitigated and recommended actions to address remaining gaps. It also outlines ASX's control framework for legal risks and describes how the framework operates in practice.

3.2 Legal Basis

The foundational nature of a CS facility's legal basis is reflected in the broad range of requirements set out in the CCP and SSF Standards and associated guidance related to the identification and management of legal risks. These requirements are summarised in the standard on Legal Basis (CCP and SSF Standard 1) as being that a CS facility 'should have a well-founded, clear, transparent and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions.' Implicit in this overarching requirement is the need for the facility to appropriately manage its legal risks in order to achieve a sound legal basis. The key elements of the legal basis and associated requirements to manage legal risks that form the basis of the Bank's assessment are set out in Table 5.

Table 5: Key Elements of the Legal Basis

Requirement	Standard(s)	Key elements
Segregation from risks of affiliated entities	CCP and SSF Standard 1.1; CCP Standards 14.2 and 14.3; SSF Standards 12.2 and 12.3	The CS facility should be in a legal entity that is not exposed to risks unrelated to those that arise from clearing or settlement. If assets held to cover the CS facility's general business risks are not held by the facility itself, the facility should have legally certain arrangements in place that guarantee access to liquid net assets held by a related entity.
Protection of rights and interests	CCP and SSF Standard 1.2; CCP Standards 5.6, 13.1, 13.3, 13.4 and 15; SSF Standards 5.6, 9.1, 9.5 and 13	The legal basis of a CS facility should clearly define the rights and interests of a CS facility, its participants and, where relevant, its participants' customers in the assets held in custody, directly or indirectly, by the CS facility, including: • interests in, and rights to use and dispose of, collateral (including cross-border collateral) • authority to transfer ownership rights or property interests • rights to make and receive payments, in all cases, notwithstanding the bankruptcy or insolvency of its participants, participants' customers, or a custodian bank • establishing that claims against collateral provided to it by a participant should have priority over all other claims, and the claims of the participant to that same collateral should have priority over the claims of third-party creditors. A CCP should have segregation and portability arrangements that effectively protect a participant's customers' positions and collateral from the default or insolvency of that participant, and disclose any legal or operational constraints that may impair such arrangements. An SSF operating a central securities depository should have appropriate rules, procedures and controls to safeguard the rights of securities issuers and holders and ensure that, to the extent permissible by law, the creditors of the SSF have no claim over securities deposited or registered by participants.
Clear and understandable rules, procedures and contracts	CCP and SSF Standard 1.3	A CS facility's rules and procedures should clearly set out the procedures that will be followed in certain circumstances, the degree of discretion that can be exercised, the processes for changing rules and procedures, and any notification period for unilateral changes to rules or procedures.
Clear articulation of the legal basis	CCP and SSF Standard 1.4	A CS facility should be able to articulate the legal basis for its activities to the Bank and other relevant parties; one recommended approach to articulating the legal basis for each material aspect of a CS facility's business is to obtain well-reasoned and independent legal opinions or analyses.
Clear and certain final settlement, netting and novation arrangements	CCP and SSF Standard 1.5; CCP Standards 8.1, 9.5 and 20.2; SSF Standards 7.1 and 8.5	There should be a clear legal basis regarding the timing of final settlement of a CS facility's obligations, including the point at which transactions are irrevocable. Similarly, netting arrangements and, for CCPs, novation arrangements should be legally certain. A CCP's rules, policies and procedures should clearly identify the point in the clearing process at which the CCP assumes the risk exposure and the nature and scope of that exposure.
Enforceability	CCP and SSF Standard 1.5; CCP Standard 19.2; SSF Standard 17.2	The rules, procedures and contracts of a CS facility should be enforceable in all relevant jurisdictions and in the event of recovery or orderly wind-down. The legal basis should protect the CS facility and any linked FMIs. A CS facility should obtain a written and reasoned independent legal opinion as to the enforceability of the CS facility's arrangements under the laws of each relevant jurisdiction.
Conflicts of law	CCP and SSF Standard 1.6	A CS facility operating in multiple jurisdictions should obtain well-reasoned, independent legal opinions that identify and analyse potential conflicts of law, as well as the enforceability of its rules and its ability to satisfy its regulatory obligations in all relevant jurisdictions. A CS facility should develop rules and procedures to mitigate identified risks. The legal opinion should be reviewed whenever there is a material change to the CS facility's operational, governance or risk management arrangements or to the legal or regulatory framework governing its activities.

3.2.1 Identification of legal risks

Operating Rules

The Bank's review of the elements of the legal basis set out in Table 5 has confirmed that the ASX CS facilities are exposed to only a limited range of legal risks that affect its core clearing and settlement activities in Australia. This is in part due to the strong protections that the *Payment Systems and Netting Act 1998* (PSNA) provides in relation to provisions of the CS facilities' operating rules. These protections include:

- *Protection of the finality of Austraclear's settlement process by its approval as RTGS system under Part 2 of the PSNA.* With this approval, a transaction settled in Austraclear at any time on the day on which a participant enters external administration has the same effect as if the participant had gone into external administration on the next day (in the case of a winding-up) or as if the participant had not gone into external administration (in the case of other forms of external administration). Accordingly, in the event of insolvency all transactions settled on the day of the insolvency are irrevocable and cannot be unwound simply because of the event of external administration.[13]
- *Protection of the netting arrangements of ASX Settlement by its approval under Part 3 of the PSNA.* This approval ensures that netting in accordance with ASX Settlement's Rules and Procedures is legally certain, and that any payment or transfer made in order to discharge the net obligation under the netting arrangements is not to be void or voidable in the event of a participant entering external administration.[14]
- *Protection of the legal certainty of the Operating Rules of both ASX Clear and ASX Clear (Futures) as netting markets under Part 5 of the PSNA.* This includes the effectiveness of the process of novation, by which the CCPs assume obligations to their participants for each cleared transaction, protections for the netting of exposures and payments with participants (including in the event of a participant default), and protection for the enforceability of the CCPs' Operating Rules (including default management and recovery rules) in the event of a participant's external administration.

ASX has, however, identified that the CCPs' Operating Rules do not explicitly authorise the offsetting of opposing positions held by two or more participants that have defaulted at the same time, which may be a preferred default management strategy in an extreme event such as this. ASX plans to remove this uncertainty as part of a broader set of default management rule changes that have been developed in response to lessons learned in the 2015 default of BBY, expected to be implemented in the second half of 2019.

> **Recommendation**. The ASX CCPs should implement changes to their operating rules to enhance the legal certainty of default management actions.

13 A similar protection is provided to the CHESS RTGS service in ASX Settlement; however, this service is not currently active.

14 A similar protection is provided to Austraclear's Assured Mode, which is used as a contingency arrangement settling on a deferred net basis if RTGS settlement is unavailable.

Intragroup capital arrangements

The standards on General Business Risk (CCP Standard 14 and SSF Standard 12) require the ASX CS facilities to hold capital against operational, business and investment risks, but allow this capital to be held by a related entity if there are legally certain arrangements guaranteeing the facility's access to this capital when required.[15] ASX maintains an intragroup agreement (the ASX Group Support Agreement) between the CS facilities, ASX Limited, ASX Operations Limited (ASX Operations) and other group entities, which covers arrangements for the holding of CS facility operational, business and investment risk capital by ASX Limited or another group entity (in practice the capital is invested in liquid assets by ASX Operations).

The Bank's review revealed four key gaps in the arrangements for holding operational, business and investment risk capital under the ASX Group Support Agreement, two of which had been addressed by 30 June, and another which had been partly addressed.

- *Access to capital in the event that the CS facility's financial standing is in doubt.* The agreement originally allowed a broad range of termination rights against the CS facilities, including that ASX Limited or ASX Operations could immediately terminate the agreement with respect to a CS facility if the facility was insolvent or was entering external administration. Access to capital under the agreement in such circumstances is essential since it is required to fund the facility's recovery or wind-down plan. ASX has since made amendments to the agreement that restrict the right of ASX Limited or ASX Operations to terminate the agreement for reasons of a CS facility's insolvency or external administration, unless the relevant capital has already been transferred to the facility, addressing the most potentially serious gap associated with termination rights under the agreement. However, there remain a number of material gaps, including certain non-insolvency circumstances in which ASX Limited could terminate the agreement without transferring the capital.
- *Access to capital in the event that ASX Limited's or ASX Operations' financial standing is in doubt.* The agreement includes no provision that safeguards the CS facilities' access to capital if ASX Limited or ASX Operations was to become insolvent. This gap is potentially of serious concern if not addressed promptly since, in extreme circumstances, it could mean that the facilities have no access to business, operational or investment risk capital. Addressing this gap is not straightforward since any solution will need to avoid the possibility that the transfer of capital by ASX Limited or ASX Operations could be characterised as an unfair preference in insolvency. ASX has developed a proposed solution involving granting the CS facilities security over the assets in which their capital has been invested. Execution of this arrangement is expected to occur later in 2019.
- *Investment risk capital.* Since July 2018, capital to cover potential losses on the CCPs' investment portfolio (i.e. investment of participant cash collateral and ASX's contribution to the CCPs' default funds) has been calculated as a separate capital requirement from operational and business risks. The agreement did not make reference to this separate pool of investment risk capital, but the recent amendments to the agreement have addressed this gap.
- *Restrictions on investment of capital.* The agreement placed no restriction on how capital held at the group level should be invested. In practice, the capital is invested in liquid assets under the terms of the ASX Limited and ASX Operations Investment Mandate, consistent with the

15 The standards do not require that capital for operational and business risks is held in separate pools. However, the CCP Resilience Guidance requires investment risk capital to be held separately.

requirements of the FSS. ASX's recent amendments have introduced this requirement into the agreement.

The ASX Group Support Agreement also covers a range of matters relevant to the CS facilities that were not within the scope of the current review, including arrangements for intragroup provision of operational and human resources relied on by the facilities. The Bank plans to review these aspects of the agreement in greater detail over the coming assessment period.

Recommendation. The ASX CS facilities should implement changes to the ASX Group Support Agreement to ensure that business, operational and investment risk capital is available to the CS facilities when required, including in circumstances where the financial standing of the CS facilities or the ASX Group entities holding the capital is in doubt.

Cross-border legal risks

ASX has identified that there are only three countries that are relevant to the analysis of core legal risks for the ASX CS facilities: Australia, New Zealand and the United States. Although the facilities have participants based in other jurisdictions, the analysis provided by ASX has concluded that the PSNA will validate actions taken under the Operating Rules within Australia, even if these actions are contrary to the laws of overseas jurisdictions (such as the insolvency law governing foreign participants). The one exception identified is for offshore collateral or other settlements that take place overseas, where a foreign court may be able to enforce decisions that give precedence to foreign law. This is currently only an issue for collateral held in New Zealand and the United States by ASX Clear (Futures). The conclusion also relies on the understanding that the ASX CS facilities do not need to pursue action to recover debts from a defaulting (foreign) participant where these exceed the level of collateral posted by that participant in order to manage a default. This is consistent with the risk management framework of the ASX CCPs, which assumes that any uncollateralised losses will be allocated to the default fund (and then, if needed, to loss allocation tools that are part of the recovery plan). However, it does mean that, in some circumstances, participants (and the ASX CCPs) will suffer larger losses than they would have if ASX had successfully recovered funds from the estate of the defaulting participant. The Bank has discussed with ASX that it should document its policy on debt recovery and disclose its approach to its participants.

The Bank's review resulted in ASX identifying an additional legal risk affecting NZD collateral and margin payments in ASX Clear (Futures). The risk relates to a small number of participants that participate in ASX Clear (Futures) via an Australian branch, but also have a branch in New Zealand. If one of these participants was to enter insolvency, then it is possible that a New Zealand court could take action that interferes with ASX Clear (Futures)' rights over any NZD collateral posted by the participant. In order to mitigate this risk, ASX Clear (Futures) has applied for designation as a settlement system by the RBNZ, which would provide it with additional settlement finality protections under the *Reserve Bank of New Zealand Act 1989* (RBNZ Act). ASX is also developing a procedure that would allow it to repatriate NZD collateral to Australia upon a participant default, where the stronger protections of the PSNA would apply.

The analysis of the New Zealand legal basis has also identified that settlement finality protections under the RBNZ Act are only valid for the first 24 hours following a default, although this time limit applies only to the application of collateral within New Zealand and does not limit the repatriation of NZD collateral to Australia. This would be most likely to affect a New Zealand-based direct OTC participant lodging NZD collateral, which has prompted ASX to defer plans to admit New Zealand-based participants unless and until there is legislative change that results in longer-lasting protections for settlement finality.

The analysis of the United States legal basis provided by ASX has not identified any additional material gaps. However, the scope of this analysis excludes any analysis of participants that are neither an Australian corporation nor an Australian branch of a foreign bank. Currently there is one such 'wholly remote' participant that does not post any USD collateral, and ASX has introduced a series of measures to prevent the participant from posting USD collateral in the future.[16]

> **Recommendation**. ASX Clear (Futures) should take all possible steps to achieve designation as a settlement system in New Zealand and develop a procedure supporting the repatriation of NZD collateral.

3.2.2 Control framework for legal risks

The ASX Legal department consists of 26 staff, led by the Group General Counsel and Company Secretary. ASX's preference has been to develop its own in-house legal expertise rather than rely on input from external counsel on routine matters.

There are two main elements of ASX's control framework for legal risks:

- *Business-as-usual (BAU) controls* primarily involve ASX business areas seeking support from ASX Legal on matters that raise potential legal risks. Input from ASX Legal is sought as part of business processes such as contract execution, admission of participants domiciled in a foreign jurisdiction and changes to margining processes. ASX Legal may seek external legal opinions in certain circumstances, such as issues involving highly specialised areas of law or advice on foreign law. ASX Legal also works with the business to develop and assist with the implementation of procedures to control for legal risks (e.g. improvements to contract review processes and controls).
- *Change management controls* seek to address legal risks that arise from both external and internal changes, such as the introduction of new legislation or ASX seeking to launch a new service or product. ASX Legal monitors for changes that may impact the operating rules of the CS facilities (which set out the rights and obligations of participants and the relevant facility) or the conclusions of external legal opinions. To support early engagement of ASX Legal with business initiatives or other changes that may require legal input, ASX Legal participates in a number of organisation-wide committees and groups. These include executive-level management groups (such as the Group General Counsel's membership of the Executive Committee), the Default Management and Recovery Working Group, ASX CCP Risk Consultative Committees, and business-level team meetings.

The Bank judges that ASX's overall control framework for legal risks is consistent with FSS requirements, but that there are some areas where enhancements could be made to improve the overall effectiveness of the framework.

16 In this context, USD collateral means collateral denominated in USD and located in the United States. It does not include, for example, USD-denominated collateral that is posted to an Australian bank via arrangements wholly within Australia.

BAU controls

The effectiveness of ASX's BAU controls relies on business units understanding when to seek legal input. Consultation and engagement with ASX Legal is embedded in internal processes for amending operating rules, procedures, and guidance notes. However, ASX has not conducted an exercise to comprehensively identify areas where legal input is required and embedded these requirements in documented procedures, meaning that the requirement to engage with ASX Legal is missing from, for example, procedures relating to the introduction of new products or services. ASX had self-identified a number of such gaps in its documented controls before the Bank's review and has commenced work to address them. In particular, ASX is developing a list of areas where legal input must be sought by the business and is taking steps to ensure that these requirements are embedded in business-level processes and procedures. Work is also underway to review processes for contract review and execution, and to finalise a set of guidelines for the engagement of external counsel. The Bank will monitor ASX's completion of work to enhance, formalise and document BAU controls for legal risks.

External legal opinions

It is critical that the ASX CS facilities identify the range of legal risks that could materially affect their ability to perform obligations or provide services as intended. Before the Bank's review, ASX had relied primarily on its own internal legal analysis to identify these risks, supplemented by advice from external counsel and occasional external legal opinions that were typically targeted at highly specialised questions. While this approach has the benefit of deepening ASX's internal knowledge of its legal basis, it creates the risk that the analysis of legal risks is not sufficiently objective or has been carried out by a generalist rather than specialist in the relevant areas of law. CCP and SSF Standards 1.4 and 1.6 highlight the use of well-reasoned and independent legal opinions as a means of identifying and articulating any risks to the legal basis of a CS facility. During the assessment period, ASX Legal formalised and documented a set of guidelines for seeking external legal advice to complement its internal legal expertise in a more systematic manner. ASX Legal reviews existing legal opinions on a case-by-case basis when there are changes to legislation covered by the opinions, material changes to the Operating Rules of the ASX CCPs or new business initiatives that may impact the scope of the opinions. In addition, ASX Legal management have recently instituted periodic meetings to discuss whether any changes to law or business activities mean that existing legal opinions should be revisited.

The Bank does not consider that these processes are sufficiently comprehensive. For example, the procedures do not capture the requirement in CCP and SSF Standard 1.6 to review, and update where appropriate, independent legal opinions covering potential conflict of laws at least every two years. The Bank also identified the potential for other enhancements, such as the adoption of a risk-based approach to prioritise obtaining independent opinions in areas of high legal risk or systemic importance. To address the Bank's concerns, it is expected that ASX will review and update its processes for commissioning, reviewing and updating legal opinions on operating rules and key contractual arrangements.

Recommendation. The ASX CS facilities should review and update processes and procedures governing the commissioning, reviewing and updating of legal opinions.

Review of rules and procedures

CCP and SSF Standard 1.3 requires that a CS facility establish rules and procedures that are clear and understandable and are consistent with industry standards and market protocols. ASX engages with participants and monitors market developments to identify changes to industry standards and market protocols and may consider rule changes to maintain consistency with these. Drafting and consultation processes for rule changes aim to ensure drafting is clear and understandable. However, ASX does not conduct periodic general reviews to assess the risk that incremental changes to rules and procedures over time might reduce their clarity and understandability.

Recommendation. The ASX CS facilities should establish a periodic review, to be carried out at least every five years, of operating rules and procedures for all CS facilities to ensure they are clear and understandable and are consistent with industry standards and market protocols

3.3 Settlement Finality

The standards on Settlement Finality (CCP Standard 8 and SSF Standard 7) require that a CS facility's rules and procedures should clearly define the point at which settlement of payments, transfer instructions or other obligations is final. Finality means that the transfer of an asset is irrevocable and unconditional, or that other obligations have been discharged in line with the terms of the underlying contract.

The ASX CS facilities' approach is consistent with the Settlement Finality standards and associated guidance, with one minor gap identified. The gap relates to a requirement in the Settlement Finality standards that a CS facility complete final settlement on the intended date of settlement, other than allowing for a small amount of failed security settlements in the normal course of business. Reflecting this, the guidance to the relevant standard sets out that a facility's rules should make clear that changes to operating hours should not be made for routine reasons (e.g. to accommodate an idiosyncratic and low-impact participant issue) but should be justified on an exceptional basis (e.g. in order to avoid a broader disruption). This is ASX's practice, but it is not set out in the Operating Rules of the CS facilities. ASX plans to amend the rules of each facility to address this gap and the Bank will monitor this work.

3.4 Segregation and Portability

The standard on Segregation and Portability (CCP Standard 13) sets out that a CCP should have rules and procedures that enable the segregation of positions and collateral of a participant's customers (clients). In the event of a participant's insolvency, such arrangements protect clients' collateral from claims by a participant's other creditors and can improve a client's ability to identify and recover its collateral. Segregation also facilitates the transfer of clients' positions and collateral to another participant. The standard requires that, to the extent reasonably practicable under prevailing law, a CCP should put in place portability arrangements that make it highly likely that a client's positions and collateral can be transferred to another participant if the client's participant defaults.

To enable a CCP to readily identify positions of a participant's clients and to segregate related collateral, the Segregation and Portability standard requires that a CCP should maintain client positions and collateral in individually segregated accounts or in omnibus client accounts, or equivalent. Under an individually segregated account structure, each client's positions and collateral are held in a separate account at the CCP, segregated from the positions and collateral of the participant and each other client. Under an omnibus account structure, all positions and collateral belonging to omnibus segregated clients of a particular participant are held together in a single account segregated from the positions and collateral of that participant.

The ASX CCPs take different approaches to client segregation. ASX Clear (Futures) offers individually segregated accounts and client omnibus accounts for both OTC and exchange-traded futures. ASX Clear offers individually segregated accounts for options but does not offer individually segregated accounts or client omnibus accounts for cash market transactions. Instead, ASX Clear relies on an exception in the FSS guidance that permits the use of alternative means to provide protection for clients' assets if this protection is materially equivalent to full segregation of client and house positions and collateral. This exception is limited to cash markets and subject to the CCP demonstrating to the Bank that the alternative protections are materially equivalent to full segregation.

ASX Clear's arrangements for cash market transactions utilise a structure that commingles house and client positions and collateral. To attempt to achieve protections materially equivalent to full segregation, ASX Clear has put in place arrangements that involve the strict segregation of client cash and securities during the period between trade and settlement, and there is a requirement that cash received from the settlement process is placed in trust for the client until it can be disbursed. This is designed to ensure that the client is not exposed to the loss of its cash or securities other than for a matter of minutes during the processing of settlements. However, it does not provide any compensation to the client for the opportunity cost of a failed settlement if its participant was to default (known as replacement cost), for example if the client was forced to re-sell its securities for a lower price. While the current arrangements do provide margin reductions for participants from netting across house and client positions, they also require participants to fund the entire margin requirement since client collateral cannot be passed through to ASX Clear if accounts are not segregated.

The Bank has concluded that ASX Clear's current arrangements for cash market transactions are acceptable given the complexity and limited lifespan of introducing material changes to the account structure used by CHESS. The CHESS replacement system is expected to have functionality that can be configured to support segregation of a participant's clients' positions and collateral from those of the participant during the pre-settlement period. Once the new system is able to support either client omnibus or individually segregated accounts, the Bank would place greater weight on the additional protections that implementation of a segregated account structure would deliver in assessing whether existing arrangements remain consistent with the Segregation and Portability standard. To facilitate the Bank's review of existing arrangements, ASX should conduct an assessment of the case for introducing segregation, including whether the protections remain materially equivalent, and consult with the Bank on the outcome.

Recommendation. ASX Clear should conduct an assessment of whether the protections from arrangements utilising a commingled house/client account structure remain materially equivalent to those provided by omnibus or individual client segregation. ASX should consult with the Bank on the outcome of this assessment within 12 months of the CHESS replacement system going live.

During the assessment period, ASX Legal took steps to address legal impediments to the adoption of portability as a default management strategy for ASX Clear and ASX Clear (Futures). The requirements of the *Anti-Money Laundering and Counter-Terrorism Financing Act 2006* (AML/CTF Act) to perform a know-your-customer (KYC) procedure before accepting ported customers may mean that participants are unable to accept the transfer of customers following a default within an acceptable timeframe in a way that is consistent with the AML/CTF Act. ASX has applied to AUSTRAC for relief allowing participants to accept the transfer of customer positions before carrying out the applicable customer identification procedure, on the condition that they would subsequently close out any positions of transferring customers found to pose an unacceptable risk.

Appendix A: 2018 Areas of Supervisory Focus

Table 6: Summary of Progress against 2018 Areas of Supervisory Focus

Development	Standard	Facility	Actions
Special Topic			
Legal basis special topic. The Bank will carry out a special topic assessment of the ASX CS facilities' legal basis, with a secondary focus on the facilities' arrangements for settlement finality and the ASX CCPs' segregation and portability arrangements.	CCP Standards 1, 8 and 13, SSF Standards 1 and 7	All facilities	The Bank performed an assessment of the ASX CS facilities' legal basis, with a secondary focus on the facilities' arrangements for settlement finality and the ASX CCPs' segregation and portability arrangements. This forms the special topic of this assessment. For more information, see section 3.
Review of Planned Work			
CCP Resilience Guidance. Implementation of ASX's plans to address gaps against the CCP Resilience Guidance that are minor but indicative of good practice in financial risk management, and consideration of how to take into account other minor gaps that ASX does not currently have specific plans to address.	CCP Standards 2, 4, 5, 6, 7 and 15	Both CCPs	The ASX CCPs have established a multi-year work program to address these gaps. For more information, see section 2.1.
Risk system enhancements. The implementation of ASX's longer-term plans to improve its CCP risk systems.	CCP Standards 4, 5, 6 and 7	Both CCPs	ASX has continued to make incremental enhancements to its risk management systems. For more information, see section 2.1.3.
Liquid resources. The review of the adequacy of liquid resources held by the ASX CCPs, as part of the ASX CCPs' annual default fund reviews.	CCP Standard 7	Both CCPs	The adequacy of liquid resources held by the ASX CCPs were reviewed as part of the ASX CCPs' annual default fund reviews. For more information, see section 2.1.1.
CHESS replacement. The development of the new clearing and settlement system for cash market transactions, including how the new system aligns with the requirements in the FSS, and the clarity, effectiveness and documentation of default management processes.	CCP Standard 14	ASX Clear and ASX Settlement	The Bank has continued its engagement with ASX on its CHESS replacement project. ASX released its response to an earlier consultation on the proposed functionality of the replacement system and has commenced building the system. For more information, see section 2.4.
Cyber resilience. Continued enhancement of ASX's cyber resilience via: • the implementation of actions identified in ASX's Cyber Strategy roadmap • ASX's evaluation of current and emerging technology that could lead to further enhancements to the abilities of ASX to recover from cyber attacks in a timely manner.	CCP Standard 16, SSF Standard 14	All facilities	ASX has progressed work to implement actions in its Cyber Strategy roadmap. Work to evaluate technology that could further enhance recovery capabilities is expected to take longer to progress. For more information, see section 2.4.

Appendix B: Background Information

B.1 ASX Group Structure and Governance

There are two types of CS facilities operated by the ASX Group:

- *CCPs*. 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. The ASX CCPs manage this risk in a number of ways, including through participation requirements, margin collection, the maintenance of pooled resources and loss allocation arrangements (see Appendix B.3).
- *SSFs*. An SSF provides for the final settlement of securities transactions. Settlement involves transfer of the title to the security, as well as the transfer of cash. These functions are linked via appropriate delivery-versus-payment (DvP) arrangements incorporated within the settlement process.

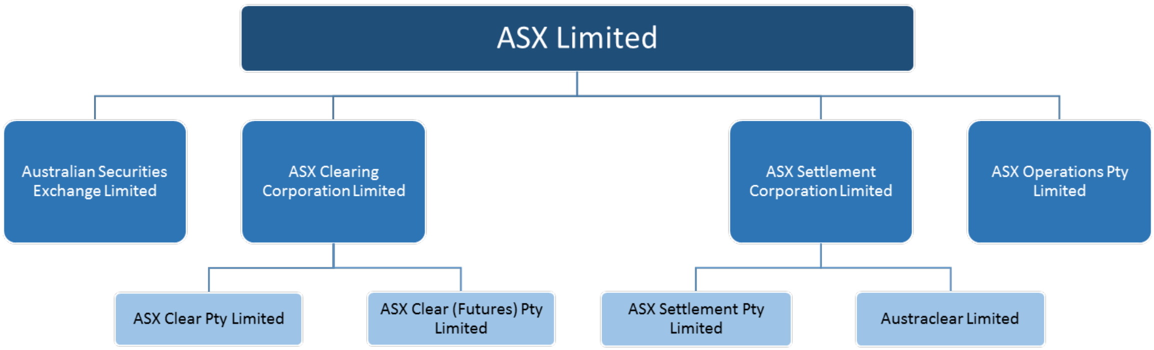
The ASX Group operates two CCPs and two SSFs:

- *ASX Clear* provides CCP services for ASX-quoted cash equities, debt products and warrants traded on the ASX and Chi-X Australia Pty Ltd (Chi-X) markets, equity-related derivatives traded on the ASX market and Chi-X-quoted warrants traded on Chi-X. The provision of CCP services for Chi-X is provided under the Trade Acceptance Service (TAS), which allows ASX Clear to act as a CCP for trades executed on AMO platforms in accordance with the ASX Clear Operating Rules and Procedures.
- *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 AUD and NZD-denominated OTC IRD.
- *ASX Settlement* provides SSF services for ASX-listed cash equities, debt products and warrants traded on the ASX and Chi-X markets. The provision of SSF services for Chi-X is provided under the TAS. Under the Settlement Facilitation Service, ASX Settlement provides DvP settlement services for transactions in non-ASX-listed securities undertaken on trading platforms operated by Approved Listing Market Operators (ALMOs); these include the National Stock Exchange of Australia (NSX) and the Sydney Stock Exchange Limited (SSX). ASX Settlement also provides for subscriptions and redemptions in unlisted managed funds through the mFund Settlement Service.
- *Austraclear* provides settlement and depository services for debt securities, including government bonds. It also provides settlement services for derivatives traded on the ASX 24 market and for margin payments in ASX Clear and ASX Clear (Futures).

Each of the ASX facilities holds a CS facility licence, and each CCP and SSF is required under the Corporations Act to comply with the relevant FSS determined by the Bank (i.e. the CCP Standards and SSF Standards, respectively) and to do all other things necessary to reduce systemic risk (see Appendix B.2).

ASX Limited is the ultimate parent company of the four CS facilities (Figure 1) and is listed on the ASX market. 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, the ASX Limited 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. There are five directors that serve on all four CS Boards; one additional director serves on both the ASX Clear and ASX Settlement Boards and three additional directors serve on both the ASX Clear (Futures) and Austraclear Boards.

Figure 1: ASX Group Structure



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

In delivering their services, the CS facilities rely on group-wide operational and compliance resources held by ASX Operations Pty Limited (ASX Operations), a wholly owned subsidiary of ASX Limited. ASX Operations provides most operational resources required by the CS facilities.

ASX has adopted a group-wide organisational structure to manage the business operations of its various entities. Business units relevant to the CS facilities are organised into eight main groups:

- Office of the CEO
- Risk
- Operations
- Technology
- Business Development
- Office of General Counsel and Company Secretariat, and Regulatory Policy

- Finance
- Human Resources.

The CRO, who heads the Risk group, is responsible for providing executive oversight of ASX's Clearing Risk Policy Framework and Settlement Risk Policy Framework, which document the formal structure for the development, governance and review of policy and standards for the CCPs and SSFs.

The COO who heads the Operations and Technology groups, is responsible for providing executive oversight of the frontline management of risks under ASX's Settlement Risk Policy Framework. The COO is also responsible for the delivery of overall operations of the ASX Group and reports directly to the CEO, as does the CRO. Both COO and CRO have a direct reporting line to the CS Boards and are able to attend CS Board meetings.

The Risk and Operations groups contain a number of departments that play key roles in the management of risks faced by the CS facilities:

- Clearing Risk Quantification and Development (CRQD) is responsible for the development of clearing risk management systems, maintaining and validating CCP risk and pricing models and the implementation of CCP policies and standards.
- Clearing Risk Policy and Management (CRPM) develops and maintains CCP and SSF policies and standards.
- Post Trade Operations implements SSF policies and standards, and maintains effective procedures for carrying out those policies and standards.
- Enterprise Risk is responsible for enterprise-wide risk management, including general business risk.
- Enterprise Compliance oversees CS facility compliance obligations, including providing compliance training for business areas, undertaking compliance reviews, and coordinating reporting to regulators.
- Participants Compliance assesses new applications from potential CS participants and monitors existing participants for adherence with the CS facilities' rules.
- Internal Audit conducts risk-based reviews of internal controls and procedures across ASX. Internal Audit reports to the Audit and Risk Committee and the Managing Director and CEO for audit purposes and to the CRO for administrative purposes only.

ASX has three main executive-level committees that support decisions related to the risk management of the CS facilities:

- The Risk Committee is responsible for advising the CRO on risk management decisions in the exercise of his delegated authority from the CEO.
- The Regulatory Committee is responsible for ASX policies related to the conduct and operations of the licensed entities in the ASX Group, including the CS facilities.
- The Technology, Operations and Security Committee is responsible for advising the COO in the oversight of ASX's technology, operations and security strategies, and the investments that support these strategies. A sub-group of the committee meets as the Portfolio Governance Group, providing oversight of significant projects within the ASX Group.

ASX's Executive Committee operates in parallel to the three executive-level committees described above. The Executive Committee reports to the ASX Limited Board and CS Boards on strategic and business initiatives, non-risk related frameworks and HR matters.

ASX also operates a number of other internal forums that bring together experts from departments across the group for the review or oversight of risk management at the CS facilities:

- Risk Quantification Working Group (RQWG) is responsible for quantitative risk management matters, such as the review and application of quantitative risk policies and standards and the Model Validation Framework, including oversight of model governance and the outcomes and recommendations of regular reviews of margining and stress test outcomes and recommendations. The RQWG is chaired by the General Manager, CRQD.
- Default Management and Recovery Working Group (DMRWG) provides oversight of the CCP's Default Management and Recovery Framework (DMRF). The DMRWG is chaired by the CRO.
- Participant Incident Response Group (PIRG) is responsible for monitoring and managing material participant incidents, including any non-compliance with participant obligations, settlement default, operational failure or an event which might result in the participant becoming an externally administered body corporate or an insolvent under administration and, in the case of a clearing participant, escalating potential default events to the Default Management Committee (DMC).

In addition to the internal forums that ASX operates, the views of participants and other stakeholders are sought through external standing forums:

- An ASX Clear (Futures) Default Management Group (DMG) which is comprised of OTC participants and is consulted on aspects of the default management process.
- Risk Consultative Committees for both ASX Clear and ASX Clear (Futures), comprising participants from each CCP. The committees are consulted on material changes to default management processes, the margining methodology, the default fund, position and liquidity limits, participation criteria, and other changes affecting risk management practices or related rules.
- A Business Committee which acts as a stakeholder advisory body for ASX's cash market clearing and settlement services. The Committee is comprised of representatives of clearing participants, settlement participants, AMOs, share registries and a number of relevant industry associations.
- Advisory user groups for particular products and services (i.e. ETOs, rates and Austraclear), which are forums for participants to provide feedback on those products and services.

B.2 Regulatory Environment

The Corporations Act establishes conditions for the licensing and operation of CS facilities in Australia and gives ASIC and the Bank powers and responsibilities relating to these facilities. These powers are exercised under the governance of ASIC's Commission and the Bank's Payments System Board, respectively. The regulators' respective roles are defined in the Corporations Act.

- The Bank is responsible for determining standards (the FSS) for the purposes of ensuring that CS facility licensees conduct their affairs in a way that causes or promotes overall stability in the Australian financial system, and for assessing how well a licensee is complying with its obligation under the Corporations Act, to the extent that it is reasonably practicable to do so, to comply with these standards and do all other things necessary to reduce systemic risk.
- ASIC is responsible for assessing the extent to which CS facility licensees comply with all other obligations of a CS facility licensee arising under the Corporations Act, including notably the obligation, to the extent that it is reasonably practicable, to do all things necessary to ensure that the CS facility's services are provided in a fair and effective way.

The Bank has determined two sets of FSS relevant to its oversight of CS facilities: the CCP Standards and SSF Standards.

As licensees, the ASX CS facilities are required to provide the Bank with timely information on any material developments relevant to the services provided under its CS facility licence and its compliance with the FSS. The Bank also gathers information on the facilities through an open and ongoing dialogue with ASX staff, including through scheduled periodic meetings and ad hoc targeted meetings on specific topics.[17] Based on the information gathered, the Bank undertakes regular assessments of the ASX CS facilities.

The ASX CCPs are recognised by ESMA as 'third-country CCPs'. This allows the ASX CCPs to continue to provide clearing services to participants established in the European Union. ASX Clear (Futures) was also granted an exemption from registration as a Derivatives Clearing Organization (DCO) in the US. This exemption allows ASX Clear (Futures) to provide clearing services to US banks with respect to 'proprietary' swaps. The Bank and ASIC have established a memorandum of understanding (MoU) with each of ESMA and US Commodity and Futures Trading Commission (CFTC) which, among other things, supports cross-border cooperation and information sharing. The Bank has also issued a supplementary interpretation of CCP Standards to facilitate the ASX CCPs' recognition in the EU (see Appendix C).

The Bank has an MoU with the RBNZ which establishes cooperation arrangements relevant to ASX Clear (Futures)' existing activities in NZD-denominated products. RBNZ has also stated that ASX Clear (Futures) may be of systemic importance in New Zealand and may therefore be designated for oversight as an offshore FMI under the RBNZ's proposed new oversight regime for FMIs.[18]

B.3 Risk Management in the ASX Central Counterparties

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

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, for example, arising from operational or risk-control failings.

- ASX Clear requires direct participants that clear cash market products or derivatives to maintain at least $5 million in capital. 'General participants', which are able to clear on behalf of third-party participants, are subject to tiered capital requirements. A general participant must maintain $5 million in capital to support its own clearing activity and $5 million to support each third-party clearing relationship, up to a maximum of $20 million. These base capital requirements are supplemented by additional capital requirements that are designed to account for the complexity

17 For more information see *the Reserve Bank's Approach to Supervising and Assessing Clearing and Settlement Facility Licensees*, available at <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/standards/approach-to-supervising-and-assessing-csf-licensees.html>.

18 For more information, see 'An Enhanced Oversight Framework for Financial Market Infrastructures', available at <http://www.rbnz.govt.nz/-/media/ReserveBank/Files/regulation-and-supervision/financial-market-infrastructure-oversight/regulatory%20developments/FMIs-Cabinet-paper.pdf?la=en>.

of each participant's business model. The additional capital requirements reflect each participant's activities in own-account business, non-ASX client activity, and client-written ETO activity. ASX applies an additional capital requirement of $2.5 million or $5 million for material activity in each of these areas, depending on the level of materiality. The total core capital requirement is capped at $35 million if the maximum level of additional capital requirements applies.

- ASX Clear (Futures) requires participants that clear futures only to hold at least $5 million in net tangible assets (NTA). Participants using the OTC derivatives clearing service must meet a higher minimum NTA (or Tier 1 Capital) requirement of $50 million.

The CCPs also impose capital-based position limits (CBPLs) on participants' activity. Specifically, a participant's initial margin requirements cannot be more than three times the level of its liquid capital, NTA or Tier 1 Capital. Under certain conditions, banks and subsidiaries of banks or bank holding companies are not subject to a ratio-based capital position limit. Rather, these institutions' initial margin liabilities are subject to a fixed $1.5 billion aggregate limit. ASX Clear also places requirements on participants to establish a formal liquidity risk management framework and prepare an annual liquidity plan.

Prefunded financial resources

The CCPs cover their credit and liquidity exposures to their participants by collecting margin and maintaining a fixed quantity of prefunded pooled resources. The CCPs collect several types of margin.

- *Variation margin*. Variation (or 'mark-to-market') margin is collected at least daily from participants with mark-to-market losses and, in the case of futures and OTC derivatives, paid out to the participants with mark-to-market gains.
- *Initial margin*. Both CCPs routinely collect initial margin from participants to mitigate credit risk arising from potential changes in the market value of a defaulting participant's open positions between the last settlement of variation margin and the close-out of these positions by the CCP. The CCPs use statistical models to calculate initial margin, which vary by product type. To validate the adequacy of their initial margin models, the CCPs perform regular backtesting and sensitivity analysis.
- *AIM*. The CCPs may also make calls for AIM when exceptionally large or concentrated exposures are identified, including through stress tests, or when predefined position limits are exceeded.

In addition to end-of-day margin calls, 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. If triggered, intraday margin calls for both CCPs equal the total shortfall in initial and variation margin, and AIM in the case of the 8.05 am intraday margin run.

ASX requires that variation and intraday margin is posted in cash, while initial margin may 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. Specifically, ASX Clear accepts certain equity securities and exchange-traded funds as collateral, while ASX Clear (Futures) accepts certain Australian Government and semi-government securities, US Treasury Bills, as well as foreign currency denominated in EUR, GBP, JPY, NZD or USD. Participants may meet AIM obligations using AUD cash or non-cash collateral, including Australian Government and semi-government securities. ASX applies haircuts to non-cash and foreign currency collateral to cover market risk on the liquidation of those assets.

An average of 51 per cent of margin requirements in ASX Clear and 89 per cent of AUD-denominated margin requirements in ASX Clear (Futures) were met in cash during the assessment period. In ASX Clear, equity securities comprise the remaining collateral. In ASX Clear (Futures), approximately

4 per cent was held in foreign currency on average in 2018/19, while 10 per cent was Australian government and semi-government bonds. Some clients of participants in ASX Clear commonly post non-cash collateral in excess of margin requirements for equity derivatives. In 2018/19, on average, 77 per cent of the value of non-cash collateral posted against derivatives positions in ASX Clear was in excess of margin obligations.

The margin and other collateral posted by a participant would be drawn on first in the event of that participant's default.[19] Should this prove insufficient to meet the CCP's obligations, the CCP may draw on a fixed quantity of prefunded pooled financial resources (referred to as the CCP's 'default fund'; Graph 1).

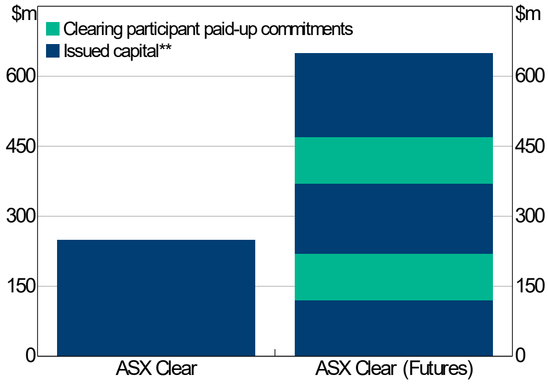
- ASX Clear's default fund was $250 million over the assessment period. This comprised $178.5 million of own equity and $71.5 million paid into a restricted capital reserve from the National Guarantee Fund in 2005.
- ASX Clear (Futures)' default fund was $650 million over the assessment period. This included $450 million of ASX's own equity and $200 million of contributions from participants.

There were no changes to either CCP's default fund over 2018/19.

Graph 1

Prefunded Pooled Financial Resources*

As at end June 2019



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

** For ASX Clear, Issued capital includes $71.5 million of restricted capital reserve

Source: ASX

Credit stress tests

In order to assess the adequacy of its financial resources to cover its current and potential future credit exposures, the CCPs perform daily credit stress tests. These tests compare each CCP's available prefunded resources against the largest potential loss in the event of the joint default of two participants and their affiliates under a range of extreme but plausible scenarios (i.e. the Cover 2 requirement). The requirement for the ASX CCPs to have sufficient prefunded resources to meet Cover 2 reflects the Bank's supplementary interpretation of the FSS, under which both CCPs are deemed to be systemically important in multiple jurisdictions (see Appendix C.1, CCP Standard 4.4).

Both ASX CCPs experienced days on which their respective Cover 2 requirement exceeded their prefunded financial resources in 2018/19. At ASX Clear (Futures), the Cover 2 requirement exceeded its prefunded financial resources on one day by $16 million (Graph 2). ASX Clear's Cover 2 requirement

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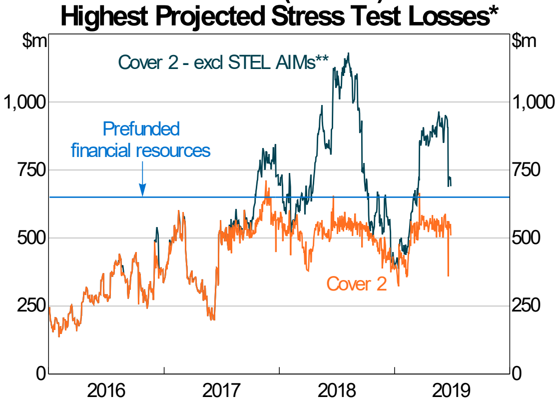
19 For ASX Clear (Futures) the other collateral would include the defaulted participant's contributions to the CCP's prefunded pooled financial resources.

also exceeded its prefunded financial resources on one day, with a shortfall of $11 million (Graph 3). These projected shortfalls were covered by AIM the next day.

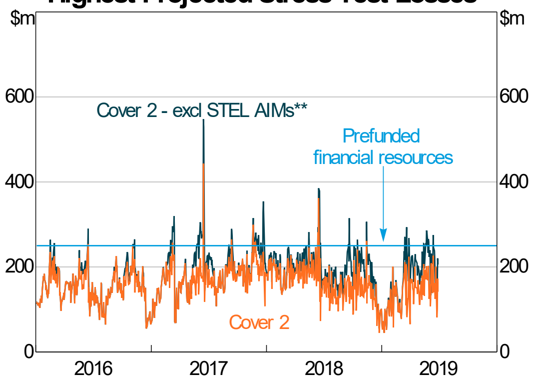
The ASX CCPs automatically call AIM, to be paid before 11.00 am the next day, when credit stress test results are in excess of STELs. The STELs are based on ASX's Internal Credit Ratings (ICRs) of participants, with all STELs set at less than half of the total default fund of the relevant CCP. Not all of these STEL AIM calls are related to shortfalls in the Cover 2 requirement. During the assessment period, ASX Clear made STEL AIM calls on 210 days against six participants in total, with the largest totalling $207 million. ASX Clear (Futures) made STEL AIM calls on 252 days against seven participants in total, with the largest call totalling $542 million.

Graph 2
ASX Clear (Futures): Highest Projected Stress Test Losses*



* Highest projected stress test loss from the default of two participants
** ASX collects AIM when credit stress test results are in excess of STELs
Source: ASX

Graph 3
ASX Clear: Highest Projected Stress Test Losses*



* Highest projected stress test loss from the default of two participants
** ASX collects AIM when credit stress test results are in excess of STELs
Source: ASX

Liquidity risk management

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

The ASX CCPs perform daily liquidity stress tests to assess the adequacy of the CCPs' available liquid resources to cover the largest potential liquidity exposure arising from the joint default of two participants and their affiliates under a range of extreme but plausible scenarios (Cover 2 liquidity target). The CCPs' liquidity stress test framework utilises the same market stress scenarios as the corresponding credit stress tests, but also takes into account additional, liquidity-specific risks.

While ASX Clear manages liquidity across both its cash market and derivatives products, it has defined a target minimum cash market liquidity 'buffer', which was sized at $100 million during the assessment period (see section 2.1.1; Appendix C.1, CCP Standard 7.8). Cover 2 cash market liquidity exposures regularly exceeded the buffer over 2018/19, in which case ASX Clear would have had to rely on OTAs (which are essentially liquidity commitments from its participants) to settle any exposures above the buffer (see Appendix C.1, CCP Standard 7.3). The buffer also implicitly defines a liquidity threshold for ASX Clear's derivatives-market exposures of $300 million. During the assessment period, ASX Clear's derivatives-market liquidity exposures exceeded this threshold on two occasions. ASX Clear (Futures) exceeded its prefunded liquid resources on one occasion.

If a liquidity stress test breach occurs at either CCP, it is reported to the CRO and Chief Financial Officer. ASX would also review the circumstances and nature of the breach, the size of the breach and possible mitigants. Breaches are also reported on a quarterly basis to the Risk Committee. In addition, if there were three breaches in a calendar quarter, this would require an emergency meeting of the Risk Committee, which would decide on the response. Potential responses to a breach could be to increase the CCPs' prefunded resources, or establish or increase the size of committed liquidity facilities.

Both ASX Clear and ASX Clear (Futures) also face liquidity risk from the reinvestment of pooled prefunded resources and the portion of margin posted by participants in the form of cash. These assets are reinvested and held by ASXCC, the holding company for the two CCPs, according to a defined investment policy and investment mandate. Liquidity risk arises since ASXCC would have to convert its assets into cash to meet any obligations arising from a participant default or for day-to-day liquidity requirements, such as the return of cash margin to participants. To mitigate investment liquidity risk, ASXCC's investment policy requires that a minimum portion of ASXCC's investments must be in liquid assets to meet its minimum liquidity requirements (see Appendix C.1, CCP Standard 7.3).

Recovery tools

In a highly unlikely scenario that involves more than two large participant defaults or market conditions that are beyond 'extreme but plausible', it is possible that prefunded or other liquid financial resources could be insufficient to fully absorb default-related losses or meet payment obligations. In such circumstances, the CCP may be left with an uncovered credit loss or liquidity shortfall. Each CCP's approach for allocating an uncovered credit loss or liquidity shortfall following a participant default relies on a number of tools:

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

In addition, ASX Clear can address a liquidity shortfall relating to the settlement of securities transactions via the use of OTAs with participants due to receive funds in the settlement batch. Both

CCPs also have the power to restore a matched book via partial or complete termination of contracts at their current market value if normal close-out processes cannot be carried out.

ASX has established a staged process for replenishment of the CCPs' default funds in the event that these were exhausted or partially drawn down following a participant default. At the end of a 22-business-day 'cooling-off period' following the management of a default, ASX Clear and ASX Clear (Futures)' default funds would be fully replenished up to $150 million and $400 million, respectively (see Appendix C.1, CCP Standard 4.8).

B.4 Activity and Participation

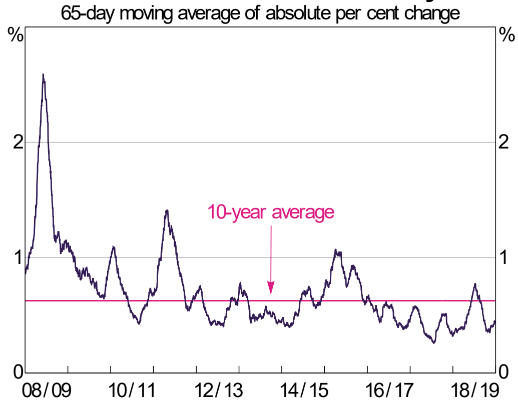
Central counterparties

In line with developments in international markets, Australian market conditions were more volatile during the assessment period, with the average volatility in products cleared by the ASX CCPs higher than during the previous assessment period. Average volatility in equity prices (as measured by the 65-day moving average of daily absolute percentage changes in the S&P ASX All Ordinaries Index) increased by around 10 basis points to 50 basis points when compared to the previous year, primarily due to heightened volatility in December and January (Graph 4). Volatility in the prices of 90-day bank bill futures also increased over 2019, exceeding long-term average levels towards the end of the year (Graph 5).

Graph 4

All Ordinaries Market Volatility

65-day moving average of absolute per cent change

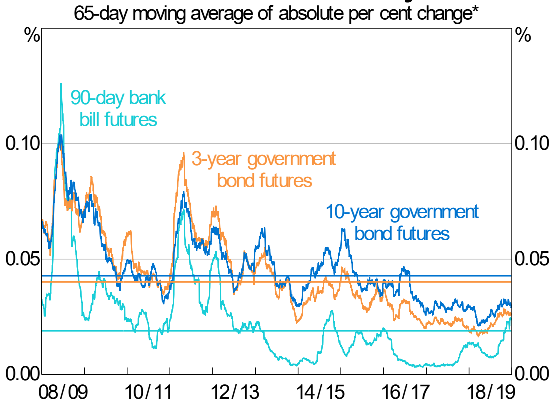


Sources: ASX; Bloomberg

Graph 5

ASX 24 Market Volatility

65-day moving average of absolute per cent change*

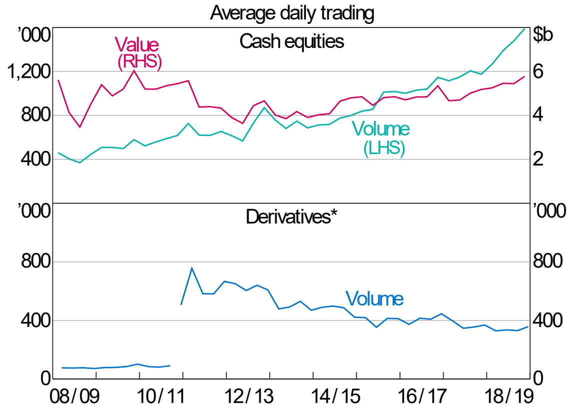


* Horizontal lines indicate the 10-year average for each series

Sources: ASX; Bloomberg

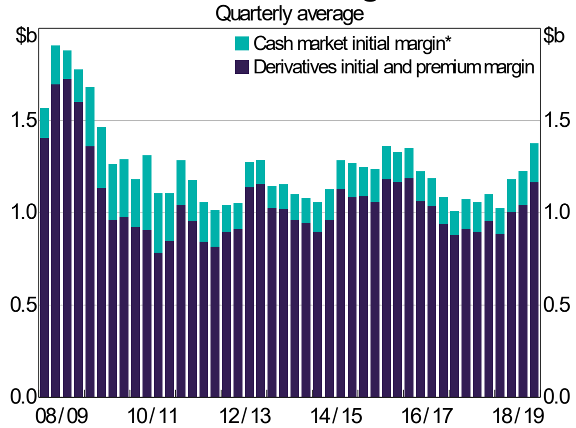
Trading activity in ETOs declined over 2018/19, while the average value and volume of cash equities traded increased, consistent with long-term trends (Graph 6). Exposures in ASX Clear increased over 2018/19. As measured by initial margin, ASX Clear's exposures in ETOs rose by 12 per cent to an average of $1 billion over 2018/19 compared with 2017/18, while exposures to cash equities trades rose by 19 per cent to an average of $177 million (Graph 7). ASX Clear's exposures to the cash equities market are much lower than for ETOs primarily because of the short duration of cash market trades at two days.

Graph 6
ASX Market Trades
Average daily trading



* In May 2011, ASX changed its standard contract size for single stock options to 100 shares per contract from 1 000 shares per contract.
Source: ASX

Graph 7
ASX Clear Margin
Quarterly average

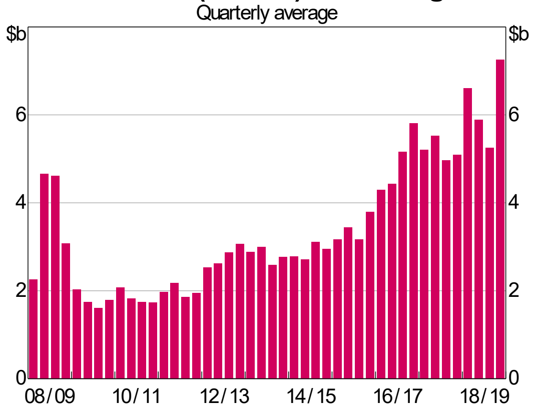


* Notional amount until 7 June 2013; Real Risk methodology used until 18 July 2012, Cash Market Margining used thereafter
Source: ASX

Exposures at ASX Clear (Futures) grew by 20 per cent to $6.3 billion on average, as measured by initial margin held (Graph 8). These exposures primarily arise from the four major contracts cleared – SPI 200 equity index futures, the 3-year and 10-year Treasury bond futures and 90-day bank bill swap futures – which accounted for around 95 per cent of total transactions cleared at ASX Clear (Futures) in 2018/19. Initial margin increased substantially in early 2019 following a reallocation of client positions between accounts, which resulted in higher margin requirements due to a loss of netting benefits. An increase in margin rates charged on SPI 200 and Treasury bond futures also contributed to this increase.

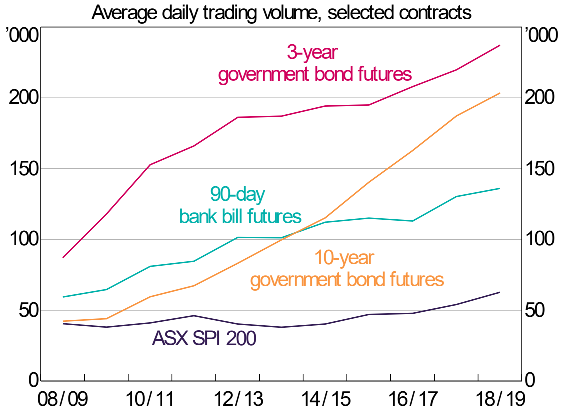
Transaction volumes increased across each of the four most actively traded contracts on ASX 24, with the 10-year Treasury bond futures and SPI 200 futures contracts experiencing the strongest growth in 2018/19 (Graph 9).

Graph 8
ASX Clear (Futures) Initial Margin
Quarterly average



Source: ASX

Graph 9
ASX 24 Derivatives Trades
Average daily trading volume, selected contracts

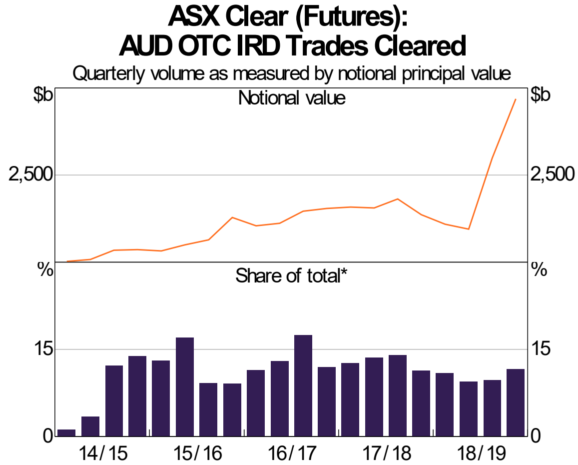


Source: ASX

The average daily value of AUD OTC IRDs cleared by ASX Clear (Futures) increased sharply in the first half of 2019, as a result of heightened market activity due to changes in market expectations of domestic monetary policy (Graph 10). Despite this increase, the share of these products cleared by ASX Clear (Futures) declined to an average of 10 per cent over the year, as a result of similar heightened levels of activity at the other CCPs clearing these product (LCH Ltd and CME Inc.).

ASX Clear had 33 direct participants as at 30 June 2019. There were 20 direct clearing participants in ASX Clear (Futures).

Graph 10



* Total includes AUD OTC IRD cleared by ASX Clear (Futures), CME Inc. and LCH Ltd.

Sources: ASX; CME Inc.; LCH Ltd.

Securities settlement facilities

The daily average value of cash equity settlements in ASX Settlement increased by around 11 per cent to $9.1 billion in 2018/19. This is consistent with the growth in cash equities trading activity in the ASX market, albeit trends in net settlement values can deviate from trends in gross trading values, since the latter do not include non-market transactions and netting efficiency can change over time.

In 2018/19, the average daily value of debt securities settled in Austraclear increased by 17 per cent, to $56 billion. This includes the value of securities settled under repurchase agreements (other than intraday repurchase agreements with the Bank).

B.5 Operational Performance

ASX manages its operational risks in the context of its group-wide ERM Framework, applying consistent operational risk controls across all of its CS facilities. Key operational objectives are minimum availability of 99.8 per cent for DCS and CHESS (99.95 per cent for Austraclear, Genium and Calypso) and peak capacity utilisation of 50 per cent or less. System availability was above target availability for all systems during the assessment period (Table 7). Peak usage was below the limit of 50 per cent for all systems except CHESS, where peak usage exceeded 50 per cent on three days during the assessment period, and Austraclear, where peak usage exceeded 50 per cent on one day.

Table 7: ASX CS Facility System Availability and Usage Statistics for 2018/19

Facility	Core system	Availability (per cent)	Peak usage (per cent)	Average usage (per cent)
ASX Clear	Derivatives Clearing System	100	20	8
ASX Clear / ASX Settlement	CHESS	100	53	38
ASX Clear (Futures)	Genium	100	17	10
ASX Clear (Futures)	Calypso	100	44	43
Austraclear	EXIGO	100	52	28

ASX did not experience any incidents during the assessment period that impacted the availability of CS facility systems. However, ASX Settlement and Austraclear were both affected by a power outage at the Reserve Bank's primary data centre on 30 August 2018, which impacted the availability and connectivity of RITS.[20] Settlement of the CHESS batch and settlement of Austraclear debt securities were both delayed until connectivity could be re-established with RITS, but ASX Settlement and Austraclear systems remained operational throughout the outage and free-of-payment transactions continued to settle at Austraclear. The incident also delayed ASX's intraday margin calls by three hours.

ASX experienced two incidents during the assessment period that impacted its Genium system without affecting system availability. On 7 September 2018, the Genium end-of-day process was initiated earlier than scheduled, which resulted in all ASX 24 market clearing activity, including allocations, being unavailable for the remainder of the day. On 11 March 2019, ICT infrastructure outages disrupted connectivity between ASX's primary data centre and the Genium system. Although participants remained connected to Genium, ASX 24 market trades could not be transmitted to it, which stopped new trades from being cleared for approximately 66 minutes.

20 For more information on the 30 August power outage see the 2019 *Assessment of the Reserve Bank Information and Transfer System* available at <https://www.rba.gov.au/payments-and-infrastructure/rits/self-assessments/2019/pdf/2019-assessment-rits.pdf>.

Appendix C: Detailed Assessment against the Financial Stability Standards

Introduction

This Appendix sets out the Reserve Bank's assessment of how well ASX Clear and ASX Clear (Futures) have observed the CCP Standards, and how well ASX Settlement and Austraclear have observed the SSF Standards as at 30 June 2019.[21] In setting out its assessment, the Bank has applied the rating system used in CPMI and IOSCO's *Principles for Financial Market Infrastructures: Disclosure Framework and Assessment Methodology*.[22] Under this framework, the Bank has assessed each of the ASX CS facilities' observance of the requirements of each of the applicable 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 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' listed under the headline standard. A single overall rating is applied to each CCP or SSF Standard, reflecting this assessment.

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.

21 The full text of the detailed assessments of each of these CS facilities is available at <https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/assessments/2018-19/>.

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

Arrangements for regular liaison and the supply of data and reports by ASX are described in further detail under the detailed assessments of CCP Standard 21 and SSF Standard 19.

Supplementary interpretation of CCP Standards

In assessing how well ASX Clear and ASX Clear (Futures) have observed certain sub-standards of the CCP Standards, the Bank has applied the supplementary interpretation of these sub-standards issued by way of an exchange of letters with ASX in October 2014.[23] This supplementary interpretation supersedes the Bank's previous supplementary interpretation of the CCP Standards issued in August 2013. The supplementary interpretation of the CCP Standards applies to any domestically licensed derivatives CCP that provides services to participants that are either established in the EU or subject to EU bank capital regulations, and affects CCP Standards 2.6, 4.2, 4.4, 6.3, 7.3, 13.2, 13.3, 15.4 and 21.

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

Abbreviations

ADI	authorised deposit-taking institution
AFR	available financial resources
AIM	additional initial margin
ALMO	Approved Listing Market Operator
ALR	additional liquidity requirement
AMO	Approved Market Operator
AONIA	Australian overnight index average
APRA	Australian Prudential Regulation Authority
ASIC	Australian Securities and Investments Commission
ASXCC	ASX Clearing Corporation
AusPayNet	Australian Payments Network Limited
BAU	Business-as-usual
BBSW	bank bill swap rate
BCL	Banque Centrale du Luxembourg
BKBM	NZ bank bill benchmark
BoE	Bank of England
CBA	Commonwealth Bank of Australia
CBPL	capital-based position limit
CCMS	centralised collateral management service
CCP	central counterparty
CDI	CHESS Depository Interest
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CFR	Council of Financial Regulators
CFTC	US Commodity Futures Trading Commission
CHESS	Clearing House Electronic Sub-register System
CIO	Chief Information Officer
CLR	core liquidity requirement
CMaX	Collateral Management Exchange
CME	Chicago Mercantile Exchange
DvP	delivery-versus-payment
ERICA	Enterprise Risk, Internal Audit & Compliance Application
ERM	enterprise risk management
ESA	Exchange Settlement Account
ESAS	Exchange Settlement Account System
ESMA	European Securities and Markets Authority
ETO	exchange-traded option
FHSVaR	filtered historical simulation of value at risk
FMI	financial market infrastructure
FSAP	Financial Sector Assessment Program
FSS	Financial Stability Standard(s)
HLE	High-level Expectation
HSVaR	Historical Simulation of Value at Risk
ICC	inter-commodity spread concession
ICR	Internal Credit Rating
IOSCO	International Organization of Securities Commissions
IRD	interest rate derivatives
KRI	key risk indicators
KYC	know-your-customer
MoU	memorandum of understanding
MPOR	margin period of risk
NSX	National Stock Exchange of Australia
NTA	net tangible assets
NZFMA	New Zealand Financial Markets Authority
NZONIA	New Zealand Overnight Index Average
OLR	ordinary liquidity requirement
OTA	offsetting transaction arrangement
OTC	over-the-counter
PFMI	Principles for Financial Market Infrastructures
PGG	Portfolio Governance Group

CMM	cash market margining	PID	participant identifier
COO	Chief Operating Officer	PIRG	Participant Incident Response Group
CPMI	Committee on Payments and Market Infrastructures	PSNA	Payment Systems and Netting Act 1998
CPSS	Committee on Payment and Settlement Systems	PSR	price scanning range
CRA	Counterparty Risk Assessment	PvP	payment versus payment
CRO	Chief Risk Officer	RAS	Risk Appetite Statement
CRPM	Clearing Risk Policy and Management	RBNZ	Reserve Bank of New Zealand
CRQD	Clearing Risk Quantification and Development	RCC	Risk Consultative Committee
CS	clearing and settlement	RITS	Reserve Bank Information and Transfer System
CSDR	Central Securities Depositories Regulation	RQWG	Risk Quantification Working Group
CSSF	Commission de Surveillance du Secteur Financier	RTGS	real-time gross settlement
DA	Digital Asset	SOF	SWIFT Oversight Forum
DBOR	Daily Beneficial Ownership Report	SPAN	Standard Portfolio Analysis of Risk
DCO	Derivatives Clearing Organization	SPOR	stressed period of risk
DCS	Derivatives Clearing System	SSF	securities settlement facility
DLR	default liquidity requirement	SSX	Sydney Stock Exchange
DLT	distributed-ledger technology	STEL	stress test exposure limit
DMC	Default Management Committee	SWIFT	Society for Worldwide Interbank Financial Telecommunication
DMG	Default Management Group	TAS	Trade Acceptance Service
DMRF	Default Management and Recovery Framework	TOSC	Technology, Operations and Security Committee
DPS	Derivatives Pricing System	VSR	volatility scanning range
DvD	delivery-versus-delivery	VWAP	volume weighted average price