

# Assessment of ASX Clearing and Settlement Facilities

September 2022

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# Executive Summary

The Reserve Bank of Australia (the Bank) has carried out its annual Assessment of the ASX clearing and settlement (CS) facilities, as at 30 June 2022. On balance, the Bank has concluded that the facilities have conducted their affairs in a way that promotes overall stability in the Australian financial system. However, ASX will need to place a high priority on addressing recommendations related to operational risk. The Bank also views prompt progress in addressing recommendations on governance and the framework for the management of risks as important in ensuring that ASX continues to promote overall financial stability in the longer term, and expects ASX to take a more proactive role in ensuring that its regulatory obligations are being met.

## Scope of assessment

The Assessment covers the four ASX CS facilities: two central counterparties (CCPs) – ASX Clear and ASX Clear (Futures); and two securities settlement facilities (SSFs) – ASX Settlement and Austraclear. The Bank has assessed the CS facilities' compliance with relevant financial stability standards (FSS) determined by the Bank, as well as the CS facilities' general obligation to do all other things necessary to reduce systemic risk.

## Key findings

The Bank's ratings of the ASX CS facilities' compliance against relevant FSS are summarised below.

Standard(s)	ASX Clear	ASX Clear (Futures)	ASX Settlement	Austraclear
Operational risk	Partly observed	Partly observed	Partly observed	Partly observed
Governance Regulatory reporting	Broadly observed	Broadly observed	Broadly observed	Broadly observed
Comprehensive framework for the management of risks	Broadly observed (↓)	Broadly observed (↓)	Broadly observed (↓)	Broadly observed (↓)
Credit risk Liquidity risk	Broadly observed	Broadly observed	N/A	N/A
Margin	Broadly observed	Broadly observed (↑)	–	–
Other applicable standards	Observed	Observed	Observed	Observed

Note: Green = Observed; Yellow = Broadly Observed; Orange = Partly Observed; Grey = N/A. Blue text is used for upgraded ratings and red text for downgraded ratings.

In arriving at these ratings, the Bank took into account the following key developments at the CS facilities:

- Operational risk:** The Bank conducted a detailed review of ASX's planned replacement of the CHES clearing and settlement system for cash equities. While the review found that the target state for the replacement system is broadly consistent with relevant FSS standards, further work is required to provide assurance that the system is being built to meet the required specifications. The review also discusses the Bank's concerns with further delays to the go-live date for CHES replacement,

which highlight the need for ASX to demonstrate that appropriate arrangements are in place to manage vendor-related risks.

- *Risk management framework:* An external review highlighted weaknesses in ASX's processes supporting its risk management framework, in particular, opportunities to improve the effectiveness of its first and second lines of risk management.
- *Governance:* While ASX has made some progress in addressing governance-related recommendations from the 2021 Assessment, there are several key outstanding items including the implementation of a self-assessment of compliance with the FSS, and further work to clarify lines of executive accountability. The Bank expects ASX to make demonstrable progress in strengthening its governance arrangements over the coming year. Insufficient progress will result in a ratings downgrade on this standard.
- *Margin:* The Bank conducted a detailed review of ASX's margining arrangements, concluding that risk exposures had been reduced by the implementation of overnight variation margining at ASX Clear (Futures).
- *Regulatory reporting:* While some improvements have been made to ASX's processes for notifying the Bank of information in a timely and transparent manner, there were significant delays in the notification of some key information.

## 2022/23 regulatory priorities

The Assessment includes a number of new or updated recommendations for the ASX CS facilities to strengthen their observance of relevant FSS, including in relation to:

- implementing the CHES replacement system, including by addressing the findings of a planned external review of the new CHES application, strengthening arrangements for the delivery and testing of new systems and ensuring the new system has appropriate settlement finality protections and risk management functionality
- completing a self-assessment of compliance with the FSS
- strengthening the operating effectiveness of ASX's three-lines model under its risk management framework
- addressing the findings of the Bank's detailed review of the CCPs' margin arrangements, including by carrying out a broad-ranging review of margin methodologies and systems
- managing the risks to the CCPs associated with large, late-in-day price movements, and addressing risks in the overnight margining process at ASX Clear (Futures)
- developing a systematic framework to address the risk of destabilising increases in margin and other financial risk requirements during volatile periods
- strengthening the quality controls and systems ASX has in place for notifying the Bank of material developments relevant to the FSS in a timely and transparent manner.

Over the coming year the Bank will conduct a deep-dive assessment of the ASX CS facilities' management of credit risk, and will continue to focus on ASX's implementation of the CHES replacement system, including the management of vendor-related risks. Other areas of focus will include ASX initiatives to enhance cyber resilience, validation of stress testing scenarios and review of its enterprise risk management framework (ERMF).

# 1. Ratings and Regulatory Priorities

This chapter sets out the ratings and recommendations identified by the Bank in its 2022 Assessment of the ASX CS facilities against the FSS. These recommendations are based on the Bank’s assessment of the ASX 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), as well as the CS facilities’ more general obligation to do all other things necessary to reduce systemic risk.

Further detail is provided in chapter 2, which describes key developments in the CS facilities relevant to the FSS and in chapters 3 and 4, which provide the results of detailed assessments conducted by the Bank on margin and CHES replacement. The Bank conducted this assessment in accordance with its *Approach to Supervising and Assessing Clearing and Settlement Facility Licensees*.<sup>1</sup>

## 1.1 Ratings – June 2022

**Table 1: 2022 Ratings of FSS Observance\***

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	Broadly observed (↓)	Broadly observed (↓)	Broadly observed (↓)	Broadly 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	Broadly 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 (→)	–	–

1 See RBA (2021), [‘The Reserve Bank’s Approach to Supervising and Assessing Clearing and Settlement Facility Licensees’](#), 25 February.

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	Observed (→)	Observed (→)	Observed (→)	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	Partly observed (→)	Partly observed (→)	Partly observed (→)	Partly 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	Broadly observed (→)	Broadly observed (→)	Broadly observed (→)	Broadly observed (→)

\* Green = Observed; Yellow = Broadly Observed; Orange = Partly Observed; Grey = N/A (see below). Blue text is used for upgraded ratings and red text for downgraded ratings. 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'). '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).

## 1.2 Recommendations – June 2022

The Bank has made recommendations that the CS facilities should address to observe or continue to observe relevant requirements in the FSS. These include recommendations to strengthen governance, operational and financial risk management, and regulatory reporting arrangements. The recommendations are set out in Table 2 and will be a key part of the Bank's regulatory priorities in the next assessment period. Recommendations from previous years that have not been fully addressed remain open and continue to be an ongoing part of the regulatory priorities (see Appendix A).

**Table 2: Recommendations to Observe or Continue Observing the FSS**

Year*	Recommendation	Standard	Facility
2021	<b>Governance.</b> The CS Boards should require the CS Lead Executives to complete a first self-assessment of compliance with the FSS by 31 December 2022. ASX should implement a robust annual self-assessment process that provides the CS Boards with ongoing visibility of the CS facilities' compliance with the FSS by June 2023. For more information, see section 2.1.3.	CCP/SSF 2	All
2022	<b>Risk management.</b> ASX should present the Bank with plans to strengthen the operating effectiveness of ASX's three lines model by 31 December 2022. For more information, see section 2.2.	CCP/SSF 3	All

Year*	Recommendation	Standard	Facility
2021	<p><b>Regulatory reporting.</b> ASX should complete work under way to review the quality controls and systems it has in place to systematically identify and bring to the Bank's attention information required to be reported to the Bank, and address any gaps identified as part of this review. By June 2023, ASX should implement metrics to monitor the effectiveness of these measures and put processes in place to address gaps. ASX should ensure that these controls are in place for its implementation of the Bank's upgraded FMI data collection.</p> <p>For more information, see section 2.3.</p>	CCP 21 SSF 19	All
2020	<p><b>Liquidity risk.</b> The ASX CCPs should take all steps possible to ensure that ASX Clearing Corporation (ASXCC) enters into an updated RITS membership agreement that is consistent with ASXCC's management of collateral and other assets held as trustee for the CCPs.</p> <p>For more information, see section 2.5.1.</p>	CCP 7	Both CCPs
2022	<p><b>Margin.</b> ASX should develop and implement a plan to review its margin methodologies and systems that takes into consideration international best practice and is designed to produce coherent and consistent risk outcomes from its margin models that are transparent to participants. ASX should discuss its implementation plan with the Bank by 30 September 2023.</p> <p>For more information, see section 3.3.2.</p>	CCP 6	Both CCPs
2022	<p><b>Margin.</b> ASX Clear should ensure that its margin period of risk (MPOR) for securities products is consistent with its approach to mark-to-market margin for these products.</p> <p>For more information, see section 3.3.3.</p>	CCP 6	ASX Clear
2020	<p><b>Margin.</b> Consistent with the CCP Resilience Guidance, by 30 June 2024 the ASX CCPs should develop a systematic framework to avoid destabilising increases in margin and other financial risk requirements during periods of heightened market volatility. This framework should include an appropriate methodology for measuring the degree of procyclicality in the CCPs' risk models and should consider the potential effect of expert judgement on procyclicality when determining margin and other financial risk requirements.</p> <p>For more information, see sections 3.4 and 3.7.2.</p>	CCP 6	Both CCPs
2020	<p><b>Margin.</b> The ASX CCPs should put in place arrangements that allow them to monitor and manage exposures from large late-in-day price movements, including movements that exceed the coverage provided by initial and additional margin. By 30 June 2023, ASX should review the feasibility of options to address this recommendation and develop a plan to implement option(s) found to be feasible.</p> <p>For more information, see section 3.5.3.</p>	CCP 6	Both CCPs
2022	<p><b>Margin.</b> By 30 June 2023 ASX Clear (Futures) should review the feasibility of options to remove or mitigate exposures to commercial settlement banks arising from overnight margin processes and develop a plan to implement option(s) found to be feasible.</p> <p>For more information, see section 3.5.3.</p>	CCP 6	ASX Clear (Futures)

Year*	Recommendation	Standard	Facility
2018	<p><b>CCP Resilience Guidance.</b> To align financial risk management practices and governance arrangements with the CCP Resilience Guidance, the ASX CCPs should continue to implement plans to:</p> <p>(a) enhance the comprehensiveness of stress testing to ensure risks are appropriately identified, captured and stressed</p> <p>(b) enhance analysis and justification of assumptions used in stress testing models so that risks are adequately captured</p> <p>(c) 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</p> <p>(d) 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</p> <p>(e) 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.</p> <p>For more information, see sections 3.7.1 and 3.9.4.</p>	CCP 2, 4, 6, 7	Both CCPs
2022	<p><b>Operational risk.</b> Consistent with the 2021 licence conditions, ASX should make any necessary adjustments to the assurance program for CHES replacement as part of its broader replan of the program and to take into account lessons learned from the delays to program timelines. ASX should implement the revised assurance program and address findings from assurance reviews.</p> <p>For more information, see section 4.3.3.</p>	CCP 16 SSF 14	ASX Clear ASX Settlement
2020	<p><b>Operational risk.</b> Consistent with the 2021 Licence Conditions, ASX should continue to address the findings from the IBM review of the Trade Refresh project, and ensure that any relevant steps are taken to apply lessons learned to its clearing and settlement operations, and in particular to the CHES replacement project.</p> <p>For more information, see section 4.4.1.</p>	CCP 16 SSF 14	All
2022	<p><b>Operational risk.</b> ASX should prepare for cutover, migration and go-live of the CHES replacement system, including by:</p> <ul style="list-style-type: none"> <li>having comprehensive and effective contingency plans in place for dealing with an issue on the go-live weekend or subsequent to go-live</li> <li>successful execution of migration dress rehearsals</li> <li>effective arrangements for go-live decision-making, including ASX's compliance with relevant 2021 Licence Conditions.</li> </ul> <p>For more information, see section 4.4.1.</p>	CCP 16 SSF 14	ASX Clear ASX Settlement
2022	<p><b>Operational risk.</b> ASX should engage with the Bank and ASIC on its plans to address findings from a planned external review of its key vendor dependency on DA for delivery of the CHES replacement application.</p> <p>For more information, see section 4.4.2.</p>	CCP 16 SSF 14	ASX Clear ASX Settlement
2022	<p><b>Legal basis.</b> ASX Settlement should apply for approvals as an approved RTGS system and as a multilateral netting arrangement under the <i>Payment Systems and Netting Act 1998</i> (PSNA), or in the case of the multilateral netting approval provide the Bank with legal analysis demonstrating why its existing approval remains valid once changes to the ASX Settlement operating rules required to support the introduction of CHES replacement have been made.</p> <p>For more information, see section 4.6.2.</p>	CCP/SSF 1	ASX Settlement



Year*	Recommendation	Standard	Facility
2019	<p><b>Segregation and portability.</b> 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 provide the Bank with a plan for implementing omnibus or individual client segregation, or a satisfactory explanation of how any alternative arrangements satisfy the requirements of the FSS, after consulting with industry stakeholders and within 12 months of the CHES replacement system going live.</p> <p>For more information, see section 4.7.2.</p>	CCP 13	ASX Clear
2022	<p><b>Margin.</b> ASX Clear should report to the Bank ahead of the CHES replacement system going live on how it intends to introduce the intraday margining of cash market positions.</p> <p>For more information, see section 4.7.3.</p>	CCP 6	ASX Clear

\* This table sets out recommendations identified during the 2022 assessment period or pre-existing recommendations that were amended during the year. The reference year reflects the year the recommendation was first raised.

### 1.3 Areas of supervisory focus – Year to June 2023

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, summarised in Table 3.

**Table 3: 2022/23 Areas of Supervisory Focus**

Development	Standard	Facility
<b><u>2022/23 special topics</u></b>		
The Bank will carry out a detailed assessment of the ASX CS facilities management of credit risk.	CCP/SSF 4	All
The Bank will also conduct reviews of:		
• Exchange of value settlements	SSF 10	Austraclear
• Central securities depositories	SSF 9	Austraclear
• Access and participation requirements.	CCP 17, SSF 15	All
<b><u>Planned work by the ASX CS facilities</u></b>		
<p><b>CHES Replacement.</b> The Bank will continue to engage with ASX, working closely with ASIC, on the implementation of the CHES replacement system, including on:</p> <ul style="list-style-type: none"> <li>EY's assessment of the CHES replacement assurance program, and ASX's compliance with the 2021 Licence Conditions</li> <li>the effectiveness of ASX's arrangements for managing any intragroup conflicts of interest in the CHES replacement program between the CS facilities and the wider ASX Group</li> <li>evidence that key non-functional requirements have been met, including through testing and the broader assurance program</li> <li>updates to legal analysis confirming the effectiveness of arrangements to protect securities holdings from creditor claims in the event of ASX Settlement's insolvency.</li> </ul> <p>For more information, see chapter 4.</p>	CCP 1, 2, 16 SSF 1, 2, 9, 14	ASX Clear ASX Settlement
<p><b>CCP Resilience Guidance.</b> The Bank will monitor implementation of ASX's plans to address gaps against the CCP Resilience Guidance.</p> <p>For more information, see Appendix A, Table 8.</p>	CCP 2, 4, 5, 6, 7, 15	Both CCPs

Development	Standard	Facility
<p><b>Enterprise Risk Management Framework.</b> The Bank, working closely with ASIC, will engage with ASX on actions to address recommendations from the 2022 external review of ASX's ERMF and strengthen its risk culture.</p> <p>For more information, see section 2.2.</p>	CCP/SSF 3	All
<p><b>Cyber resilience.</b> The Bank will monitor the continued enhancement of ASX's cyber resilience via:</p> <ul style="list-style-type: none"> <li>the implementation of actions identified in ASX's Cyber Strategy</li> <li>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.</li> </ul> <p>For more information, see section 2.4.4.</p>	CCP 16 SSF 14	All
<b><u>Other reviews</u></b>		
<p><b>Stress test severity.</b> The Bank will discuss with ASX the outcome of the independent validation of whether its stress scenarios could cover an event of similar severity as the 1987 stock market crash, taking into account differences in the current market environment.</p> <p>For more information, see Appendix A, Table 8.</p>	CCP 4, 7	Both CCPs
<p><b>Legal certainty of intragroup agreements.</b> The Bank will conduct reviews of:</p> <ul style="list-style-type: none"> <li>the legal certainty of arrangements for ASX Limited to replenish ASX contributions to the CCPs' default funds</li> <li>the ASX Group Support Agreement, covering aspects outside the scope of the 2018/19 special topic assessment of the CS facilities' legal basis.</li> </ul> <p>For more information, see Appendix A, Table 8.</p>	CCP 1, 14 SSF 12	All
<p><b>Margin.</b> The Bank will discuss with ASX the processes and controls it uses to help ensure the reliability of its margin-related operations, as well as its backup procedures in the event of an outage affecting the systems it uses to calculate and collect margin.</p> <p>For more information, see section 3.8.1.</p>	CCP 6	Both CCPs

In addition to the recommendations and supervisory focus, the Bank expects ASX to continually strengthen its risk management arrangements. This is in accordance with the general obligation on CS facilities to do all things necessary to reduce systemic risk. As part of its ongoing supervisory engagement, the Bank will continue to discuss with ASX areas where there may be opportunities for improvement.

## 2. Developments

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This chapter discusses key developments relevant to the ASX CS facilities that occurred during the 2021/22 assessment period (1 July 2021 to 30 June 2022).<sup>2</sup> These and all other developments relevant to the regulatory priorities set out in the 2021 Assessment are summarised in Appendix A. Appendix B provides background information on the group structure, activity and participation in ASX facilities.

### 2.1 Governance

The Bank undertook a detailed review of ASX's governance arrangements in the 2020/21 assessment period. The Governance Review put forward 17 recommendations to address gaps in ASX's governance arrangements and better align those arrangements with the expectations set out in the FSS. Some of the key findings from the Governance Review were in the area of: management of intragroup conflicts of interest; objectives and accountability; and oversight of compliance with the FSS, which are discussed below.

As at 30 June, ASX had fully addressed 11 of the recommendations (see Appendix A for a summary of progress). Although ASX has committed to addressing the seven remaining recommendations, progress has been slower than the Bank would expect. In large part this is due to delays in ASX communicating and explaining its response to the Bank. It was only towards the end of the assessment period that ASX demonstrated the expected sense of urgency to progress the remaining recommendations.

The Bank expects ASX to make demonstrable progress in strengthening its governance arrangements over the coming year. Insufficient progress will result in a ratings downgrade on this standard.

#### 2.1.1 Management of intragroup conflicts of interest

The four ASX CS facilities form part of the ASX group of companies.<sup>3</sup> The CS facility subsidiary companies are ultimately controlled by the parent company, ASX Limited, and have several common directors with their parent. While there can be efficiencies in having some functions, roles and responsibilities carried out on a group-wide basis, any such arrangements must uphold the CS facility's capacity to meet its regulatory and other obligations. Furthermore, the arrangements must not compromise or subordinate the CS facility's interests to the interests of the group.

The 2021 Assessment highlighted the potential for each of the ASX CS facilities to have interests that conflict with those of ASX Ltd group and recommended arrangements to support the management of those conflicts for ASX Clear (Futures) and Austraclear. These arrangements were modelled on arrangements already in place for the ASX Clear and ASX Settlement Boards.<sup>4</sup> In response to this recommendation the ASX boards approved changes to the CS Boards Charter in May. Under the new

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2 Developments between the end of the assessment period and the finalisation of this report on 26 August are noted where relevant.

3 See Appendix B.1 – ASX group structure and governance.

4 The existing arrangements had been designed to address conflicts of interest that may arise by virtue of ASX Clear and ASX Settlement offering clearing and settlement services to markets operating in competition to ASX Limited.

arrangements, the Chair of each CS Board cannot be an ASX Limited director. The revised CS Boards Charter also makes provision for separate meetings of the CS directors who are not also ASX Limited directors and allows for the non-ASX Limited directors of the CS facility boards to form a quorum of each board to address situations in which an intragroup conflict requires ASX Limited directors to recuse themselves.<sup>5</sup>

### 2.1.2 Objectives and accountability

The Governance Review highlighted the importance of having objectives, strategies and goals specific to the CS facilities, as well as clear lines of responsibility and accountability for achieving those objectives. To achieve this, the Bank recommended that ASX should appoint one or more identifiable executives with overall responsibility for the CS facilities (known as CS Lead Executive(s)) and document clear and direct lines of responsibility and accountability for each of the CS facilities' businesses by way of an accountability map and accountability statements for directors and executives.

#### ***CS Lead Executive(s)***

The Governance Review identified instances where the CS facilities businesses and obligations may not have received sufficient focus and attention, and a lack of clarity as to which ASX executives are accountable to the CS boards for the operation of the CS facilities' businesses. It recommended that ASX identify one or more executive(s) as being accountable to the relevant CS board for the operation of each CS facility. The CS Lead Executive(s) are expected to have a clear line of accountability to the relevant CS Board and also expected to be a 'voice' for the interests, business and obligations of the CS facility within the broader group.

ASX implemented a new operating model in October 2021. Among other things, the new operating model assigns most of the core responsibilities for the operations, technology systems and business development supporting clearing and settlement to Group Executives for Markets, and Securities and Payments. To align with the revised operating model, ASX nominated these two executives as CS Lead Executives.<sup>6</sup> Consistent with the Bank's recommendation, ASX's Lead CS Executives are responsible for the operation of the CS facilities and the achievement of strategies and objectives determined by the CS Boards. Under the revised CS Boards Charter, the CS Boards are responsible for providing input to the Remuneration Committee on the remuneration arrangements and performance of the CS Lead Executives.

#### ***Objectives, strategy and goals***

The FSS require CS facilities to have objectives that place a high priority on the safety of the facility, support the stability of the financial system and reflect other relevant public interest considerations. The review recommended that ASX document the objectives, strategies and goals for each CS facility in a way that explicitly incorporates the objectives required by the FSS. Such objectives also assist in ensuring that the business, obligations and systemic importance of the CS facilities are given due attention in the course of group-wide decision-making.

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5 The changes do not address one element of the ASX Clear and ASX Settlement arrangements included in Recommendation 9 – the requirement for a majority of directors to be non-ASX Limited directors. The Bank does not consider this element to be necessary in order for ASX to adequately manage the type of intra-group conflicts faced by ASX Clear (Futures) and Austraclear.

6 The Group Executive, Markets is CS Lead Executive with responsibility for ASX Clear (Futures) and ASX Clear's derivatives business. The Group Executive, Securities and Payments is CS Lead Executive with responsibility for Austraclear, ASX Settlement and ASX Clear (other than aspects covered by the Group Executive, Markets).

ASX is still in the process of developing the CS facility strategy documentation to address this recommendation. The Bank expects ASX to have the relevant documentation in place by the end of 2022.

### **Accountability map and accountability statements**

In line with CCP Standard 2.2/SSF Standard 2.2, the Bank recommended that ASX should document governance arrangements that set out clear and direct lines of responsibility and accountability for each of the CS facilities' businesses. The Governance Review found that the ASX CS facilities did not have such documented arrangements in place.

In May the ASX Boards approved an accountability map. The accountability map outlines the list of Accountable Persons, the allocation of non-executive director accountabilities and high level executive accountabilities. It also sets out the structure of ASX Boards, ASX Board Committees and Management Committees.

The Governance Review also recommended (consistent with CCP Standard 2.5/SSF Standard 2.5) that ASX clearly specify the roles and responsibilities of directors and of the senior executives referred to in the accountability map. It was recommended that this be done by creating accountability statements specifying the roles and responsibilities of directors and of senior executives, as well as the part of the CS facility's business for which each senior executive is accountable.

ASX has developed a set of accountability statements for ASX directors and executives. The Bank has communicated to ASX that further work is required to ensure these documents set out accountabilities in a clear and comprehensive manner. Over the coming period the Bank will engage further with ASX on changes to these documents to meet the Bank's expectations.

### **2.1.3 Oversight of compliance with FSS**

Ensuring that a corporation is compliant with its legal obligations is a fundamental role of a board of directors.<sup>7</sup> The 2021 Assessment identified instances where the Boards were not aware of compliance issues until these were highlighted by the Bank. The Assessment found the Boards had not taken a sufficiently active role in ensuring that ASX fulfils its regulatory obligations and instilling a compliance culture within the ASX Group.

Having noted ASX's responsibility to come to its own understanding on compliance with regulatory obligations, the Governance Review recommended that the ASX Boards should take a more active role in ensuring compliance of the CS facilities with the FSS. To achieve this, the Bank recommended that the CS Boards require the CS Lead Executives to complete an annual self-assessment of compliance with the FSS. The purpose of the recommendation was to increase the understanding by the ASX executives and directors of the CS facilities' FSS obligations, and to identify any areas of non-compliance at an early stage and bring these to the attention of the CS Boards and the Bank.

The Bank has set a target date of 31 December 2022 for ASX to complete its first self-assessment, which ASX has agreed to meet. This target was set because the Bank considered that ASX's original target date was too far in the future. The Bank was also concerned that this reflected a lack of urgency by the CS Boards and executives in understanding whether the CS facilities are meeting their compliance obligations.

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<sup>7</sup> This is noted in paragraph 2.3.1 of the FSS guidance, which lists 'ensuring compliance with all supervisory and oversight requirements' among the responsibilities of the board of a CS facility.

**Recommendation:** The CS Boards should require the CS Lead Executives to complete a first self-assessment of compliance with the FSS by 31 December 2022. ASX should implement a robust annual self-assessment process that provides the CS Boards with ongoing visibility of the CS facilities' compliance with the FSS by June 2023.

#### 2.1.4 Other changes to governance arrangements

ASX's response to other governance recommendations are summarised in Appendix A. These include the establishment of a Board-level Technology Committee responsible for overseeing the implementation of the ASX Group's technology, data and cyber security strategies, as well as technology project implementation (including CHES Replacement). ASX has also implemented a change in the administrative reporting line for the General Manager of ASX Internal Audit to the Chief Financial Officer. The Bank will continue to monitor the level of constructive engagement with ASX Internal Audit by management, in light of concerns identified during the Governance Review that there has been resistance to internal audit among parts of the organisation.

## 2.2 Framework for the comprehensive management of risk

Standard 3 of the FSS requires CS facilities to have a sound framework for managing legal, credit, liquidity, operational and other risks. To achieve this, a CS facility is expected to take an integrated and comprehensive view of its risks.<sup>8</sup> This includes having comprehensive internal processes to help the board and senior management monitor and assess the adequacy and effectiveness of a CS facility's risk management policies, procedures, systems and controls.

During the assessment period ASX internal audit commissioned an external review of its risk management framework. This review found that ASX had documented a comprehensive Enterprise Risk Management Framework (ERMF) and made good progress in the implementation of risk management systems and enhanced risk reporting (introduced as part of ASX's Building Stronger Foundations program). Despite this progress, the operating effectiveness of ASX's risk management framework remains behind the maturity levels of its peers in the Australian financial services industry.

To strengthen ASX's risk culture overall, the review noted the importance of the ASX executive team forming a collective view of risk appetite and risk management, as articulated in the ASX Risk Appetite Statement and ERMF. It also noted the need for the executive team to collectively promote and consistently support the ERMF across the organisation. A stronger risk culture would also be expected to encourage challenge and foster greater psychological safety around speaking up.

Consistent with industry best practice, ASX's arrangements for monitoring, assessing and managing risks are founded on a 'three lines' model.<sup>9</sup> The external review highlighted that further work is required to strengthen ASX's implementation of this model, as set out in the ERMF. The review identified that the first line in some business areas did not have sufficient capabilities to fully discharge its role, requiring more extensive support from the second line which undermined the latter's ability to provide

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<sup>8</sup> The Bank conducted a detailed review of ASX's risk management framework against Standard 3 in 2021, recommending that ASX should establish a process to periodically conduct systematic assessments of the range of potential risks other entities may pose to its CS facilities and the risks ASX CS facilities could potentially pose to other entities. See Appendix A for a summary of progress.

<sup>9</sup> The three lines referenced in this approach are: line 1 – risk owners/frontline managers; line 2 – risk control and compliance; and line 3 – risk assurance, typically undertaken by the internal audit function. For further information on the oversight of risk management and the three lines model in FMIs, see Bolt S and D Meredith (2020), '[Governance of Financial Market Infrastructures](#)', RBA *Bulletin*, December.

independent challenge. In particular ASX should be working to build greater (dedicated) risk capabilities in line 1, which in turn should enable line 2 to act as a more effective source of independent challenge.

ASX has established a plan to respond to the recommendations of the external review by February 2023. The Bank, working closely with ASIC, will monitor ASX's implementation of this plan and the ongoing work to strengthen ASX's risk culture.

**Recommendation:** ASX should present the Bank with plans to strengthen the operating effectiveness of ASX's three lines model by 31 December 2022.

**Area of supervisory focus:** The Bank, working closely with ASIC, will engage with ASX on actions to address recommendations from the 2022 external review of ASX's ERMF and to strengthen its risk culture.

## 2.3 Regulatory reporting

The ASX CS facilities are required under the FSS to provide the Bank with timely information on any material developments relevant to services provided under the CS facility licences and ASX's compliance with the FSS. The 2021 Assessment noted instances where ASX's regulatory reporting had been deficient. This included instances where important information was not brought to the Bank's attention in a timely and transparent manner. The Bank recommended ASX improve the quality controls and systems supporting its reporting requirements.

While ASX has implemented a number of measures intended to uplift its regulatory reporting performance over the past 12 months, there have been examples where ASX has not kept the Bank informed in a timely way. The most significant example was a substantial delay in notifying the Bank and ASIC of the identification of a major risk to the schedule of the CHES replacement program (see chapter 4). Such a delay in notification is unacceptable and ASX has since made significant improvements to its regulatory engagement to ensure that major CHES replacement developments are communicated in a timely way. There have also been a number of examples of ASX failing to notify the Bank of updated policy documents in a timely fashion.

The Bank is concerned that there is not a consistent understanding of regulatory reporting, and compliance obligations more broadly, across ASX. The Bank will continue to engage with ASX as it completes its work to improve regulatory reporting systems and controls. This should include enhancements to enterprise compliance training to ensure regulatory reporting obligations are well understood across the organisation.

The Bank expects ASX executives and the CS Boards to encourage a culture that prioritises transparent and timely regulatory engagement, and will discuss how the Bank's cooperation letters with the CS facilities can be updated to reflect these expectations.

### BOX A: Enhanced FMI Data Reporting Update

The Bank is undertaking a project to improve the quality, scope and timeliness of its data collection on the activities and risks of systemically important CS facilities. These data help the Bank assess how well CS facilities observe the FSS, monitor emerging risks and inform the policy advice given to the Payments System Board (PSB).

During the Assessment period, the project reached its first key milestone with ASX commencing regular reporting through the new delivery system; initial reporting includes data on settlement activity at

Austraclear, links with other FMIs, and operational risk and participation details for all four CS facilities.

However, staff turnover at ASX has delayed the transition of the remainder of the data collection, which was expected to be completed before the end of 2022. The Bank has communicated its expectation that ASX monitor and promptly communicate any emerging risks to the timeline, improve its contingency planning arrangements and maintain the appropriate mix of internal and external expertise required to advance the project.

Following a replanning process, the Bank and ASX agreed a revised project timeline, with the revised data collection for ASX CS facilities to be implemented in the first half of 2023. The Bank expects to continue working closely with ASX on the project, and will regularly assess ASX's progress towards its completion.

**Recommendation:** ASX should complete work under way to review the quality controls and systems it has in place to systematically identify and bring to the Bank's attention information required to be reported to the Bank, and address any gaps identified as part of this review. By June 2023, ASX should implement metrics to monitor the effectiveness of these measures and put processes in place to address gaps. ASX should ensure that these controls are in place for its implementation of the Bank's upgraded FMI data collection.

## 2.4 Operational risk

### 2.4.1 CHESSE capacity

CHESSE is the system used by ASX to facilitate clearing, settlement and other post-trade services for the Australian cash equities market. Following processing delays experienced during high trading volumes in March 2020, the Bank recommended that ASX implement measures to increase the capacity of the current CHESSE infrastructure to ensure it remains operationally resilient until the CHESSE replacement program is completed. The program of work to expand capacity was completed in June 2021, increasing the business as usual capacity of the system to 10 million trades per day (see Graph 1).

The 2021 Assessment recommended that ASX complete work underway to increase the joint capacity of CHESSE and the related 'CORE' system. The CORE system supports the submission of trades from the ASX trade platform into CHESSE. If the capacity of CORE to process trades is lower than the capacity of CHESSE to absorb them then CORE may act as a bottleneck, resulting in processing delays if trading volumes were sufficiently high.

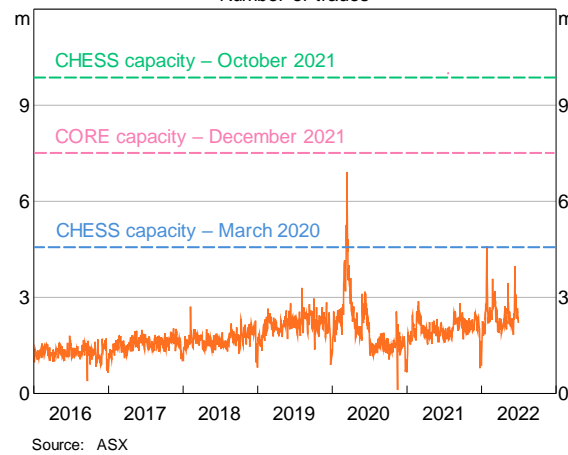
In December 2021 ASX completed upgrades in the capacity of the CORE system, which is now able to support 7.5 million trades per day.<sup>10</sup> At market open on 24 February 2022, there was a very significant volume of trades to process; the upgraded capacities of CHESSE and CORE allowed ASX to process these trades, with the maximum backlog of trades in CORE only reaching 11 minutes. By comparison a similar backlog took one hour to clear in March 2020.

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<sup>10</sup> CHESSE also supports clearing of trades executed on the Cboe Australia and National Stock Exchange of Australia markets. ASX targets a higher capacity for CHESSE than for CORE, which does not play a role in processing trades from non-ASX markets.



**Graph 1**  
**CHESSEquities Cash Trades**  
Number of trades



## 2.4.2 Risk management systems

Over the assessment period ASX continued to embed the use of new risk management systems, such as its Enterprise Risk, Internal Audit and Compliance Application (ERICA) and IT Service Management (ITSM) tool. These systems were implemented as part of ASX’s Building Stronger Foundations program which commenced in 2018 and was formally closed in 2020. The systems are intended to support more effective measurement, monitoring, reporting and aggregation of operational risk. For example, the ERICA system provides a real time view of risk at both the business unit and enterprise level.

As noted in section 2.3, an external review of ASX’s risk management framework was carried out over the assessment period. The review found that good progress has been made in the implementation of these new risk management systems. However, it noted that data quality is key to the success of systems like ERICA. The review recommended further training across ASX to increase awareness of the importance of ERICA data in supporting effective risk-decisions.

## 2.4.3 Staff resourcing

Staff resourcing has been an ongoing issue for ASX and the wider financial services industry over the assessment period. Filling vacant positions has become increasingly difficult, reflecting a scarcity of people with specialist IT, operational and technical skills in the current tight labour market. This has led to delays and cost implications for projects at ASX.

The delays to the CHESSE replacement program outlined in chapter 4 also present staff resourcing challenges. This includes the requirement to maintain the current CHESSE system for longer than originally intended, which requires specific skills that are becoming increasingly scarce. In addition, there is a risk that the ongoing delays to the CHESSE program result in fatigue among staff. If this risk is not managed it could increase staff turnover, with an associated loss of corporate knowledge affecting not just delivery of the new system but also its ongoing maintenance.

In response to staff resourcing challenges ASX has implemented a number of strategies focused on recruitment and staff retention. ASX have also sought to manage the risks resulting from heightened turnover with measures such as the approval of additional roles, the introduction of project prioritisation processes, and maintaining a list of critical roles to minimise disruption. The management

of the heightened operational risk associated with staff resourcing challenges will be an area of supervisory focus over the next assessment period.

**Recommendation:** The ASX CS facilities should continue to embed the use of new systems and processes supporting change management, incident management and knowledge management, and use these systems to identify, monitor and manage operational risks at an enterprise-wide level. This should include the roll out of additional training to support the data integrity of the new systems. (See Table 6, Appendix A.)

#### 2.4.4 Cyber resilience

During the assessment period, ASX continued to implement enhancements to its cyber security practices in line with actions set out in its Cyber Strategy. This included the implementation of measures to improve internal controls and enhancements to its cyber testing regime. ASX participated in industry forums such as the CPMI-IOSCO industry working group on cyber and actively engaged with Australian government initiatives related to improving cyber resilience.

The CPMI-IOSCO *Guidance on Cyber Resilience for Financial Market Infrastructures* provides a set of internationally agreed guidelines for FMIs in the area of cyber risk.<sup>11</sup> Consistent with the expectations set out in the guidelines, ASX continued to evaluate current and emerging technology that could lead to further enhancements in ASX's capabilities to recover its operations safely within two hours following an extreme cyber-attack.

**Area of Supervisory Focus:** The Bank will monitor the continued enhancement of ASX's cyber resilience via:

- the implementation of actions identified in ASX's Cyber Strategy
- 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.

## 2.5 Financial risk

### 2.5.1 Access to liquidity facilities

The 2020 Assessment recommended that ASX Clear (Futures) take steps to establish an ability to access liquidity from the Reserve Bank in respect of a defaulting participant's non-cash collateral. During the current assessment period, ASX Clear (Futures) has taken steps towards addressing a legal impediment to accessing liquidity from the Bank via ASX Clearing Corporation (see Appendix B3) using non-cash collateral posted to the CCP. Previously it was only able to use this arrangement in respect of cash collateral.

As at 30 June, ASX had yet to complete work to update ASX Clearing Corporation's RITS membership agreement to reflect the way in which ASXCC uses its ESA as trustee for the CCPs, including to seek liquidity from the Bank. This work is expected to be completed in September.

**Recommendation:** The ASX CCPs should take all steps possible to ensure that ASXCC enters into an updated RITS membership agreement that is consistent with ASXCC's management of collateral and other assets held as trustee for the CCPs.

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11 BIS (2016), 'Guidance on Cyber Resilience for Financial Market Infrastructures', CPMI Paper No 146, 29 June.

## 2.5.2 Crypto ETFs

In May 2022, ASX Clear commenced clearing of exchange-traded funds referencing underlying bitcoin and ether holdings (Crypto ETFs).

The FSS require that CCPs identify, measure, monitor and manage risks related to their activity, which extend to the clearing of novel products. During the Assessment period, ASX reviewed a range of specific risk management issues affecting Crypto ETFs through its internal governance process, including the approval of a clearability assessment in accordance with ASX's clearability policy for new products. The initial risk settings for these products included a margin rate of 40 per cent for bitcoin ETFs and 50 per cent for ether ETFs, and new stress-test scenarios assuming up to a 100 per cent fall and a 200 per cent increase in prices of the Crypto ETFs. Participants clearing these products are also required to hold sufficient liquid resources (or put in place other controls) to address the liquidity risk associated with a 'run' on crypto-ETF holdings by clients in response to some adverse event.

## 2.6 Cross-border regulatory developments

### 2.6.1 European Union

In March, the European Securities and Markets Authority (ESMA) recognised both ASX CCPs as 'Tier 1' third-country CCPs in line with recent changes to the EU regulation on OTC derivatives, CCPs and trade repositories, known as European Market Infrastructure Regulation (EMIR) 2.2. Tier 1 CCPs are not considered to be systemically important in the EU, so are not subject to the full range of ESMA's supervisory powers that apply to CCPs of potential systemic importance.<sup>12</sup>

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<sup>12</sup> Arrangements for supervisory cooperation between EU and Australian authorities are described in RBA (2022), ['Memorandum of Understanding between the Bank, ASIC and ESMA'](#).

## 3. Special Topic – Margin

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### 3.1 Introduction

During the assessment period, the Bank conducted a detailed review of the ASX CCPs' margin arrangements against the FSS. This chapter summarises the Bank's findings and recommendations.

Margin is a key component of a CCP's approach to managing financial risk. In the absence of a participant default, CCPs operate a 'matched book', meaning that for any position they hold with one clearing participant, they hold an equal and opposite position with another. This means a CCP has no direct exposure to price movements in the products it clears. However, in the event of a default, the CCP must assume the obligations of the defaulting participant – and therefore the risk of adverse price movements on its portfolio – until the CCP is able to close out those positions. The regular collection of margin from participants creates the first layer of financial resources used by CCPs to mitigate the risk of default-related losses.

CCPs collect two main types of margin:

- *Variation margin* is collected to prevent the build-up of current exposures between a CCP and its participants as prices move. For example, a CCP will call variation margin from a participant whose long position in a product has declined in value as prices fall; the CCP will typically pay out an equivalent amount to participants with short positions that have gained in value.
- *Initial margin* is collateral collected from participants to cover potential future losses in the event of a participant default. It is calibrated to cover potential exposures from price changes occurring between the last payment of variation margin (when the CCP's current exposures to participant portfolios are brought down to zero) and when the defaulting participant's portfolio is closed out.

Both types of margin are collected either daily or several times per day, depending on the product, either at fixed intervals or in response to significant market movements. Initial margin represents the majority of collateral held by the ASX CCPs to mitigate possible losses from a participant default. At the end of the Assessment period the CCPs collectively held around a total of \$10.2 billion in margin and \$900 million in other (mutualised) financial resources (see Appendix B.3).

The end-to-end risk coverage of a CCP's margin arrangements depend on the settings of the overall margin system. For example, the amount of initial margin that must be held by a CCP will depend on the frequency with which it collects variation margin, the calibration of its initial margin parameters, and the settings of related systems that underpin the calculation, collection and investment of margin (including its collateral management policies).

### 3.2 Variation margin

CCP Standard 6.4 requires CCPs to mark participant positions to market and collect variation margin at least daily to limit the build-up of exposures as prices change. The ASX CCPs collect different types of variation margin to cover these exposures depending on the product (Table 4).

**Table 4: ASX Variation Margin**  
By product type

Clearing house	Product	Margin name	Timing	Margin collection
ASX Clear	Cash equities and warrants	Mark-to-market Margin	Daily	Added to or offset against the participant's posted initial margin.
ASX Clear	Exchange-traded options (ETOs)	Premium Margin	At least daily	Collected from participants with net short positions, and held by ASX.
ASX Clear	Low-exercise-price options (LEPOs)	Variation Margin	At least daily	Collected from and paid to participants.
ASX Clear	Interest-rate securities*	N/A	None	No variation margin collected.
ASX Clear (Futures)	All	Variation Margin	**	Collected from participants with a mark-to-market loss and passed on to participants with a gain.

\* For example, retail depository interests in corporate bonds or government securities.

\*\* See section 3.5 for the frequency of margin calls at ASX Clear (Futures).

### 3.3 Initial margin

CCP Standard 6.3 states that CCPs should use initial margin models that generate margin requirements sufficient to cover their potential future exposure to participants and appropriately account for relevant risk factors of the products cleared.

For any initial margin model, a CCP must set three key parameters:

- *Confidence interval.* The target level of coverage of initial margin over potential future exposures. The FSS require that a CCP target initial margin to meet a single-tailed confidence level of at least 99 per cent of the estimated distribution of future exposures for exchange-traded products, and 99.5 per cent for OTC products.<sup>13</sup>
- *Historical sample period.* The sample of historical data used to estimate the model.
- *Margin period of risk (MPOR).* Also known as the close-out period, this is the estimated maximum length of time between the receipt of the last variation margin payment from a defaulting participant, and the point at which all of that participant's positions have been closed out. That is, it is the period in which the CCP is exposed to potential losses on a defaulting participant's portfolio.

Initial margin models can have varying degrees of structure. That is, they can be primarily statistically driven, with a limited number of assumptions, or include a greater number of parameters that must be set in order to generate margin calculations. The choice of model type involves a range of trade-offs (see Box B).

#### 3.3.1 Margin models at the ASX CCPs

The ASX CCPs use four different methodologies to calculate base initial margin requirements for participants across its range of products (Table 5).

For exchange-traded derivatives (ETD) transactions, ASX Clear and ASX Clear (Futures) calculate initial margin requirements using the CME SPAN methodology. Margin requirements in SPAN are largely

13 The Bank's supplementary interpretation of the FSS requires that the ASX CCPs use a 99.5% confidence interval for OTC products: RBA (2014), '[Supplementary Interpretation of the Financial Stability Standards for Central Counterparties](#)', Email to ASX, 27 October.

determined by the setting of key parameters. These include the price scanning range (PSR) and the volatility scanning range (VSR), which model potential changes in price and implied volatility. Both CCPs review and recalibrate CME SPAN margin parameters on at least a quarterly basis.

**Table 5: ASX Margin Models**  
Calibration of key margin parameters

Clearing house	Product	Margin model	Historical sample period	Confidence interval (per cent)	MPOR	Initial margin <sup>(a)</sup>
ASX Clear	Cash Equities	HSVaR	5 years	99.7	2 days	\$127m
ASX Clear	Cash Securities	Flat rate	Up to 5 years	95, 99.7 <sup>(a)</sup>	2, 3 days <sup>(b)</sup>	\$211m
ASX Clear	ETDs	SPAN	Highest requirement from 1 year or 5 years	99.5	3 days	\$1,110m
ASX Clear (Futures)	Liquid ETDs	SPAN	5 years <sup>(c)</sup>	99.5	2 days	\$6,739m
ASX Clear (Futures)	Less liquid ETDs <sup>(d)</sup>	SPAN	5 years <sup>(c)</sup> (10 years for electricity caps)	99.5	3 days	
ASX Clear (Futures)	OTC	FHSVaR	Back to June 2008	99.7	5 days <sup>(e)</sup>	\$711m

(a) Initial margin requirements on 30 June 2022 by service and margin model.

(b) Stocks in the All Ordinaries target a confidence interval of 99.7 per cent with an MPOR of two days, and all other products (equities, ETFs, etc.) target 95 per cent over a three-day MPOR. The combination of these settings for individual stocks aims to achieve a target confidence interval of 99.7 per cent with an MPOR of two days at the portfolio level.

(c) After the end of the assessment period, ASX introduced a 12-month lookback period at ASX Clear (Futures) in addition to the existing five-year period for equity index and interest rate derivatives.

(d) For example, exchange-traded electricity derivatives.

(e) OTC client accounts are required to post initial margin based on a seven day MPOR; ASX approximates this outcome by charging an OTC client account add-on.

To calculate margin requirements for OTC derivatives, ASX Clear (Futures) uses a filtered historical simulation value-at-risk (FHSVaR) model. Value at risk (VaR) models use a distribution of simulated changes in the value of a portfolio to calculate the potential loss at a given confidence level. In a FHSVaR model these changes are 'filtered' or scaled using a volatility scaling factor to more closely reflect the current level of market volatility (e.g. if volatility is high relative to previous periods, price changes from previous periods may be scaled up).<sup>14</sup> ASX takes a conservative approach by extending the historical sample period back to the period of stress in the second half of 2008.

ASX Clear uses two models to margin cash equities and other cash market products, as part of its overarching cash market margining (CMM) model:

- A historical simulation value at risk (HSVaR) model, used for securities in the ASX 500 All Ordinaries index with more than five years of continuous price data.<sup>15</sup> There is no filtering of historical volatility in the CMM model since the shorter historical sample period means that there is a greater weight on recent volatility.
- Flat rates are used for all remaining cash market products. Flat rates are intended to cover two-day price moves within a 99.7 per cent confidence level at the cash securities portfolio level. ASX assigns

<sup>14</sup> Volatility is calculated using an exponential decay factor (currently 0.97), which places greater weight on more recent observations.

<sup>15</sup> During the assessment period, ASX Clear increased the historical sample period for cash equities from two to five years. This resulted in 50 stocks (with price histories greater than two years, but less than five years) that were previously margined using the HSVaR model to be margined using flat rates.

individual flat rates for securities in the All Ordinaries index, while other securities are grouped with broadly similar products and assigned a common flat rate.

ASX also collects margin 'add-ons' to account for certain idiosyncratic risks (e.g. portfolio concentration and size) which are not captured by its initial margin models (see section 3.3.4). These risks are captured outside of the base margin requirements to allow ASX to better target their coverage, thereby differentiating between products and positions to which these risks apply and those to which they do not.

### BOX B: Types of Initial Margin Models

While parameter-based and the more statistically driven VaR-based margin models have different risk characteristics, neither model type is inherently biased towards higher or lower margin requirements. In both cases the level of margin produced by the model will depend on the choice of MPOR, target confidence level and historical sample period, and how these interact with market conditions. The main trade-offs between these models are rather in the dimensions of flexibility, transparency and scalability.

- Parameter-based models provide CCPs with greater flexibility to influence model outcomes by adjusting intermediate parameters. For example, parameters could be constrained or adjusted to reflect risks that are hard to quantify or to cover the possibility that future risks may be different from those captured by historical data. CCPs should have robust governance arrangements in place to ensure that this flexibility is exercised appropriately (see section 3.7.1). The same outcomes are difficult to engineer for VaR models without the need for add-ons that can add complexity to the model (see section 3.3.4).

- The assumptions behind VaR models and potential add-ons can be simpler to communicate, since they do not rely on intermediate parameters. However, it can be harder to understand how changes to volatility or positions feed through to margin outcomes. Parameter-based models, on the other hand, can separately specify how volatility and offsetting risk positions influence margin requirements.

- The calibration of a parameter-based model is more practicable when products are standardised (e.g. futures). In contrast, VaR models have historically been preferred for less standardised products such as OTC derivatives. More recently, VaR models have become increasingly common in part to meet the growing diversity and complexity of cleared products as well as the evolution of risk management practices.<sup>16</sup>

### 3.3.2 Margin model review program

ASX is currently in the process of implementing a multi-year work plan to review many of its key margin models and systems. In the assessment period, ASX began upgrading its OTC derivative margining systems, as well as planning for cash market model upgrades. ASX should ensure that any revised models that emerge from its review program meet the FSS requirement for a CCP's risk management framework to be coherent and consistent (e.g. by making sure products with similar risk characteristics are treated similarly).<sup>17</sup> ASX should also take into account industry best practice consistent with its Model Validation Standard (see section 3.9.3).

<sup>16</sup> In 2019, CME announced that it had developed a new margin model using a VaR-based methodology (CME SPAN 2), which it expected to implement over a number of years.

<sup>17</sup> See guidance paragraph 3.1.2 to the CCP Standards. A CCP does not necessarily need to take a uniform margining approach across all products in order to achieve coherent and consistent risk outcomes.

The review also provides opportunities for ASX to enhance the transparency of its margin models to participants. While ASX currently makes available most of the information required for participants to recreate the outputs from its base margin models, this does not include some add-on requirements that ASX considers to be proprietary. Some international CCPs have begun taking steps to increase the transparency of their margin requirements – for example, by using open source models or allowing participants to estimate margin requirements via an application programming interface (API).

**Recommendation:** ASX should develop and implement a plan to review its margin methodologies and systems that takes into consideration international best practice and is designed to produce coherent and consistent risk outcomes from its margin models that are transparent to participants. ASX should discuss its implementation plan with the Bank by 30 September 2023.

### 3.3.3 MPOR

CCP Standard 6.3 requires CCPs to conservatively estimate the time it might take to close out or effectively hedge a defaulting participant's positions, including in stressed market conditions (i.e. the MPOR).

The 2020 Assessment recommended that ASX review the consistency between its MPOR assumptions and its operational capacity to close out portfolios across all of its asset classes simultaneously. To address the outstanding recommendation, ASX conducted an analysis of the sequencing of actions required to manage the default of a participant with a large and diverse portfolio (i.e. that would require ASX to conduct multiple default auctions). The analysis looked at how the timing of the auctions could be feasibly staggered across a number of days. ASX concluded that the current MPOR settings for individual product groups are consistent with the time it would take to liquidate large and diverse portfolios based on likely default management actions, and will continue to monitor this via its default management procedure review.

The Bank has identified one inconsistency in ASX Clear's MPOR settings. The CCP clears a range of interest rate securities for which it does not collect variation margin. The level of activity in these securities is low, representing less than 0.1 per cent of average initial margin over 2021/22. Nevertheless, ASX Clear is exposed to up to two days of mark-to-market losses between the point at which trades in these securities are struck and the point at which the trades are settled. This effectively increases the MPOR on these trades by two days. However, ASX does not use a higher MPOR for these products than it does for comparable products for which variation margin is collected.

**Recommendation:** ASX Clear should ensure that its MPOR for securities products is consistent with its approach to mark-to-market margin for these products.

### 3.3.4 Initial margin add-ons

CCP Standard 6.1 requires that margin levels are commensurate with the risks and particular attributes of each product, portfolio and market that the CCP serves. ASX uses a range of margin add-ons to capture more specific risks.

#### **Concentration risk add-ons**

In a default scenario, market liquidity can affect the CCP's ability to close out a participant's portfolio in an orderly manner. ASX calls for margin add-ons from clearing participants with concentrated portfolios that are considered more difficult to liquidate. In particular, portfolios that are sufficiently large relative to market turnover will likely take longer to close-out than the MPOR, meaning that the CCP is exposed



to adverse price movements for longer. In order to cover this risk without penalising participants with smaller positions, ASX charges participants with larger portfolios a range of add-ons. These include an OTC Liquidity Add-on for larger OTC portfolios, and a 'scaler' (i.e. multiplier) used to calibrate margin parameters on larger ETD portfolios at ASX Clear (Futures).

### **Market liquidity risk add-ons**

CCPs also face the risk that specific products are not sufficiently liquid to close out the positions of participants even when they do not have unusually large positions within the assumed MPOR. This can be addressed through liquidity risk add-ons, as well as through a review of the MPOR assumptions.

The 2017 Assessment included a recommendation for ASX Clear to review the need for add-ons to manage liquidity risk in cash market products and ETOs. ASX has concluded that liquidity add-ons for ETOs are not needed, taking into account a survey of market participants to understand their capacity to acquire a large defaulted portfolio, but is yet to begin its review for cash market products. Going forward, ASX will conduct regular analysis to assess the need for liquidity add-ons for ETOs. ASX plans to complete its review of liquidity add-ons for cash market products by June 2023.

**Recommendation:** ASX Clear should complete its review of add-ons to manage liquidity risk for cash market products and implement these add-ons if the review concludes they are needed (see Table 6, Appendix A).

### 3.3.5 Portfolio margining and offsets

CCP Standard 6.5 states that a CCP may allow offsets or reductions in margin across products that it clears if the risk of one product is significantly and reliably correlated with the risk of the other product. Most of ASX's margin models permit some form of offset, except for flat rate margin.

ASX's VaR-based models for cash market products and OTC derivatives calculate margin using the historical distribution of changes in a portfolio's value over the historical sample period. Historically observed price correlations between products will be reflected in this distribution, reducing margin requirements relative to a purely product-by-product calculation.

The CME SPAN model allows for margin offsets between related contracts via the inter-commodity spread concession (ICC) parameter. The ICC reduces margin requirements across product pairs to account for diversification benefits where reliable correlations are observed across related contracts. ICCs are calibrated using a one-year historical sample period and an MPOR consistent with the one used to calibrate the related PSRs. ICCs are reviewed quarterly and subject to sensitivity analysis by calculating the impact of a complete erosion of underlying correlations, with the maximum concession generally capped at 80 per cent.

ASX Clear (Futures) participants that have both OTC and exchange-traded interest rate derivatives products in their portfolio are able to hold both products in a common portfolio for margining purposes (under the FHSVAr model).<sup>18</sup> ASX's Margin Optimiser model is used to determine the optimal allocation of interest rate futures.<sup>19</sup>

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<sup>18</sup> The futures products eligible for cross-product margining include: 30 day cash rate futures, 90 day bank bill futures, and 3, 5, 10 and 20 year bond futures contracts.

<sup>19</sup> The model seeks to minimise the initial margin requirements under the FHSVAr model, while not increasing the sum of FHSVAr and SPAN margin. The allocation of positions is theoretical for margining purposes only and no actual transactions take place.

### 3.4 Measures to address procyclicality

Increasing margin requirements during periods of market stress can create liquidity challenges for a CCP's participants. Such increases can be considered 'procyclical' if they tend to occur during downturns in the business or credit cycle or during periods of market stress, and may either cause or exacerbate market instability. This risk has been an area of focus among regulators in recent years, and the CPMI-IOSCO CCP Resilience Guidance encourages CCPs to put in place measures to maintain higher initial margin requirements through the cycle in order to avoid sudden increases in times of stress.<sup>20</sup>

These measures can involve CCPs placing a floor on margin requirements or ensuring – even during periods of low volatility – that their margin calculations take into account earlier episodes of stress. A CCP can also use expert judgement to identify emerging risks and pre-emptively increase margin to avoid the need for increases at the time that these risks crystallise, when participants may be under greater stress. The 2020 Assessment recommended that ASX develop a systematic framework designed to avoid destabilising increases in margin and other financial risk requirements during periods of heightened market volatility.<sup>21</sup>

During the assessment period, the ASX CCPs completed the introduction of margin floors for all products margined using SPAN.<sup>22</sup> ASX Clear (Futures) also applies a floor (at 50 per cent) to the volatility scaling factor in the OTC FHSVaR margin model, which limits the extent to which margin requirements are reduced in low volatility conditions.

While the implementation of margin floors reduces the risk of destabilising increases in margin during periods of heightened market volatility, it does not constitute the systematic procyclicality framework needed to reduce this risk across all margin and financial risk requirements at the ASX CCPs. In particular, a comprehensive framework should cover margin floors or other measures to address procyclicality for all remaining contracts at both CCPs, as well as non-margin risk requirements such as collateral haircuts. The framework should include an appropriate methodology for measuring the degree of procyclicality in risk models to allow management and the CS Boards to assess the adequacy of tools employed by the CCPs to address procyclicality.

ASX should also consider the impact of expert judgement decisions within this framework, for example when overriding the application of tools such as margin floors, or the potential to use expert-judgement driven forward-looking scenarios to anticipate future increases in margin requirements (see section 3.7.2).

**Recommendation:** Consistent with the CCP Resilience Guidance, by 30 June 2024 the ASX CCPs should develop a systematic framework to avoid destabilising increases in margin and other financial risk requirements during periods of heightened market volatility. This framework should include an appropriate methodology for measuring the degree of procyclicality in the CCPs' risk models and should consider the potential effect of expert judgement on procyclicality when determining margin and other financial risk requirements.

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20 The Bank applies the CPMI-IOSCO CCP Resilience Guidance in interpreting CCP Standards 2, 3, 4, 5, 6, 7 and 14.

21 This includes non-margin sources of procyclicality in CCP risk management models – for instance, where haircuts applied to collateral posted by participants are calibrated to increase in times of market stress.

22 ASX Clear (Futures) had introduced floors for equity index futures and major interest rate futures contracts in the previous assessment period.

### 3.5 Intraday and overnight margin

CCP Standard 6.4 requires that CCPs have the authority and operational capacity to make and settle intraday margin calls and payments, both scheduled and unscheduled, to participants. In considering the timing of intraday calls, CCP Standard 6.8 requires that CCPs consider the operating hours of payment and settlement systems in the markets in which they operate.

Collecting intraday margin allows CCPs to mitigate build-ups in risk exposures over a trading session from changes in participants' net positions (by collecting initial margin) and from price movements (by collecting variation margin).

In selecting the appropriate number of margin calls to schedule and make per day, CCPs must weigh the financial risk management benefits of more frequent collection against the operational costs and risk this can create.<sup>23</sup> The selected frequency of margin calls will also impact the calibration of other margin settings (e.g. MPOR).<sup>24</sup>

ASX Clear and ASX Clear (Futures) have different processes for managing intraday exposures reflecting differences in the materiality of intraday changes in exposures and the operating hours of the two CCPs (Figure 1). In both cases the CCPs will only call margin from a participant on an intraday basis if the calculated margin shortfall exceeds certain thresholds based on the relative size of the shortfall or ASX's assessment of the creditworthiness of the participant.

**Figure 1: ASX CCPs Timing of Key Margin Processes**

Timing of margin calculation, call and settlement



23 The risk is heightened when ad hoc calls are made.

24 Less frequent intraday margin calls imply a longer MPOR should be applied, since there is a longer potential period between the last variation margin call and the point at which a default can be closed out.

### 3.5.1 ASX Clear intraday margin processes

ASX Clear does not schedule regular intraday margin calls, but an ad hoc call will be calculated if equity price movements are sufficiently large (the current trigger is an increase/decrease of 1 per cent or more in the S&P/ASX 200 index).<sup>25</sup> During periods of heightened volatility (including during ETO expiries), ASX Clear undertakes ad-hoc reviews of cash market developments three times per day, which can lead to an intraday call if exposures become elevated. Once ASX Clear makes an intraday margin call, participants have two hours to settle the necessary collateral.

### 3.5.2 ASX Clear (Futures) intraday margin processes

ASX Clear (Futures) offers clearing services 24 hours per day, from Monday morning to Saturday morning, and so it faces intraday risk overnight as well as during the day.

#### ***Day Session (8:30 am – 4:30 pm)***

ASX Clear (Futures) has three scheduled intraday margin runs during its Day Session. ASX Clear (Futures) also recalculates margin on ETDs and OTC derivatives hourly, and may conduct ad-hoc margin calls during the Day Session if the ASX Clearing Risk team's senior management conclude that market movements have been sufficiently large, such as during periods of heightened volatility. Intraday margin calls must be met by participants within one to two hours of notification, depending on the timing of the call and whether or not it was scheduled.

#### ***Night Session (5:10 pm – 7:00 am)***

ASX Clear (Futures) also conducts an overnight call (shortly after 2am) for margin from certain participants.<sup>26</sup> This call is based on the change in margin requirements since the last intraday run and originally included only initial margin to mitigate exposures created during ASX 24's Night Session. ASX Clear (Futures) started collecting overnight variation margin in April 2022 (section 3.5.3). The call must be settled by participants in US dollars (USD) using commercial settlement banks within two hours.<sup>27</sup>

### 3.5.3 Late-in-day and overnight price movements

In the 2020 Assessment, the Bank recommended that the ASX CCPs should put in place arrangements that allow them to monitor and manage exposures arising from late-in-day and overnight price movements.

While ASX Clear (Futures) has now commenced the collection of overnight variation margin in USD, this approach generates a credit exposure to the commercial settlement banks used to settle these payments. This exposure is unwound following the first intraday margin run in Australian dollars (AUD) the next morning. If a commercial settlement bank was to default, any losses would be allocated to ASX and its participants as set out in the ASX Recovery Rules.<sup>28</sup>

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25 ASX Clear's intraday ad hoc margin call consists of two parts: an additional initial margin (AIM) call based on estimated exposures, and a call for initial, premium and variation margin for ETOs only. The CHESSE replacement system is expected to support calculation of intraday cash equity exposures, and the Bank is recommending that ASX Clear update its intraday margining approach to reflect this new capability (see section 0).

26 For a participant to be included in the overnight margin call, it must meet certain exposure thresholds.

27 The timing of the call means that participants cannot use Austraclear to make payments as they would during the Day Session.

28 ASX has consulted participants on proposed changes to how the Recovery Rules allocate losses from a commercial settlement bank default related to overnight margin. Among other things, these changes would ensure that none of these losses are allocated to participants of ASX Clear.

ASX Clear (Futures) plans to investigate alternative longer-term solutions to collect overnight variation margin that do not involve credit exposure to commercial settlement banks. These options include using alternative collateral (such as government securities) or using the New Payments Platform to settle payments in AUD via exchange settlement accounts at the Bank. Although an AUD solution would present a range of challenges, including the management of overnight AUD liquidity requirements by participants, it is preferable from a risk management perspective to settle margin obligations in the same currency as the related exposures.

Both CCPs will need to make further progress in implementing arrangements to monitor and manage exposures arising from late-in-day price movements.

**Recommendation:** The ASX CCPs should put in place arrangements that allow them to monitor and manage exposures from large late-in-day price movements, including movements that exceed the coverage provided by initial and additional margin. By 30 June 2023 ASX should review the feasibility of options to address this recommendation and develop a plan to implement option(s) found to be feasible.

**Recommendation:** By 30 June 2023 ASX Clear (Futures) should review the feasibility of options to remove or mitigate exposures to commercial settlement banks arising from overnight margin processes and develop a plan to implement option(s) found to be feasible.

### 3.6 Pricing

CCP Standard 6.2 requires that CCPs have a reliable source of timely price data for their margin system, and have procedures and sound valuation models for addressing circumstances in which pricing data are not readily available or reliable.

ASX Clear and ASX Clear (Futures) have access to timely price data for the products that they clear (Table 6).

**Table 6: Pricing Sources**

By product type cleared

Clearing house	Product	Pricing source	Pricing type examples
ASX Clear	Cash equities	ASX Trade	Traded prices (i.e. settlement auction for the daily settlement price).
	Exchange traded derivatives	ASX Trade	Traded prices where available, otherwise extrapolated prices from previous pricing periods or untraded bids and offers. For less liquid stock options, ASX's Derivatives Pricing System compares calculated prices against trades in similar options.
ASX Clear (Futures)	Exchange traded derivatives	ASX Trade 24	Daily settlement (and intraday) prices based on traded prices. Final settlement prices (at contract expiry) calculated in accordance with the respective contract specifications, typically with reference to underlying spot markets.
	OTC derivatives	Third-party data providers	The clearing system prices interest rate curves using the official cash rate and other pricing points provided through third parties. Prices are subject to second source validation. Participants are given information needed to create an end-of-day yield curve and calculate the net present value of contracts.

ASX has procedures and contingencies in place for situations in which prices are not available or are deemed to be unreliable (for example, during a market outage). For example, for cash market securities

and ETOs, ASX makes use of alternate trading venues such as Cboe Australia or estimation based on market indexes such as S&P/ASX200. In addition, ASX can also use the last available trading price or the closing price from the previous day.<sup>29</sup>

ASX runs a set of checks and validations for its price data each day to ensure they are correct. These include comparing daily price movements against predefined tolerance levels and independent third-party data, and automated alerts where pricing algorithms produce results outside set rules or parameters. Market participants are also given the opportunity to query calculated settlement prices ahead of interim market settlement.

### 3.7 Expert judgement

As with any predictive model, margin models rely on simplifying assumptions and are therefore subject to model risk. Where there is evidence that the model's assumptions may be violated (e.g. where future price volatility is expected to significantly differ from the historical sample period), there may be a case for manual adjustment of margin model outputs (including intermediate outputs such as the PSR). This use of expert judgement by a CCP's management can help to ensure that a margin system establishes margin levels commensurate with the relevant risks and particular attributes of each product, portfolio and market it serves (see Standard 6.1).

Although expert judgement can play an important role alongside its margin models, the use of expert judgement should be appropriately governed to ensure that it is used judiciously and should seek to limit destabilising procyclical changes to initial margin by taking a forward-looking view. The application of expert judgement should also not be used to address systematic margin model shortcomings. Among other things, it is difficult for clearing participants to properly anticipate changes in margin when driven by the use of expert judgement (see section 3.9.4).

#### 3.7.1 Governance

The use of expert judgement to override margin model outputs can potentially constitute a material adjustment to the margin methodology and parameters. It is therefore important that the use of expert judgement is subject to appropriate governance processes (see paragraph 6.7.1 of guidance to the CCP Standards). The CCP's board is ultimately responsible for material risk decisions and for ensuring that there is adequate governance surrounding the adoption and use of margining models (see paragraphs 2.3.1 and 2.6.4 of guidance to the CCP Standards).

The ASX CS Boards have delegated authority to the Chief Risk Officer (CRO) to make non-material changes to margin. Any such changes are typically made as part of the quarterly review of margin model outputs and backtesting results by the Risk Quantification Working Group (RQWG).<sup>30</sup> However, changes may also be made on an ad-hoc basis if deemed necessary, for example if urgent changes are required to respond to market stress.

The CS Boards have sole authority to approve material changes to margin requirements at the ASX CCPs. However, the significant expert-judgement driven changes to margin in March 2020 (see Box C) were made without prior approval from the CS Boards, which would have been impractical given the fast-evolving risk environment. ASX management subsequently informed the CS Boards of the overall

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29 For example, ASX used last traded prices as the closing price following the outage affecting ASX Trade in November 2020.

30 Margin floors are reviewed semi-annually and dollar PSRs at ASX Clear (Futures) are reviewed monthly.

margin changes but directors were not told how much of the change was due to the application of expert judgement.

During the assessment period, the CRO approved a new margin decision framework for ASX Clear (Futures) to clarify the situations under which expert judgement may be used to make margin changes. This includes where backtesting results or forward-looking market risk measures suggest the need for a change in margin levels. The framework formalises the procedures that were already followed by the ASX CCPs in practice, and ASX has begun extending the framework to ASX Clear. However, this framework does not distinguish between material and non-material changes to margin, indicate who is required to approve these, or set out a process for independent challenge and review of expert judgement decisions.

While it is important that the ASX CCPs are able to make changes to margin in a timely manner, particularly when market conditions are evolving quickly, the process involved in making urgent margin changes and the respective roles of management and the CS Boards should be clear. Consistent with the recommendation below, the ASX CCPs should ensure that roles and processes in relation to the governance of expert judgement are appropriately formalised and documented.

**Recommendation:** To align financial risk management practices and governance arrangements with the CCP Resilience Guidance, the ASX CCPs should continue to implement plans to: [...] 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.

## BOX C: Examples of ASX's Use of Expert Judgement

### ***March 2020 increases in margin requirements***

The onset of the COVID-19 pandemic resulted in heightened volatility across financial markets. The S&P/ASX 200 VIX, which measures anticipated near-term volatility in the Australian equity market, rose from around 10 per cent to 26 per cent by 28 February 2020 and then to 42 per cent by 13 March.

ASX responded by increasing initial margin settings beyond the level suggested by the purely statistical output of its margin models. This reflected ASX's judgement that market volatility would remain above the level in SPAN's historical sample period for some time. As a result:

- On 13 and 31 March, the SPAN PSR parameters were increased for equity index futures and options, increasing total initial margin held at ASX Clear (Futures) by a cumulative \$1.7 billion (20 per cent).
- On 19 March, the MPOR for single stock ETOs cleared by ASX Clear was increased from two to five days. On average initial margin coverage increased by five percentage points.

By November 2020, the statistical output of margin models caught up with the level set by expert judgement and margin levels returned to being model-determined.

### ***Margin floors on interest rate futures***

In May 2021, ASX Clear (Futures) introduced margin floors for major futures contracts. While these floors were primarily model-determined, ASX used expert judgement to override the floors for interest-rate futures contracts affected by the Bank's monetary policies at the time. It was ASX's expectation that these policies would mean volatility on products referencing interest rates up to three years would remain very low for some time. ASX concluded that the cost of maintaining higher margin floors through the period would have negatively affected market activity, concentration levels and liquidity in these

products.

This decision resulted in margin coverage falling below model-determined floors for a range of short-medium term rates contracts.<sup>31</sup> In parallel, ASX introduced two hypothetical credit stress-test scenarios to address the possibility of a sudden increase in volatility.

In July 2021, ASX communicated triggers for a transition back to model-determined floors to participants. As a result, the margin floors on affected contracts were increased to their model-determined levels between September 2021 and November 2021, when the Bank's three-year AGS yield target was discontinued.

### 3.7.2 Procyclicality and the use of expert judgement

While the use of expert judgement to adjust margin coverage during periods of market stress may help to ensure that margin requirements remain sufficient, such increases can be destabilising (see CCP Standard 6.3). Similarly expert judgement could increase the procyclicality of margin requirements if used to override measures, such as margin floors, that are designed to prevent margin levels from falling too low during less volatile periods. On the other hand, expert judgement can be used in a way that reduces procyclicality, for example by maintaining higher margin requirements than those produced by models if there is a plausible risk of increased market volatility.<sup>32</sup> This would reduce the need for a sudden change in margin requirements if volatility subsequently increased.

The examples in Box C highlight recent cases in which the application of expert judgement at the ASX CCPs has increased the potential procyclicality of margin requirements. For example, the large increases in initial margin in March 2020 occurred around the peak in market volatility. If some of this increase had been implemented earlier – for example, when volatility began to increase in late February or during the period of historically low volatility that preceded this – the increase required at the time of peak market stress could have been significantly smaller.

While it is not possible for CCPs to predict changes to market conditions with confidence, they can examine the impact of plausible scenarios on margin requirements. For example, the forward-looking components of ASX's margin decision framework could be enhanced with consideration of plausible historical or hypothetical scenarios (e.g. the impact of known or potential events such as elections or geopolitical conflicts). Additional forward-looking analysis could help ASX identify and quantify emerging risks at an earlier stage and adjust margin as required before these risks crystallise.

The Bank has already identified the need for the ASX CCPs to develop a systematic framework to limit procyclicality in their risk models (see section 3.4). This framework should consider the potential effects of the use of expert judgement on procyclicality.

## 3.8 Margin systems and processes

The ASX CCPs use a range of related systems and processes to support their margin operations:

- Upstream systems and processes are used to calculate participants' margin requirements. This includes the data feeds for product prices and participant positions as well as systems used to calculate margin requirements based on these inputs.

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31 Contracts affected included the 30-day inter-bank cash rate futures (IB), 90-day bank accepted bill futures (IR) and 3-year Australian Government bond futures (YT).

32 A similar outcome can be achieved by adjustments to margin settings, depending on the context (see section 3.4).



- Collateral management systems, which aggregate margin requirements, compare these to the value of collateral posted for each participant, and generate notifications to participants of any margin payments due.
- Downstream systems and processes that ASX and clearing participants jointly use to post collateral to settle margin obligations.

### 3.8.1 Operational reliability, recovery and backup procedures

CCP Standard 16 requires that a central counterparty should identify and mitigate plausible sources of operational risk. This includes designing systems to ensure a high degree of operational reliability, and having effective arrangements in place for timely recovery of operations in the event of a major disruption. Given the central role that margin systems play in underpinning CCP risk management, it is of critical importance that these systems are resilient and supported by strong recovery and contingency arrangements to maintain a continuous operational capacity to make margin calls.

Over the assessment period, ASX experienced some system and process incidents related to its margin operations. Some of these incidents had external impacts, such as a delay in issuing a margin call or the issuing of a call in error. In the next assessment period, the Bank will discuss with ASX the processes and controls it uses to help ensure the operational reliability of its margin-related operations. The Bank will also engage further with ASX on its backup procedures in the event of an outage affecting the systems it uses to calculate and collect margin balances due.

**Area of Supervisory Focus:** The Bank will discuss with ASX the processes and controls it uses to help ensure the reliability of its margin-related operations, as well as its backup procedures in the event of an outage affecting the systems it uses to calculate and collect margin.

#### **Contingency procedures**

ASX conducts disaster recovery tests for each of its main margin systems every 12 to 24 months. ASX's timeframe for executing a cut-over to its secondary data centre is two hours from the time that its technology teams are advised to initiate the process. In addition, ASX has backup procedures to mitigate risks in the event that recovery is delayed.

- *Margin inputs and calculations.* The ASX CCPs have well-defined backup procedures for determining prices in the event of a market outage or closure, and can access participant positions through multiple systems. In case of a SPAN outage, both CCPs could compute margin manually using the 'PC SPAN' system and use ad-hoc procedures to call margin on this basis.
- *Collateral management systems.* In case of an outage, ASX would manually collate relevant data on collateral holdings, margin requirements and any resulting margin balances due. Participants can receive information on their margin obligations via email, CHES message (at ASX Clear) or by checking the ASX settlement instructions in Austraclear.
- *Margin settlement systems.* If ASX's Clearing Operations team were unable to access the standard Austraclear interface to complete margin settlements, ASX's internal Austraclear team could perform an assisted transaction on their behalf. If Austraclear as a whole were to become unavailable, ASX would seek to settle AUD margin directly via RITS. In the event that real-time settlement in RITS was unavailable, Austraclear could be operated in Assured Mode, which allows for deferred net settlement of Austraclear payments.

### 3.8.2 Late margin payments

CCPs should establish and rigorously enforce timelines for margin collections and payments and set appropriate consequences for failure to pay on time (paragraph 6.4.2 of guidance to the CCP Standards). While the vast majority of margin payments are collected on time, ASX has procedures in place to investigate, and in some cases sanction, participants for late margin payments.

Late payments are usually the result of operational issues experienced by the clearing participant, a settlement bank or ASX. However, they could also be a sign of financial issues at the clearing participant. If ASX concludes the event represents a breach of the relevant CCP's Operating Rules, the breach may be referred for enforcement action. In more serious cases, including where financial stress is suspected, ASX's Participant Issue Response Group (PIRG) would consider the issue. In the event of a possible participant default, the PIRG would escalate the issue further to ASX's Default Management Committee.

## 3.9 Review and validation

CCP Standards 6.6 and 6.7 set out requirements for CCPs to analyse and monitor model performance and overall margin coverage through backtesting and sensitivity analysis, and to regularly review and validate their margin systems.

### 3.9.1 Backtesting

Backtesting is used to compare actual model performance with predicted model outcomes. In practice, it involves the comparison of the number of breaches in margin coverage observed over a certain period (e.g. the previous year) against the number of breaches expected for each margin model based on its calibration assumptions. ASX conducts daily backtesting of the SPAN, CMM and the OTC FHSVaR margin models to test whether the margin models reliably cover price movements to a 99.5 per cent confidence level for exchange-traded derivatives and 99.7 per cent for all other products. ASX also backtests key model parameters, including the PSR and VSR in CME SPAN, and flat rates for cash market products. Reporting is reviewed by the RQWG and used to identify the need for further investigation of margin model performance. For example, in June 2022, backtesting outcomes for the OTC FHSVaR margin model fell below the 99.5 per cent confidence level; as a result, ASX adjusted the model to increase margin requirements.

During the assessment period, ASX identified some inconsistencies between backtesting and modelling assumptions in its existing infrastructure. For example, for some products, the MPOR assumed for the calculation of initial margin was found to be different from the MPOR used in backtesting. ASX reviewed the effect of these errors on reported backtesting outcomes and did not identify any material breaches. ASX plans to complete work to enhance its backtesting systems over the next assessment period.

### 3.9.2 Sensitivity analysis

While backtesting tests whether a model is performing as intended under its current assumptions, it is also important to examine the effects of relaxing these assumptions via sensitivity analysis. ASX assesses the sensitivity of margin requirements to changes in key margin settings, including the MPOR, historical sample period and confidence interval. ASX also conducts 'reverse sensitivity analysis' on CME SPAN margin models, which examines the conditions under which target initial margin coverage would be breached. ASX performs its sensitivity analysis on at least a monthly basis and the findings are considered by the RQWG.

ASX primarily uses the one-factor-at-a-time approach, which involves moving one input variable at a time while keeping the others at their baseline values. This approach is generally less suitable for non-linear models or for historical or hypothetical scenario analysis. ASX does perform a limited set of multi-parameter sensitivity tests and plans to do further work to incorporate non-linearities as part of the scope of the ongoing margin model review program.

### 3.9.3 Model validation

ASX's Model Validation Standard requires that all margin models undergo a full annual validation and ongoing review. The RQWG is responsible for overseeing the regular reviews of models carried out by the Clearing Risk Quantification and Development (CRQD) group, while Internal Audit coordinates the independent third-party validation process with CRQD input.

Internal Audit reports the results of independent validations to the Risk Committee, Audit and Risk Committee and the CS Boards. These annual validations examine the conceptual soundness and performance of the models. A validation of conceptual soundness is also required when a model is materially changed. In addition, all new models and changes to existing models are subject to internal peer review to ensure development is compliant with the relevant model documentation, internal development standards and requirements documentation.

All margin models were externally validated during the assessment period. The main models were found to be conceptually sound with no material limitations identified. However, the review identified a number of low-rated findings on the quality of documentation.

As a second component of the independent model validation process, Internal Audit review whether models are operating as intended in practice. During the assessment period, Internal Audit's review identified instances of non-compliance with margin parameter review frequencies required by ASX's own policies, as well as the need to update some of the model documentation; ASX management has commenced remediating these issues.

At the Bank's request, ASX's Model Validation Standard requires that margin models are to be assessed annually against industry best practice; however, ASX is yet to carry out the first of these reviews. ASX anticipates the first review will be conducted in the next assessment period. ASX should also take into consideration international best practice as part of its ongoing margin model review program (see section 3.3.2).

### 3.9.4 Transparency

Transparency helps participants understand and manage their risks from participation in the CCPs and enables more effective user governance by providing an external source of expert challenge on the CCPs' margin models.

ASX makes a range of margin-related information available to its participants, including quarterly backtesting results, current margin parameter files and web-based tools used by participants to estimate requirements. However, participants currently do not receive results from ASX's sensitivity analysis or its annual independent model validations, nor do they receive detailed information on ASX's use of expert judgement to override its model outputs when determining margin requirements. The Bank has previously highlighted the need for the ASX CCPs to ensure that their disclosure arrangements address all relevant aspects of their risk management frameworks, and will discuss the gaps identified above in the context of this recommendation.

**Recommendation:** To align financial risk management practices and governance arrangements with the CCP Resilience Guidance, the ASX CCPs should continue to implement plans to: [...] 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.

## 4. Special Topic – CHES Replacement

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### 4.1 Introduction

CHES is the system used by ASX to facilitate clearing, settlement and other post-trade services for the Australian cash equities market. It is a critical piece of national financial market infrastructure. The services that ASX Clear and ASX Settlement provide enable the management of clearing and settlement risks in that market and allow for the record of title to be maintained. The Australian cash equities market could not function effectively without the services this system provides. Although the current system has generally performed well – maintaining system availability of 100 per cent during the assessment period – the CHES software was developed more than 25 years ago. The age of the legacy system makes it harder to maintain, and this risk increases the longer it remains in use.

ASX began a process of evaluating replacement options for CHES in 2015. In 2017, it selected Digital Asset (DA) as the vendor to provide the distributed ledger technology-based (DLT-based) platform that will replace CHES. In 2019, ASX and DA partnered with VMware, a large US-based technology firm. Under this arrangement, VMware is responsible for designing the ledger component of the new system, leaving DA to focus on delivery of the CHES replacement application software.

ASX's use of DLT in the CHES replacement system differs significantly from the use of such technology by systems such as Bitcoin. It will operate a private, permissioned network application of DLT. ASX will be the only entity that can write to the ledger and it will control access so that users can only see elements of the ledger relevant to them. By contrast, Bitcoin is an example of a public, permissionless DLT system.

#### 4.1.1 Key areas of supervisory engagement

The Bank is working closely with the Australian Securities and Investments Commission (ASIC), the Australian Competition and Consumer Commission (ACCC) and the Treasury to monitor ASX's conduct against the Council of Financial Regulators' Regulatory Expectations for Conduct in Operating Cash Equity Clearing and Settlement Services in Australia as it implements the CHES replacement program.<sup>33</sup> The Bank also works closely with ASIC as co-supervisor of licensed CS facilities in Australia under Part 7.3 of the Corporations Act. In October 2020, ASIC and the Bank publicly outlined their expectations of ASX.<sup>34</sup> ASIC and the Bank expect ASX to replace CHES as soon as this can be safely achieved by ASX and users of CHES, and that the new system should meet the requirements that CHES currently meets for system availability, resilience, recoverability, performance and security.

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<sup>33</sup> See CFR (2017), 'Regulatory Expectations for Conduct in Operating Cash Equity Clearing and Settlement Services in Australia', Policy Statement, September.

<sup>34</sup> See RBA (2020), '[ASIC and RBA Announce Expectations for CHES Replacement](#)', Media Release No 2020-23, 1 October.

In November 2021, additional conditions were imposed on the CS facility licences of ASX Clear and ASX Settlement following the conclusion of ASIC’s investigation into the November 2020 ASX market outage (the 2021 Licence Conditions).<sup>35</sup> The 2021 Licence Conditions require:

- The CS facilities to appoint an independent expert to assess whether ASX’s assurance program for the replacement of CHES is fit for purpose, identifying any shortfalls, and reporting regularly to ASIC
- The independent expert to oversee any remedial actions relevant to CHES replacement from recommendations arising from IBM’s review of the ASX Trade Refresh project that resulted in the November 2020 ASX market outage (IBM review recommendations). The independent expert is also required to regularly report to ASIC on the status and implementation of these remedial actions.
- ASX senior executives to provide attestations to ASIC on matters including adequacy of testing and readiness for implementation.
- ASX directors to attest to the adequacy of controls and procedures to address remediation actions recommended by the independent expert and that sufficient resources have been made available for this work prior to go-live.

The Bank is engaging closely with ASIC and ASX on the matters set out in the 2021 Licence Conditions. This includes regular engagement with EY as the independent expert appointed by ASX.

#### 4.1.2 The Bank’s assessment of CHES replacement

The Bank’s regulatory role in respect of CHES replacement includes providing advice to the Minister or the Minister’s delegate on the changes to ASX Clear and ASX Settlement Operating Rules that support the introduction of the new system, and performing a broader assessment of whether the new system and its supporting arrangements satisfy the requirements of the FSS.<sup>36</sup> The Bank’s joint engagement on CHES replacement with ASIC, ACCC and Treasury has covered many of the matters required to perform this assessment.

The Bank has assessed how well ASX Clear and ASX Settlement will likely observe the FSS both for the replacement system once it is in production (i.e. assuming it is delivered to specifications), and how well the CS facilities are observing the FSS in their management of the change program required to deliver the replacement system into production. It focuses on ASX’s governance arrangements, management of operational, settlement and legal risks, and how the new system supports ASX’s management of clearing risks. The Bank’s assessment against the central security depository and exchange-of-value standards covers both the current CHES system as well as the replacement system. This reflects the large degree of overlap between the design of the current and replacement CHES systems on these points, as well as the importance of reviewing the current CHES system against these standards in light of the delay to delivery of the replacement system.

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<sup>35</sup> See ASIC (2021), ‘ASIC Imposes Additional Licence Conditions on ASX and Issues Expectations to Improve Market Resilience’, Media Release No 21-313MR, 24 November.

<sup>36</sup> The Minister has delegated relevant powers under Part 7 of the Corporations Act to Commissioners or senior staff within ASIC.

The remainder of this chapter provides an update on recent delays to the go-live date, summarises the Bank's assessment and discusses the further work that will be required to complete the Bank's assessment between now and go-live.

## 4.2 Go-live delay

ASX announced in August that the April 2023 go-live date for CHES replacement would be delayed until late 2024 at the earliest, as a result of delays in the delivery of the CHES replacement application software being developed by DA. This follows several earlier delays from the original go-live date of late 2020. While the Bank understands that the current version of the software is able to process present-day transaction volumes in normal circumstances, ASX has identified a number of scenarios that could create bottlenecks or latency issues. These issues need to be resolved in order for the system to meet its performance and scalability requirements.

ASIC and the Bank have communicated to ASX their expectations that ASX consult broadly with stakeholders on its replan of the CHES replacement program, build adequate contingency into the plan so that any further delay is extremely unlikely, and have its revisions to new plan validated by an independent expert. ASX has appointed Accenture to review the new CHES application that DA is developing, and has commissioned EY to review its replanning process and assess whether the plan provides sufficient time for ASX and its users to prepare for go-live. ASX is consulting with stakeholders on the timing of user readiness activities, and a feasible window for go-live. ASX is aiming to release the findings of the Accenture review by the end of the year and announce a new go-live date following this.

The regulators are disappointed by the extent of the delay at an advanced stage of the program, and welcome the Accenture review as an important step in providing assurance that the new CHES application software will be fit for purpose (see section 4.4.2). Given the extended delay, the regulators expect ASX to continue to invest in and maintain the current CHES system so that it continues to service the market reliably until the CHES replacement can go live.

## 4.3 Governance

### 4.3.1 Program governance arrangements

As described in section 2.1.2, the Bank recommended in the 2021 Assessment that ASX should document governance arrangements that set out clear and direct lines of responsibility and accountability. Such arrangements ensure that issues are addressed or escalated in a timely way and that decision-making is aligned with the objectives of the program. Responsibility for the CHES replacement program ultimately rests with the ASX Limited and CS Boards. The CS Boards have responsibility for ensuring that the new system is delivered in a way that complies with the licence obligations of ASX Clear and ASX Settlement, including the FSS.

Two Board sub-committees play an important role in overseeing the program on behalf of the Boards: the Audit and Risk Committee (ARC) and a newly created Technology Committee (TC). The formation of a board-level technology committee was recommended in the 2021 Assessment (Recommendations 2021-11 and 2021-12). The TC held its first meeting in May 2022 and is tasked with overseeing ASX Group's technology and data operations, strategic initiatives and risk management. As such the TC has the primary oversight responsibilities at the Board committee level for the CHES replacement program. The ARC, which previously oversaw the CHES replacement program, continues to provide oversight of ASX Group's overall risk management of operations, programs and projects (with the

exception of those matters carried out by the CS Boards and the Technology Committee), and response to significant operational incidents. ARC can refer issues to the TC that are within the scope of the TC's role and responsibilities for advice as necessary. The TC reports on its activities to the ASX Limited and CS Boards, and may escalate matters to these boards or refer them to another Board committee as appropriate.

The TC and ARC have significant responsibilities beyond CHES replacement in the management of technology and other risks affecting the CS facilities. It is important that these committees, the CS Boards and ASX management are able to devote sufficient resources and attention to managing these risks despite the large amount of resource and effort dedicated to CHES replacement. The establishment of the TC as a separate committee from ARC should assist in enabling these committees to oversee other risks in addition to CHES replacement. ASX should ensure that sufficient resources are dedicated to the management of all of its risks, not just those relevant to CHES replacement.

The Executive Steering Group (ESG) is the key executive level governance forum within ASX for the CHES replacement program. The ESG meets monthly and consists of the key members from the program's leadership team and other key ASX executives, including the Chief Executive Officer (CEO), the Chief Risk Officer (CRO) and the Chief Technology Officer (CTO). Representatives from DA and VMware can be invited to attend. The Executive Sponsor of the CHES replacement program chairs the ESG and has overall accountability of the execution and delivery of the CHES replacement program. The Executive Sponsor is supported by the Group Executive, Technology and Data and CIO as the Technology Executive Owner for the CHES replacement program. Additionally, the ASX CRO is accountable for the assurance program for the CHES replacement and reports directly to the ARC on this program.

### 4.3.2 Risk management framework

The FSS require FMIs to have a clear, documented risk management framework. ASX's overarching approach to risk management is set out in its ERMF (see section 2.2). A key element of the ERMF is the identification and assessment of risks and controls. Project management of the CHES replacement program falls under the ASX Project Risk Management Framework, which is designed to be aligned to the ERMF.

ASX's stated tolerance for operational and technology risk is 'very low'. ASX's enterprise risk management team has assigned a 'high' inherent risk rating for the CHES replacement program, taking into account the complexity of the program, the need to integrate internal and customer systems to a new technology solution, and the need to ensure the new system meets regulatory requirements, including the FSS. ASX has identified a range of mitigants to bring down residual risk in the program, including in the areas of program resourcing, migration and integration testing. However, as at 30 June the program was operating outside risk appetite, in particular due to the delivery delays discussed in section 4.2.

### 4.3.3 Assurance

The FSS require that an FMI's operations are subject to internal audit and, where appropriate, independent expert reviews. Consistent with the expectations communicated by ASIC and the Bank, and the 2021 Licence Conditions, ASX has developed an assurance program for the CHES replacement program. The program consists of around 40 individual reviews relating to program governance, the technical solution and design, operational processes and controls, and industry readiness and implementation. Around two-thirds of the reviews are tied to specific milestones in the program, such



as the opening of testing systems, operational readiness, go-live and post implementation. ASX will need to review its assurance program in light of new delivery timelines when they are determined.

The reviews are conducted by either an external independent reviewer, a specialist external expert embedded in specific workstreams, or by ASX Internal Audit. ASX has selected external reviewers where needed to assess new or specialist technologies or for critical activities, whereas internal reviews are likely to be used in areas where ASX Internal Audit has experience (such as in reviewing processes carried over from the existing CHES system and other ASX systems). Where reviews are undertaken by embedded experts, ASX requires that a separate independent team also conduct a review as part of pre-go-live testing. The results of the reviews are provided to the program team, the ESG, the CS Boards, Technology Committee, and ASIC and the Bank. Any actions from the reviews are tracked by the assurance program workstream, with reporting to the ESG and the Technology Committee.

ASX has appointed EY as the independent expert required under the 2021 Licence Conditions. In February, EY reviewed the design of ASX's Assurance Program, concluding that it is fit for purpose, while making 3 recommendations for further improvement.<sup>37</sup> In June, EY completed the first of its six-monthly progress reports, confirming that the recommendations from its February review had been addressed while recommending improvements to the tracking and closure of remedial actions from the assurance program.<sup>38</sup>

**Recommendation:** Consistent with the 2021 licence conditions, ASX should make any necessary adjustments to the assurance program for CHES replacement as part of its broader replan of the program and to take into account lessons learned from the delays to program timelines. ASX should implement the revised assurance program and address findings from assurance reviews.

#### 4.3.4 Engagement with stakeholders

The FSS require CS facilities to engage with relevant stakeholders to ensure that an FMI's design and strategy appropriately reflect the interests of its participants. This is critical for the replacement of a system such as CHES, which is relied upon by a broad range of stakeholders in the Australian equities market – extending beyond the direct clearing and settlement participants to end investors, issuers, share registries and the banks arranging transfer of funds in the CHES batch (payment providers).

ASX established a number of forums for engagement with stakeholders on CHES replacement, including:

- working groups focusing on software provider readiness, CHES user readiness, market-wide implementation and transition activities, an ISO 20022 messaging Technical Committee, and focus groups on functional changes
- public consultations on matters including the business requirements of the CHES replacement system, changes to the project timeline to go-live, amendments to the operating rules that will be required to implement and support the operation of the new system, and changes to netting and settlement workflows designed to enable greater processing capacity in the new system
- to seek the views of stakeholders during the 2020 and 2022 replans of the program; industry feedback that more time was required for industry testing and vendor preparedness was a

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<sup>37</sup> See ASX (2022), 'Independent Expert Report: Independent Assessment of ASX's Assurance Program for its Implementation of the CHES Replacement Program', Design Report, 28 February.

<sup>38</sup> See ASX (2022), 'Independent Expert Report: Independent Assessment of ASX's Assurance Program for its Implementation of the CHES Replacement Program', Progress Report, 30 June.

contributing factor to the length of the delay in go-live from the 2020 replan (see section 4.2 on the 2022 replan)

- a Business Committee, which comprises representatives of cash equity clearing participants, settlement participants, AMOs, share registries, and other relevant stakeholders and their associated industry organisations (including in representing issuers and shareholders), with a view of securing user input into ASX's governance framework and on the provision of clearing and settlement services (see Appendix B.1).

The 2021 Assessment included two recommendations focused on improving the focus on stakeholder management and documenting these expectations in a Stakeholder Charter (for progress see Recommendations 2021-16 and 2021-17, Table 6 in Appendix A).

#### 4.3.5 Management of intra-group conflicts of interest

The FSS require that CS facilities have measures in place to manage conflicts between the obligations and interests of the CS facility and those of other entities in the group, or the group as a whole.

With respect to the CHES replacement program, a key potential conflict of interest is commercial in nature: ASX Clear and ASX Settlement provide CS arrangements to approved market operators (AMOs) that are competitors to ASX Limited. This conflict is recognised by the ASX Cash Equities Clearing and Settlement Code of Practice that was introduced in 2017 in accordance with the Council for Financial Regulators' *Regulatory Expectations for Conduct in Operating Cash Equity Clearing and Settlement Services in Australia* (Regulatory Expectations). Among other things, ASX has committed to provide access to its CS services on transparent and non-discriminatory terms (including pricing).

In the CHES replacement system, all market operators using the Trade Acceptance Service – including ASX Limited – will access CHES on a materially equivalent basis and agreements with AMOs for that service will be subject to common legal terms and standards. ASX will consult with market operators on proposed changes to its legal terms and standards.

While the ASX Limited and CS Boards typically discharge their responsibilities for oversight of CHES replacement as part of a concurrent meeting of both boards, there are circumstances in which conflicts may arise between the regulatory obligations of the CS facilities and the commercial interests of the broader ASX Group. For example, this may arise because the technology underpinning the replacement system has been designed to enable ASX Group to offer services in addition to the core cash equities CS services provided by the current CHES. There may be scenarios where a decision that enhances the resilience of CS services in CHES replacement limits the potential for ASX to offer these non-core services.

As set out in the Regulatory Expectations, the ASX Clear and ASX Settlement Boards have arrangements in place that allow its non-ASX Limited directors to meet separately if required to address potential intragroup conflicts of interest. While these arrangements were originally instituted to address commercial conflicts arising from competition between ASX Limited and other AMOs, the Bank has been discussing with ASX how these arrangements would be used to address the broader range of intragroup conflicts of interest described above (see section 2.1.1).

**Area of supervisory focus:** The Bank will continue to engage with ASX, working closely with ASIC, on the effectiveness of ASX's arrangements for managing any intragroup conflicts of interest in the CHES replacement program between the CS facilities and the wider ASX Group.

## 4.4 Operational risk

### 4.4.1 Identification, management and monitoring of key operational risks

The FSS require a CS facility to have appropriate systems and processes to identify, manage and monitor operational risks, especially when significant changes are occurring. These requirements are particularly relevant given the extent of the changes that will be required to support implementation of the CHES replacement system. The following sections set out how ASX is identifying, managing and monitoring key operational risks in three key areas: testing, cutover and migration and go-live decision-making.

#### **Testing**

The purpose of testing is to verify whether the system is working as intended (including meeting non-functional requirements such as system capacity and availability), that other ASX and user systems are properly integrated with the CHES replacement system, and that the plan to migrate ASX and users from the current to the replacement system can be successfully implemented.

ASX's testing approach covers each of these areas:

- The system is tested over a series of overlapping stages including:
  - unit testing (ensuring that individual components run without error)
  - system testing (verifying whether system components meet acceptance criteria)
  - system integration and end-to-end testing (examining how the integration of multiple components work together)
  - non-functional testing (for requirements in areas such as performance, availability and security).
- Software providers (both vendors providing software to multiple CHES users and those users developing in-house systems) must seek technical accreditation to demonstrate that their systems can connect and interact with the CHES replacement system. Software providers are also provided with an environment allowing them to complete their own testing and support testing by CHES users utilising their software.
- CHES users will take part in mandatory, industry-wide end-to-end testing. This testing will be undertaken in a simulated, production-like working environment to ensure that CHES users can perform their business-related functions (such as batch settlement, corporate actions and exception handling).
- Migration testing will be performed to check the integrity of migrated data and that business processes in the target platform perform as expected with the migrated data. Inflight migration testing allows software providers and CHES users to test workflows that are affected by the cutover to the CHES replacement system when it goes live.

ASX's cutover approach does not include parallel testing with industry ahead of go-live, or parallel operation in production, since ASX has judged that supporting compatibility between the two systems is impractical (see 'Cutover and migration' below). This magnifies the risks of cutting over to the replacement system at go-live. ASX is mitigating these risks in a number of ways and will conduct three phases of dress rehearsals ahead of go-live (cross refer to migration and cutover section).

## Next steps

ASX is in the process of reviewing its testing approaches and strategies for the CHES replacement program. Some of this work will be carried out as part of ASX's Delivery Excellence Program, which is implementing the recommendations from the IBM review of the ASX Trade Refresh project. As of May, ASX had completed implementation of 24 of the 59 IBM recommendations at an organisation-wide level, although it had only completed four of the 22 recommendations related to testing. ASX had closed 19 of the 49 recommendations that are relevant to the CHES replacement program. As part of its assurance program for CHES Replacement, ASX will also commission an independent assessment of its test approach and strategy. Part of that review will compare ASX's approach with leading testing practices for comparable infrastructure.

**Recommendation:** Consistent with the 2021 Licence Conditions, ASX should continue to address findings from the IBM review of the ASX Trade Refresh project, ensuring that any relevant steps are taken to apply lessons learned to its clearing and settlement operations, and in particular to the CHES replacement program.

## Cutover and migration

Cutover is the process of removing the current CHES system as the production system and replacing it with the CHES replacement system. The cutover process carries significant risks in any system replacement. The risks are heightened for CHES replacement because ASX intends to cutover to the replacement system over a single weekend ahead of go-live.

In July, ASX released an information paper that set out its rationale for choosing a single weekend cutover rather than a phased migration (where part of all of the old and new systems run in production during a transition period).<sup>39</sup> The key reason in support of a single weekend cutover is that phased migration would require interoperability between the current and new systems. This is difficult to achieve because the two systems use different message formats (the CHES replacement system incorporates international standard ISO 20022 messaging, whereas the current CHES system uses proprietary messaging). Running both systems in parallel would either require participants to send dual messages to each system – running the risk that conflicting messages could be sent – or for ASX to build temporary message translation systems that allow a single message to be routed to each system. ASX has indicated that building such translation systems would in itself be a multi-year project.

Utilising a phased approach would require three separate changes to the production environment: changes to current CHES to support interactions with the new system; transition to concurrent operation of the two systems; and transition to sole operation of the replacement system. ASX's view is that no new business processes or data models could be introduced in the two interim phases, and that the last change would itself require a single cutover because of the change in business processes between the current and final replacement system.

ASX also believes that the necessary data migration activities can be performed in a single weekend. ASX can limit the amount of data that needs to be migrated on the cutover weekend by migrating some data (such as historical data) ahead of the cutover weekend.

ASX has commissioned KPMG to provide it with a data migration platform to extract the data from the current system and migrate it to the replacement one. ASX has cutover readiness plans that are intended to ensure that ASX and the market is ready to cutover to the replacement system. A review

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<sup>42</sup> See ASX (2022), 'CHES Replacement: Assessment of Implementation Options for Cutover', Information Paper, July.

of ASX's data migration plans has been undertaken as part of the assurance program and two additional reviews are scheduled.

### ***Dress rehearsals***

ASX will conduct three phases of cutover dress rehearsals prior to go live:

- *ASX technical dress rehearsals* will rehearse the technical aspects of the go-live plan to ensure that ASX's technical cutover tasks are stable. CHES users will not participate in these rehearsals.
- *ASX dress rehearsals* will test whether the ASX's cutover activity can be executed within the cutover window. In addition to the technical aspects that were rehearsed in the technical rehearsal, ASX will rehearse the go-live governance model, including escalation groups, incident management support and rollback rehearsal. CHES users will not participate in these rehearsals.
- *Market dress rehearsals* tests the full scope of the go-live cutover, including all ASX and external participants. Participation by CHES users is mandatory.

ASX will make the 'to be' production environment available to CHES users on the Monday following each of the market dress rehearsal weekends. CHES users will be able to test various business workflows using production data.

### ***Go-live decision-making***

The decision authority and the final point of escalation for go-live and the related checkpoints is the Implementation Governance Group (IGG), which is made up of a subset of ESG members.

The cutover weekend (and dress rehearsals) is subject to a number of checkpoints:

- ASX will hold an internal go/no go readiness checkpoint facilitated by the IGG around two weeks before the rehearsal or actual cutover event to determine the readiness of ASX and participants.
- There is an internal go/no go checkpoint on Saturday night for the IGG to sign off on ASX's migration activities that occurred that day
- There is a final go/no go checkpoint scheduled for Sunday for the IGG to seek the final go-live decision based on, among other things, a readiness confirmation from each CHES user, who by that stage will have connected to the replacement system and performed verification checks on the migrated data.

The formal checkpoints on the Saturday and Sunday consist of a number of Critical Success Factors (CSFs), each of which must be passed to proceed. Each CSF is owned by a specific IGG member.

**Recommendation:** ASX should prepare for cutover, migration and go-live of the CHES replacement system, including by:

- having comprehensive and effective contingency plans in place for dealing with an issue on the go-live weekend or subsequent to go-live
- successful execution of migration dress rehearsals
- effective arrangements for go-live decision-making, including ASX's compliance with relevant 2021 Licence Conditions.

## 4.4.2 Engagement with service providers and vendors

The FSS require a CS facility to identify, monitor and manage the risks posed by third-party service providers – including software vendors such as DA and VMware that are responsible for providing critical elements of the replacement system. The Bank expects a CS facility to have access to relevant information to effectively monitor the products and services that its vendors provide and have systems in place if a vendor does not perform as expected. The CS facility ultimately remains responsible for any products and services that are provided by external providers, and ensuring that these vendors deliver to a standard that is consistent with the requirements of the FSS.

As noted in section 4.2, the recently announced delay from the April 2023 go-live date raises questions about whether ASX's management of vendors in the program has been consistent with the expectations of the FSS. The regulators are engaging with ASX to better understand: the Board's oversight of vendor relationships; the way that the original design specifications were communicated, and subsequent engagement between ASX and vendors on any challenges developing to these specifications; and ASX's contingency plans if its current vendor arrangements required changes.

**Recommendation:** ASX should engage with the Bank and ASIC on its plans to address findings from a planned external review of its key vendor dependency on DA for delivery of the CHES replacement application.

## 4.4.3 Operational reliability and business continuity

The FSS require a CS facility to have clearly defined operational reliability objectives and business continuity plans. The key requirements and how ASX intends to meet them are:

- *System availability.* The replacement system has a target availability of 99.95 per cent.
- *Scalable capacity adequate to meet its current stressed requirements.* System will target the capability to process a peak 15m trade day, which gives 100 per cent headroom over peak trade registrations experienced to date. The system has a target capacity of 10m trades per day on a sustained basis (equivalent to current CHES), without compromising other non-functional requirements such as system latency. The system is required to allow capacity to be expanded beyond this level in the medium term.
- *Comprehensive physical and information security policies.* The replacement system will be hosted in secure data centres. Access to the replacement system will be controlled and data will be encrypted. There will be mechanisms that can prove the origination of a transaction is genuine. Auditability will be provided through a full history of the complete ledger.
- *Business continuity plans and two-hour recovery time objective.* The nodes that support updates to the ledger will be hosted across four data centres and the system is designed to be able to return to operations within two hours of a disruption.

ASX will demonstrate that it meets these requirements through system testing, disaster recovery and incident management playbooks, and specific reviews in the broader assurance program that cover performance, scalability and security.

**Area of supervisory focus:** The Bank will continue to engage with ASX, working closely with ASIC, on evidence that key non-functional requirements have been met, including through testing and the broader assurance program.

## 4.5 Central securities depositories

The FSS require an SSF that operates a central securities depository (CSD) to have appropriate rules and procedures to ensure the integrity of securities issues and manages the risks associated with safekeeping and transferring securities.

ASX Settlement is not a traditional CSD but performs many of the key functions of a CSD by maintaining a record of ownership and movement of securities for the securities that are held in CHES (the CHES sub-register). The CHES sub-register forms part of an issuer's primary securities register. ASX Settlement conducts reconciliation of securities issues it maintains by sending daily information on the movement of securities to share registries to enable them to accurately maintain a listed entity's registers. Annual audits of the controls used in ASX Settlement's systems are conducted by an external auditor, with the resulting reports published on the ASX website.

ASX Settlement also issues a monthly CHES holding statement to securities holders to report changes in their holdings of securities on the CHES sub-register. While investors can use this information to identify any errors in ASX's records of securities holdings, the daily reconciliation of securities is the primary means for ASX to meet its obligations under SSF Standard 9.1, and the Bank does not consider that holding statements play a role in meeting this requirement.

ASX Settlement is subject to a number of additional FSS requirements related to its CSD function:

- *Transfer of title.* Securities settled by ASX Settlement are dematerialised (that is, they are held only as electronic records) and held in CHES, with transfer of title given effect by electronic book entry.
- *Claims of creditors.* ASX Settlement is not the legal owner of any participant or client assets. ASX Settlement's rules and arrangements for title are designed to provide a high degree of assurance that participants' securities would be protected from claims by ASX Settlement's creditors if ASX Settlement was insolvent. ASX plans to update legal analysis confirming the effectiveness of this protection once changes to the operating rules supporting the replacement system have been finalised.
- *Overdrafts and debit balances.* ASX Settlement does not allow securities accounts to be overdrawn or have a debit balance.
- *Protection against custody risks.* ASX Settlement has identified potential custody risks arising from negligence, misuse of assets, fraud, poor administration, or inadequate record-keeping and has operational controls in place to mitigate these risks.
- *Segregation of FMI's and participants' assets.* CHES provides an account structure that is designed to ensure the legal and operational segregation of ASX Settlement's assets from those of its participants, and of participants' securities from those of clients. However, there is a period during settlement when securities are held in a separate settlement account with no operational segregation between participant and client securities. ASX has arrangements in place to mitigate the risks from these arrangements by ensuring that clients remain beneficially in possession of their securities or the corresponding funds for all but a brief window during the settlement period.
- *Ancillary activities.* ASX Settlement does not perform any ancillary activities (such as providing a securities lending facility) that may pose a risk to the operation of its CSD function.

**Area of supervisory focus:** The Bank will engage with ASX, working closely with ASIC, on updates to legal analysis confirming the effectiveness of arrangements to protect securities holdings from creditor claims in the event of ASX Settlement’s insolvency.

## 4.6 Settlement

### 4.6.1 Exchange-of-value settlement systems

The FSS require that a CS facility eliminate principal risk by making the final settlement of one obligation conditional upon the final obligation of the other. ASX Settlement achieves this by performing both its cash and securities settlements in a multilateral net batch on a DvP Model 3 basis, and this will continue in the CHES replacement system.<sup>40</sup> ASX Settlement also currently has functionality to settle individual transactions on a DvP Model 1 basis (CHES RTGS), although this functionality has never been used.<sup>41</sup> The CHES replacement system will provide an updated DvP Model 1 settlement function.

In the current CHES system, not all novated trades are eligible for netting.<sup>42</sup> For those that are, the system generates a single batch instruction – the Net Broker Obligation (NBO) – in each line of stock on the night of the trade date and cancels the underlying gross transactions. Transactions that are not eligible for netting are not included in the NBO and are settled on a gross basis in the batch. In the CHES replacement system all trades that are novated to ASX Clear will be netted. The system will determine a Novated Net Delivery Position (NNDP) at the beginning of batch settlement and send a daily report to CS participants on their NNDP at the start of each day prior to settlement.

The DvP processes for both the multilateral net batch and CHES RTGS are designed so that securities are transferred within CHES if and only if the corresponding cash payments are made in RITS. In order to achieve this, the securities are locked in CHES until confirmation is received that the cash leg has settled in RITS, at which point the securities are released to the accounts of the purchasing participants. This process typically takes around 15 minutes. However, given that settlement of each leg is not strictly simultaneous, it is possible for the payments leg to be completed but for something to occur (such as an operational incident) that prevents the securities leg from being completed.

If such an incident occurred and ASX was unable to resolve the issue on the day, ASX’s most likely option would be to defer settlement of securities to the following day. Such a disruption occurred in November 2020 resulting in a delay in the settlement of securities of several hours, but settlement was concluded by the end of the day. The 2021 Assessment recommended that ASX undertake analysis of the legal certainty of powers that would be used to support the deferral of the movement of cash securities in such circumstances, and the Bank has been engaging with ASX as it completes this work.

**Recommendation:** ASX should complete its analysis of the legal certainty of powers used to support deferral of the movement of cash securities if this cannot be achieved on the same day as the transfer of cash.

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<sup>40</sup> DvP settlement on a model 3 basis refers to settlement of both securities and funds on a net basis, with final transfers of both securities and funds occurring at the end of the processing cycle.

<sup>41</sup> DvP settlement on a model 1 basis refers to settlement of both securities and funds on a trade-by-trade (or gross) basis.

<sup>42</sup> For example, some trades that are reported after markets have closed and through options exercise, and trades without settlement dates.



## 4.6.2 Settlement finality

The FSS require that an SSF ensure clear and certain final settlement. The finality of settlement in ASX Settlement is protected by its approvals as a multilateral netting arrangement under Part 3 of the *Payment Systems and Netting Act 1998* (PSNA) and as an approved RTGS system under Part 2 of the PSNA. The extensive changes to the ASX Settlement operating rules required to support CHES replacement mean that it is necessary to confirm that these protections will continue to apply once the new system is in place. In particular:

- ASX will need to provide legal analysis demonstrating that the existing multilateral netting approval continues to apply to the CHES batch following the proposed amendments to the ASX Settlement operating rules. This is required to provide certainty that Part 3 of the PSNA continues to protect the finality of batch settlement. If this certainty cannot be provided then ASX Settlement will need to apply for a new multilateral netting approval and provide evidence that it meets the necessary criteria for approval.
- Since the new CHES RTGS service has been substantially redesigned compared to the existing service, ASX Settlement will be required to apply for a new approval of CHES RTGS as an approved RTGS system. This approval provides protection from the 'zero-hour' rule in the event of a participant entering external administration by making all transactions settled on the day of an insolvency irrevocable and unable to be unwound simply because of the event of external administration.

**Recommendation:** ASX Settlement should apply for approvals as an approved RTGS system and as a multilateral netting arrangement under the PSNA, or in the case of the multilateral netting approval provide the Bank with legal analysis demonstrating why its existing approval remains valid once changes to the ASX Settlement operating rules required to support the introduction of CHES replacement have been made.

## 4.7 Clearing risk enhancements

CHES is the core clearing system for ASX Clear, and supports key risk and default management functionality. The new system should retain this functionality and in some areas enable ASX Clear to enhance its management of clearing risks.

### 4.7.1 Back-out algorithm

In the current CHES system, if there was a clearing participant default and ASX Clear had insufficient prefunded liquidity to be able to meet the payment obligations of the defaulting participant (that is, the defaulting participant is a net purchaser of securities), ASX Clear would enter into offsetting transaction arrangements (OTAs) with its participants in order to fund any remaining liquidity requirements. An OTA is a rules-based repo transaction with non-defaulting participants used to generate liquidity from securities that the defaulting participant was due to purchase.<sup>43</sup> ASX Clear would use its back-out algorithm to identify which securities are subject to an OTA (and in net terms removed from settlement in that day's batch).

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<sup>43</sup> Under the first leg of the OTA, ASX Clear would re-deliver the stock to a non-defaulting participant that was due to sell the securities in question in return for payment equal to the amount of the payment obligation of ASX Clear to that participant. ASX Clear would agree to repurchase the stock the next business day under the second and final leg of the transaction.

The objective of the back-out algorithm is to maximise the number and value of units settled and minimise the impact of any changes in settlement obligations to other clearing participants, provided that the defaulting participant's net payment obligation can be brought to zero and any increase to the payment obligations of non-defaulting clearing participants can be avoided. However, there is limited documentation on how the back-out algorithm is designed, which makes it difficult to accurately model or predict precise outcomes for specific participants.

The back-out algorithm in the replacement CHES system has been redesigned to address some of the limitations in the current system. The new arrangements will include a default scenario simulation tool, which will allow the back-out algorithm to be run in simulations with production data. The default scenario simulation tool will be available for use in default management fire drills from go-live. ASX is also investigating whether the default scenario simulation tool can be used during an actual default to assist with decision-making and 'what-if' scenario analysis.

#### 4.7.2 Segregation and portability

Under current arrangements, ASX Clear utilises a structure that commingles house and client positions and collateral for cash market transactions. However, the standard on segregation and portability (CCP Standard 13) sets out that a CCP should maintain client positions and collateral in individually segregated accounts or in omnibus client accounts (or equivalent) to enable the segregation of positions and collateral of a participant's clients from that of the participant. ASX Clear currently makes use of 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.

The CHES replacement system has been designed in a way that it can be configured to support segregation of client and house positions and collateral. The Bank's recent assessments have recommended that ASX conduct an assessment of whether the protections from existing client protection arrangements remain materially equivalent to those provided by individual client or omnibus segregation, which should include engagement with industry on the impact of different client segregation operating models. ASX should consult with the Bank and ASIC on the outcome of this assessment within 12 months of the CHES replacement going live.

**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 provide the Bank with a plan for implementing omnibus or individual client segregation, or a satisfactory explanation of how any alternative arrangements satisfy the requirements of the FSS, after consulting with industry stakeholders and within 12 months of the CHES replacement system going live.

#### 4.7.3 Intraday margining

Currently, margining in cash markets is carried out using end-of-day positions and determined overnight, and collected the following morning, and CHES does not support the capability to calculate and call margin for changes in intraday cash market exposures. The CHES replacement system will be able to provide the data required for the determination of netted trade obligations for participants

intraday from go-live. This functionality is required to support any future changes to provide intraday margining of cash market positions.

**Recommendation:** ASX Clear should report to the Bank ahead of the CHES replacement system going live on how it intends to introduce the intraday margining of cash market positions.

## Appendix A: Summary of Progress 2021/22

The tables below summarise actions taken by the ASX CS facilities during the 12 months to June 2022 (the assessment period) to address recommendations identified in the Bank’s 2021 *Assessment of ASX Clearing and Settlement Facilities*, as well as outstanding recommendations from previous years. Table 6 sets out the current status and progress for recommendations yet to be fully addressed. Table 7 provides a summary progress for recommendation that ASX fully addressed over the year to June 2022.

**Table 6: Recommendations Open at 30 June 2022  
Current Status and Progress**

Reference*	Recommendation	Standard	Facility	Progress
2021- 1	<b>Governance.</b> The objectives, strategies and goals for each CS facility should be documented and communicated within the ASX group. The objectives should explicitly place a high priority on the safety of the facility and explicitly support the stability of the financial system and other relevant public interest considerations. This should include a statement as to how “financial stability” can be practically understood by decision-makers within the CS facilities. It should also set out the strategies that have been adopted to safeguard system stability. CS Board processes should include a system for monitoring progress against the strategy and objectives.	CCP/SSF 2	All	Drafting of the CS facility strategy document has commenced.
2021-3	<b>Governance.</b> As soon as practicable in the circumstances of the current transition to ASX’s new operating model, ASX should document governance arrangements that set out clear and direct lines of responsibility and accountability for each of the CS facilities’ businesses as required by CCP Standard 2.2/SSF Standard 2.2. This can be done by way of an accountability map that contains the names of staff with senior executive responsibility for all or part of each CS facility’s operations. The accountability map could contain details of the reporting lines and lines of responsibility for those senior executives. Such a map would demonstrate the lines of reporting from those senior executives through to a board or board committee within the ASX Group and specify the relevant board or board committee.	CCP/SSF 2	All	The ASX Board approved an Accountability Map, which was shared with the Bank in May. A revised version of the document was provided in August following further discussion with the Bank.  See section 2.1.2.
2021- 4	<b>Governance.</b> ASX should clearly specify the roles and responsibilities of directors and of the senior executives referred to in Governance Recommendation 3. This	CCP/SSF 2	All	The ASX Board approved a set of Accountability Statements, which were shared with the Bank in May. The Bank considers

Reference*	Recommendation	Standard	Facility	Progress
	<p>can be done by creating, for each such person, an accountability statement containing details of:</p> <p>(a) the part of the CS facility's business for which that person has senior executive responsibility; and</p> <p>(b) the responsibilities of that person.</p> <p>The accountability statement for the CEO and Managing Director should document his or her responsibility for ensuring that the CS Lead Executive has access to sufficient resources for the operation of the CS facility.</p>			<p>that further work is required to ensure these documents provide a clear and comprehensive view of accountabilities.</p> <p>See section 2.1.2.</p>
2021-15	<p><b>Governance.</b> The ASX boards should continue their emphasis on stakeholder management, potentially through the creation of a stakeholder committee. This should also include more regular meetings with key stakeholders.</p>	CCP/SSF 2	All	<p>The ASX Limited Board has reviewed the need for a stakeholder committee but concluded its functions could be adequately covered under existing forums.</p> <p>ASX completed a stakeholder mapping process. The process of stakeholder review resulted in a number of new or enhanced initiatives to improve stakeholder engagement.</p> <p>Further actions are planned for the next assessment period:</p> <ul style="list-style-type: none"> <li>the ERMF will be updated to incorporate a greater focus on stakeholder management</li> <li>ASX is assessing the need for enhanced representation in the Austraclear user group</li> <li>a revised CHES replacement engagement plan is being developed</li> <li>ASX is designing new stakeholder metrics to align with KRIs and improve understanding and reporting of stakeholder sentiment.</li> </ul> <p>ASX has developed a Stakeholder Charter. This information was published on the ASX website in August.</p>
2021-16	<p><b>Governance.</b> The CS facilities should publish a Stakeholder Management Charter, which identifies groups of stakeholders and articulates the ASX's approach to engaging with each group of stakeholders.</p>	CCP/SSF 2	All	<p>ASX published a Stakeholder Charter in August 2022.</p>
2021-17	<p><b>Governance.</b> The CS boards should require the CS Lead Executive/s to complete an annual self-assessment of compliance with the FSS.</p>	CCP/SSF 2	All	<p>ASX has agreed to complete a self-assessment by end-2022.</p> <p>See section 2.1.3.</p>
2018-1	<p><b>CCP Resilience Guidelines.</b> To align financial risk management practices and governance arrangements with the CCP Resilience Guidance, the ASX CCPs should continue to implement plans to:</p> <p>(a) enhance the comprehensiveness of stress testing to ensure risks are appropriately identified, captured and stressed</p>	CCP 2, 4, 7	Both CCPs	<p>The ASX CCPs are implementing a multi-year work program to address this recommendation. During the assessment period:</p> <p>(a) ASX Clear and ASX Clear (Futures) progressed work to establish enhanced stress-test scenario methodologies, and expect to</p>

Reference*	Recommendation	Standard	Facility	Progress
	<p>(b) enhance analysis and justification of assumptions used in stress testing models so that risks are adequately captured</p> <p>(c ) 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</p> <p>(d) 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</p> <p>(e) 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.</p>			<p>implement a range of new scenarios during the next assessment period.</p> <p>(b) ASX Clear set concentration limits to cap the amount of individual equities that can be posted as collateral.</p> <p>(c) ASX Clear has completed work on the approach to remove excess collateral from its stress-testing methodology, but this is yet to be implemented.</p> <p>(d) ASX continued to formalise and document roles and processes in relation to the governance of risk management (see section 3.7.1).</p> <p>(e) ASX commenced work to enhance its CCP Reporting and Disclosures Policy which it expects will be completed in the next assessment period (see section 3.9.4).</p>
2021-18	<b>Framework for the comprehensive management of risks</b> ASX should establish a process to periodically conduct systematic assessments of the range of potential risks other entities may pose to its CS facilities and the risks ASX CS facilities could potentially pose to other entities.	CCP/SSF 3	All	Work is underway to develop and implement a systematic assessment process; this is scheduled to be delivered in December.
2020-1	<b>Procyclicality.</b> Consistent with the CCP Resilience Guidance, the ASX CCPs should develop a systematic procyclicality framework designed to avoid destabilising increases in margin and other financial risk requirements during periods of heightened market volatility. This framework should include an appropriate methodology for measuring the degree of procyclicality in the CCPs' risk models.	CCP 5, 6	Both CCPs	<p>During the assessment period, the ASX CCPs completed the introduction of margin floors for all products margined using SPAN. ASX Clear will consider developing similar floor methodologies for cash market products as part of the ongoing margin model review. ASX will work to develop an appropriate methodology for measuring the degree of procyclicality in its risk models.</p> <p>See section 3.4.</p>
2020-2	<b>Late-in-day price movements.</b> The ASX CCPs should put in place arrangements that allow them to monitor and manage exposures arising from large late-in-day price movements, including movements that exceed the coverage provided by initial and additional margin. For ASX Clear (Futures), this also applies to price movements during the overnight trading session.	CCP 6	Both CCPs	<p>During the assessment period, ASX Clear (Futures) implemented a process for the collection of overnight variation margin. However, both CCPs will need to make further progress in implementing arrangements to monitor and manage exposures arising from late-in-day price movements.</p> <p>See section 3.5.3.</p>
2017-1	<b>Liquidity add-ons.</b> ASX Clear should complete its review of add-ons to manage liquidity risk for cash market products and implement these add-ons if the review concludes they are needed.	CCP 6	ASX Clear	ASX plans to complete its review of liquidity add-ons for cash market products by June 2023.

Reference*	Recommendation	Standard	Facility	Progress
2020-3	<b>Liquidity risk.</b> ASX Clear (Futures) should take all necessary steps to establish an ability to access liquidity from the Bank in respect of a defaulting participant's non-cash collateral.	CCP 7	ASX Clear (Futures)	ASX Clear (Futures) has implemented arrangements enabling it to access liquidity from the Bank via ASX Clearing Corporation. ASX Clearing Corporation will need to update its RITS membership agreement to ensure that it is consistent with this arrangement.  See section 2.5.1.
2020-4	<b>Exchange-of-value settlement.</b> ASX Settlement should complete analysis of the legal certainty of powers used to support deferral of the movement of securities if this cannot be achieved on the same day as transfer of cash.	CCP 11 SSF 10	ASX Settlement and ASX Clear	The Bank is engaging with ASX on draft legal analysis supporting the legal certainty of deferral.  See section 4.6.1.
2019-1	<b>Segregation and portability.</b> 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 CHES replacement system going live.	CCP 13	ASX Clear	No action is required until the CHES replacement system goes live.  See section 4.7.2.
2020-5	<b>CHES capacity and system replacement.</b> ASX should implement the new clearing and settlement system for cash market transactions as soon as this can be safely achieved by ASX and users of CHES. In the short term, ASX should complete work underway to increase the joint capacity of the current CHES and CORE systems.	CCP 16 SSF 14	ASX Clear and ASX Settlement	ASX has increased the daily capacity of the CHES and CORE systems to support 10 million and 7.5 million trades respectively.  ASX is progressing towards implementing the CHES replacement system, although the go-live date has been delayed from April 2023.  See sections 2.4.1 and 4.2.
2020-6	<b>Operational incidents.</b> ASX should implement its response to findings from the IBM review of the ASX Trade Refresh project, ensuring that any relevant steps are taken to apply lessons learned to its clearing and settlement operations, and in particular to the CHES replacement program. ASX's assessment of how relevant lessons apply to the CHES replacement program should be subject to independent external review.	CCP 16 SSF 14	All	ASX has appointed EY to roles as the independent expert overseeing its response to IBM review findings and implementation of these for CHES replacement under new licence conditions imposed in 2021. EY concluded 24 of the 59 recommendations had been addressed at 30 June, with 19 of the 49 actions specific to CHES replacement closed. Further, the CHES replacement program's assessment of the impact of IBM recommendations has been subject to independent review by EY.
2020-7	<b>Operational Risk Management.</b> The ASX CS facilities should continue to embed the use of new systems and processes supporting change management, incident management and knowledge management, and use these systems to identify, monitor and manage operational risks at an enterprise-wide level. ASX Internal Audit should complete its review of the effectiveness of these systems and processes in practice.	CCP 16 SSF 14	All	The ASX CS facilities have continued to embed the use of new systems and processes, including to identify, monitor and manage operational risks at an enterprise wide level.  ASX Internal Audit completed its internal review and commissioned external reviews of ASX's risk and compliance management frameworks, which were completed during the assessment period. ASX will implement the recommendations from these reviews over the next year.

Reference*	Recommendation	Standard	Facility	Progress
				See section 2.4.2.
2020-8	<b>Risk management systems.</b> The ASX CCPs should implement plans to ensure that their core systems have the functionality to fully support their risk management approach, including by migrating processes currently operated on non-core systems to core systems.	CCP 16	Both CCPs	ASX established a five-year strategic roadmap for its risk management systems that includes actions to address this recommendation. In addition, ASX has completed a review of the systems infrastructure required to support its risk management approach over the long-term. During the assessment period, ASX made some progress by migrating its overnight margin call calculations from a process located on non-core infrastructure to one run in its core systems.
2021-19	<b>Regulatory reporting.</b> ASX should review the quality controls and systems it has in place to systematically identify and bring to the Bank's attention information required to be reported to the Bank, and address any gaps identified as part of this review. ASX should ensure that these controls are also in place for its implementation of the Bank's upgraded FMI data collection.	CCP 21 SSF 19	All	Work to improve ASX's regulatory reporting systems and processes is underway.  See section 2.3.

\* Referencing indicates the year the recommendation was first raised and the order in which the recommendation appears in this Assessment.

**Table 7: Recommendations Fully Addressed at 30 June 2022**

Reference	Recommendation	Standard	Facility	Implementation measures taken over period
2019-2	<b>Legal basis.</b> The ASX CS facilities should enhance their process for five-yearly review of operating rules and procedures to include a systematic process for benchmarking against industry standards and market protocols, and identifying rules and procedures that are redundant or inconsistent, or where changes are otherwise desirable.	CCP/SSF 1	All	ASX made amendments to its process for review of operating rules and procedures to ensure that rules identified as having systemic importance are benchmarked against global peers/industry standards at least once every five years, and to outline a systematic process for identifying rules and procedures that are desirable to introduce, or existing rules and procedures that are redundant or inconsistent.
2021-2	<b>Governance.</b> ASX should introduce clearer lines of responsibility and accountability for each CS facility as required by CCP Standard 2.2/SSF Standard 2.2. An appropriate way to do this would be to appoint one or more identifiable executives, the 'CS Lead Executive/s', accountable to the relevant CS board for the operation of each of the CS facilities. The CS Lead Executive/s should also be accountable for the achievement of strategies and objectives determined by the relevant CS board. The relevant CS board should have input into both the performance assessment and remuneration of the CS Lead Executive/s.	CCP/SSF 2	All	Group Executives for Markets, and Securities and Payments appointed as CS lead executives.  See section 2.1.2



Reference	Recommendation	Standard	Facility	Implementation measures taken over period
2021-5	<b>Governance.</b> ASX's performance and remuneration policies and frameworks should ensure that any failure by a person identified in Governance Recommendation 3 to appropriately discharge their responsibilities will be reflected in any variable remuneration payable to that person. This will promote the soundness and effectiveness of risk management of the CS facilities as required by CCP Standard 2.5/SSF Standard 2.5.	CCP/SSF 2	All	ASX has implemented a revised framework for determining performance and remuneration outcomes.
2021-6	<b>Governance.</b> The administrative reporting line for the General Manager, Internal Audit should be to the Managing Director and CEO of the ASX Group.	CCP/SSF 2	All	General Manager, Internal Audit administrative reporting line adjusted to Chief Financial Officer. The Bank has accepted this revised reporting line.
2021-7	<b>Governance.</b> ASX should conduct an annual skills audit of each CS board in the same manner as the audit currently conducted for the ASX Limited board.	CCP/SSF 2	All	CS directors were invited to complete a skills self-assessment in May. The results of the self-assessment and a finalised CS Boards Skills Matrix were presented to the Boards in June.
2021-8	<b>Governance.</b> The CS boards should formally approve the application of any group-wide policies, procedures or governance documentation to the CS facilities. Such policies should include a statement, approved by the CS boards, as to the manner in which the relevant policy, procedure or document applies to the CS facilities.	CCP/SSF 2	All	Documented guidelines for approval of documents with specific application to CS facilities have been approved by the Boards. ASX conducted a review of relevant policies and other governance documents. Processes relating to Board papers and agendas took effect in June.
2021-9	<b>Governance.</b> The application of the following arrangements for ASX Clear and ASX Settlement should be extended to ASX Clear (Futures) and Austraclear: (a) the requirement that the boards shall comprise at least 50 per cent non-executive directors who are not also directors of ASX Limited and that the non-ASX Limited directors can also comprise a quorum (b) the requirement that the Chair is not also an ASX Limited director (c) provision for meetings of non-ASX Limited directors. These meetings should consider all potential conflicts of interest between the CS facilities and other ASX Group entities. The composition and appointment of the Chairs of the boards of ASX Clear (Futures) and Austraclear should be changed accordingly.	CCP/SSF 2	All	CS Boards Charter has been revised, reflecting changes consistent with the recommendation. A non-ASX Limited Chair has been appointed to Austraclear and ASX Clear (Futures).  See section 2.1.1.
2021-10	<b>Governance.</b> The non-ASX Limited directors should be represented in board-level discussions of the supervision of risks to the CS facilities. This includes involvement at any board or committee meeting which considers risks or the risk appetite of the CS facilities.	CCP/SSF 2	All	Technology Committee must include at least one non-ASX Limited CS director. One non-ASX Limited CS director required for quorum.  Audit and Risk Committee (ARC) Charter includes a standing invitation for a representative of the non-ASX directors of the CS boards to attend. ARC may request that this person withdraw for any part of a meeting.
2021-11	<b>Governance.</b> ASX should continue to explore ways to provide its boards with access to skills, experience and networks relevant to large technology project implementation.	CCP/SSF 2	All	ASX has established the Technology Committee to oversee technology project implementation. The committee has the

Reference	Recommendation	Standard	Facility	Implementation measures taken over period
				ability to appoint external experts to assist it in carrying out its responsibilities. See Appendix B.1.
2021-12	<b>Governance.</b> The ASX Group boards should strengthen their oversight of technology project implementation. To achieve this, ASX should proceed with its proposal to establish a board committee to monitor technology project implementation. The respective responsibilities of this committee and the ARC will need to be carefully defined.	CCP/SSF 2	All	See 2021-11 above.
2021-13	<b>Governance.</b> ASX Group should adopt: (a) structured and documented processes for director recruitment and board renewal, ultimately including a tenure policy (b) a more systematic approach to board education with an emphasis on supporting directors in the supervision of ASX's technology program (c) systems for considering and implementing feedback arising from the annual board feedback survey (d) more rigorous director performance management (e) documented guidance as to the matters which should be referred to the various board meetings.	CCP/SSF 2	All	New processes for recruitment and appointment of non-executive ASX and CS directors, and director tenure guidelines, have been implemented. These changes were reflected in arrangements related to director independence and the Nomination Committee Charter.  Changes to the structure of Board days took effect in June.  A set of guidelines to assist management to identify the most appropriate forum for consideration of information they wish to raise for discussion, approval or noting by directors was approved in May.
2021-14	<b>Governance.</b> ASX should take steps to improve their identification and management of intragroup conflicts of interest. The non-ASX Limited directors should have unqualified access to independent legal advice and other expert advice on matters where the interests or obligations of a CS facility could potentially conflict with the interests of another entity in the ASX Group. To facilitate this, ASX should consider establishing a small unit of staff dedicated to supporting the CS Boards, including by providing assistance with obtaining external advice.	CCP/SSF 2	All	Amendments to the ASX Group Support Agreement confirm that CS directors have access to external advice, paid for by ASX Operations. Amendments to the same effect were incorporated in the revised CS Boards Charter in May.  The ASX Boards considered the issue of dedicated CS support and determined that they do not require a separate unit of staff dedicated to supporting the CS Boards.
2020-9	<b>Margin period of risk.</b> The ASX CCPs should review whether their calibration of MPOR assumptions and margin add-ons is consistent with the time it would take to liquidate large and diverse portfolios, taking into account the sequencing of liquidation in a default scenario.	CCP 6, 12	Both CCPs	ASX conducted an analysis concluding that the calibration of MPOR assumptions and margin add-ons is consistent with the time it would take to liquidate large and diverse portfolios, taking into account the sequencing of liquidation in a default scenario.  See section 3.3.3.

\* Referencing indicates the year the recommendation was first raised and the order in which the recommendation appears in this Assessment.

**Table 8: Summary of Progress Against 2021 Areas of Supervisory Focus**

Development	Standard	Facility	Actions
<i>Special topic</i>			
<p><b>2021/22 special topics.</b> The Bank will carry out special topic assessments of the ASX CS facilities' margin arrangements and the CHES replacement system, with a secondary focus on the facilities' collateral arrangements, exchange-of-value settlement arrangements and SSF central securities depository arrangements</p>	<p>CCP Standards 5, 6, and 11, SSF Standards 5, 9 and 10</p>	<p>All facilities</p>	<p>See chapter 3 (Margin) and chapter 4 (CHES replacement, as well as exchange-of-value and central securities depositories for ASX Settlement). Special topic reviews of: exchange-of-value settlement arrangements (Austraclear); central securities depository arrangements (Austraclear); and collateral were deferred.</p>
<p><b>Risk management framework.</b> The Bank will monitor how recent developments, including revisions to the CS Boards Charter, ASX's new organisational model and the recommendations of this Assessment, are reflected in the upcoming review of ASX's Enterprise Risk Management Framework and in updates to the underlying frameworks for settlement and clearing risk. The Bank will discuss with ASX how this review process takes into account:</p> <ul style="list-style-type: none"> <li>• how any gaps in the ERMF contributed to issues experienced in the ASX Trade Refresh project and CHES replacement program</li> <li>• whether the ERMF worked as intended during those events</li> <li>• any changes that are required to address or support recommendations from the IBM review of the ASX Trade outage and the EY reviews of the CHES Replacement program.</li> </ul>	<p>CCP and SSF Standard 3</p>	<p>All facilities</p>	<p>The revised ERMF (November 2021) was updated to reflect revised documentation and ASX's new operating model (see section 2.2).  See chapter 4 for discussion of the CHES replacement program and follow up to IBM review.</p>
<i>Review of planned work</i>			
<p><b>CCP Resilience Guidance.</b> Implementation of ASX's plans to address gaps against the CCP Resilience Guidance.</p>	<p>CCP Standards 2, 4, 5, 6, 7 and 15</p>	<p>Both CCPs</p>	<p>The CCPs continue to implement a multi-year work program to address identified gaps against the CCP Resilience Guidance.</p>
<p><b>Default management and recovery.</b> Implementation of ASX's work plan to enhance its default management and recovery frameworks, taking into account potential gaps identified in the 2019/20 special topic assessment. These include:</p> <ul style="list-style-type: none"> <li>• A review of the legal certainty of arrangements for ASX Limited to replenish ASX contributions to the CCPs' default funds.</li> <li>• The implementation of planned enhancements to fire drills, lessons learned from the Nasdaq Clearing AB default and benchmarking to the Committee on Payments and Market Infrastructures-International Organization of Securities Commissions (CPMI-IOSCO) paper on Central Counterparty default management auctions – Issues for consideration.</li> </ul>	<p>CCP Standards 12, 2, 3, 4, 7 and 14,  SSF Standards 11, 2 and 3</p>	<p>All facilities</p>	<p>ASX continued to implement the work plan to enhance its default management and recovery frameworks, and this is expected to continue into the future. Of note:</p> <ul style="list-style-type: none"> <li>• The review of the legal certainty of arrangements for ASX Limited to replenish contributions to the ASX CCPs' default funds will be deferred to 2022/23.</li> <li>• ASX completed a gap analysis against the CPMI-IOSCO paper on default management auctions and shared its results with the Bank; ASX Clear (Futures) introduced amended Operating Rules and Procedures with respect to its framework for default management auctions.</li> </ul>

<ul style="list-style-type: none"> <li>The continued enhancement of its recovery plan via benchmarking it to the CPMI-IOSCO Recovery of financial market infrastructures – Revised report and updating it for the gaps identified.</li> <li>The implementation of enhancements to the default management framework including periodic audits and improved documentation.</li> </ul>			<ul style="list-style-type: none"> <li>ASX will perform a gap analysis against the CPMI-IOSCO guidance on recovery of financial market infrastructures by December 2022, and share the outcome with the Bank.</li> <li>ASX updated its documentation to clarify the role of the ASX Limited Board and the CS Boards in default management.</li> </ul>
<p><b>Cyber resilience.</b> Continued enhancement of ASX’s cyber resilience via:</p> <ul style="list-style-type: none"> <li>the implementation of actions identified in ASX’s Cyber Strategy</li> <li>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.</li> </ul>	CCP Standard 16, SSF Standard 14	All facilities	<p>During the assessment period, ASX continued to implement enhancements to its cyber security practices in line with actions set out in its Cyber Strategy.</p> <p>See section 2.4.4.</p>
<b>Other</b>			
<p><b>Stress test severity.</b> The Bank will discuss with ASX how it plans to validate whether its stress scenarios could cover an event of similar severity as the 1987 stock market crash, taking into account differences in the current market environment.</p>	CCP Standard 4, 7	Both CCPs	<p>ASX has engaged a third party to complete an independent validation of whether its stress scenarios could cover an event of similar severity as the 1987 stock market crash, taking into account differences in the current market environment.</p> <p>ASX has made plans to establish a Stress Test Advisory Group during the next assessment period.</p>
<p><b>ASX Group support agreement.</b> 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.</p>	CCP Standard 14 and SSF Standard 12	All facilities	This review has been deferred to 2022/23.

# Appendix B: Background Information

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## B.1 ASX group structure and governance

The ASX Group operates two types of CS facilities:

- *CCPs*. A central counterparty (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. These arrangements provide substantial benefits to participants in terms of counterparty risk management as well as greater opportunities for netting of obligations. However, they expose the CCP to risk if a participant defaults on its obligations, since the CCP must continue to meet its corresponding 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.
- *SSFs*. A securities settlement facility (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) settlement arrangements that mitigate an SSF's principal risk (i.e. that the securities are delivered but no cash payment received).

The ASX Group operates two CCPs and two SSFs:

- *ASX Clear Pty Limited* provides CCP services for ASX-quoted cash equities, debt products and warrants traded on the ASX and Cboe markets, equity-related derivatives traded on the ASX market, Cboe-quoted warrants, Transferable Custody Receipts and funds traded on Cboe, and National Stock Exchange of Australia Pty Ltd (NSXA) quoted securities traded on the NSXA market. The provision of CCP services for Cboe and NSXA is provided under the Trade Acceptance Service (TAS), which allows ASX Clear to act as a CCP for trades executed on Approved Market Operator (AMO) platforms in accordance with the ASX Clear Operating Rules and Procedures.
- *ASX Clear (Futures) Pty Limited* 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 interest rate derivatives (IRD).<sup>44</sup>
- *ASX Settlement Pty Limited* provides SSF services for ASX-listed cash equities, debt products and warrants traded on the ASX and Cboe markets. The provision of SSF services for Cboe 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; these include NSXA and the Sydney Stock Exchange Limited. ASX Settlement also provides for subscriptions and redemptions in unlisted managed funds through the mFund Settlement Service.

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<sup>44</sup> Equity index futures and options on these futures are cleared through ASX Clear (Futures), while options over equity securities or indexes are cleared through ASX Clear.

- *Austraclear Limited* 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.

The four CS facilities form part of the ASX group of companies (see Figure 2), and are controlled by ASX Limited through two holding companies – ASX Clearing Corporation Limited (ASXCC) and ASX Settlement Corporation Limited. ASX Clear and ASX Clear (Futures) are subsidiaries of ASXCC, which manages the financial 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. 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.

**Figure 2: ASX Group Structure**



ASX Limited is the ultimate parent company of the four CS facilities and is listed on the ASX market. The ASX Limited Board is responsible for overseeing the processes for identifying significant risks to ASX and for ensuring that appropriate policies, as well as adequate control, monitoring and reporting mechanisms are in place.<sup>45</sup> This means that the ASX Group operates on a day-to-day basis as a single group, rather than as a collection of individual entities.

As corporate entities, the CS facilities are required to have their own boards. The CS Boards focus on management of clearing and settlement risk and oversee compliance with the FSS and consistency with the international PFMI standards.<sup>46</sup> A number of directors of the CS facilities' boards (CS Boards) are also directors of ASX Limited. This can give rise to commercial conflicts of interest as ASX Clear and ASX Settlement provide clearing and settlement services to market operators who are competitors of ASX Limited. It can also give rise to more general conflicts of interest in cases where the interests of the CS facilities diverge from those of the broader ASX Group (e.g. in the allocation of resources across the group).

45 See ASX Constitution and ASX Board Charters. Available at <<https://www2.asx.com.au/about/corporate-governance>>.

46 See CS Board Charters. Available at <<https://www2.asx.com.au/about/corporate-governance>>.

The ASX Limited Board has established four committees to assist in discharging its role and responsibilities: the Audit and Risk Committee (ARC); the Technology Committee; the Nomination Committee; and the Remuneration Committee.<sup>47</sup> These committees also undertake activities on behalf of the CS facilities, although the CS Boards are have the primary role for clearing and settlement risks. The Audit and Risk Committee (ARC) review and oversee systems of risk management, internal control and regulatory compliance. The Technology Committee is responsible for review and oversight of the ASX Group's technology and information strategies and performance. This includes oversight of ASX's technology project implementation and management of cyber resilience, including the CHES replacement program.

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

- The Risk Committee, which ensures the adequacy and appropriateness of the risk management frameworks, policies, process and activities of the ASX Group, including the ERMF.
- The Regulatory Committee, which oversees licence compliance matters.
- The Technology and Cyber Committee, which oversees IT security and systems and incident management.

ASX's Executive Committee operates in parallel to these three executive-level committees.<sup>48</sup> The Executive Committee reports to the ASX Limited Board and CS Boards on strategic and business initiatives, non-risk related frameworks and HR matters.

To assist in managing risk across the organisation, ASX uses the 'three lines' model. This is intended to provide a clear organisational structure, clarify responsibilities for managing risks and controls across the business, and promote a culture of risk ownership among frontline managers. The first line is made up of the operational management staff who are accountable for risk management within their business functions. The second line includes the independent risk management and compliance functions which oversee, facilitate and assist Line 1's risk management.

The third line is ASX's Internal Audit function which provides independent reviews on internal control systems and procedures, as well as assurance on the manner in which Lines 1 and 2 achieve the risk objectives.<sup>49</sup> ASX Internal Audit has full access to the Audit and Risk Committee, as well as unrestricted access to all ASX records, property and personnel. The general manager of Internal Audit reports to the Chair of the Audit and Risk Committee, with an administrative reporting line through to the Chief Financial Officer.

ASX also operates external standing forums to gauge the views of participants and other stakeholders. These include:

- 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.

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47 See ASX Board Committee Charters. Available at <<https://www2.asx.com.au/about/corporate-governance>>.

48 See ASX Executive Team. Available at <<https://www2.asx.com.au/about/our-board-and-management/our-executive-team>>.

49 See ASX Internal Audit Charter. Available at <<https://www2.asx.com.au/about/corporate-governance>>.

- The ASX Clear (Futures) Default Management Group (DMG), which is comprised of OTC participants and is consulted on aspects of the default management process.
- 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.<sup>50</sup>
- Advisory user groups for particular products and services (i.e. ETOs, interest rate derivatives and Austraclear), which are forums for participants to provide feedback on those products and services.

See section 4.3.4 for ASX’s external engagement in relation to the CHES replacement program.

## 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’ 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. In addition, the Bank is responsible 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 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 (see section 2.4.1). 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.<sup>51</sup> Based on the information gathered, the Bank undertakes regular assessments of the ASX CS facilities.

The ASX CCPs are recognised by the European Securities and Markets Authority (ESMA) as ‘third-country CCPs’. This allows the ASX CCPs to continue to provide clearing services to participants established in the European Union (the CCPs have transitional recognition in the UK following its withdrawal from the EU). ASX Clear (Futures) was also granted an exemption from registration as a Derivatives Clearing Organization 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

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<sup>50</sup> See ASX Business Committee Charter. Available at <<https://www.asx.com.au/cs/documents/charter-of-the-business-committee.pdf>>.

<sup>51</sup> For more information, see RBA (2021), ‘[The Reserve Bank’s Approach to Supervising and Assessing Clearing and Settlement Facility Licensees](#)’, 25 February.



a memorandum of understanding (MoU) with each of ESMA and the US Commodity and Futures Trading Commission 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 Swiss Financial Market Supervisory Authority (FINMA) also recognises ASX Clear (Futures) as a foreign central counterparty, which allows it to grant Swiss market participants supervised by FINMA direct access to its facilities as clearing participants.

The Bank has a MoU with the RBNZ which establishes cooperation arrangements relevant to ASX Clear (Futures)' activities in NZD-denominated products. ASX Clear (Futures) has been designated as a settlement system under the RBNZ Act.

### **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 capital requirements of between \$5 million and \$20 million, depending on the number of third parties they clear for. These base capital requirements are supplemented by additional capital requirements that are designed to account for the complexity of each participant's business model, which can increase total core capital requirements to a maximum of \$35 million.
- ASX Clear (Futures) requires participants that clear futures only to hold at least \$5 million in net tangible assets (NTA) or \$25 million in NTA for remote (i.e. offshore) participants. 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 ASX's measure of 'liquid capital', NTA or Tier 1 Capital. Under certain conditions, banks and subsidiaries of banks or bank holding companies that are participants of ASX Clear (Futures) are instead subject to a fixed \$1.5 billion aggregate limit for initial margin requirements. If a participant exceeds its CBPL, it will be called for additional margin.

## 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, OTC derivatives and cash market contracts – 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.
- *Additional initial margin (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 exceed predefined limits due to changes in market value and the opening of new positions.

ASX requires that any variation and intraday margin shortfall be 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.

The margin and other collateral posted by a participant would be drawn on first in the event of that participant’s default.<sup>52</sup> 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 2).

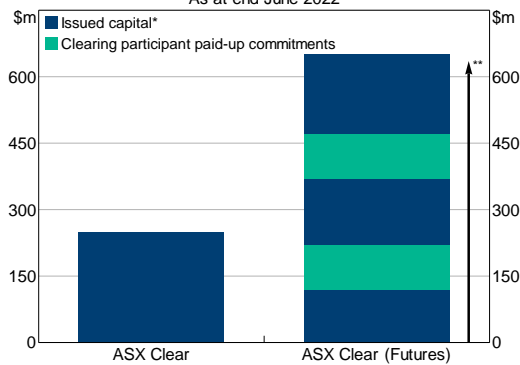
- ASX Clear’s default fund remained at \$250 million during the assessment period. This comprised \$178.5 million of own equity and \$71.5 million paid into a restricted capital reserve from the National Guarantee Fund in 2005.
- The default fund of ASX Clear (Futures) remained at \$650 million during 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 2021/22.

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

**Graph 2**  
**Prefunded Pooled Financial Resources**  
 As at end June 2022



\* For ASX Clear, issued capital includes \$71.5 million of restricted capital reserve.

\*\* The direction of the arrow reflects the order of application, starting from the bottom bar and working upward.

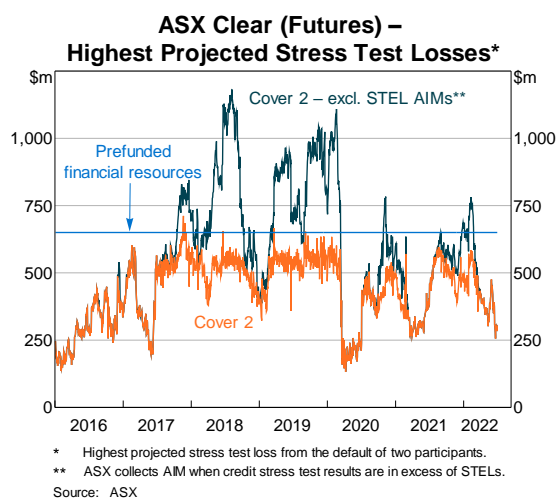
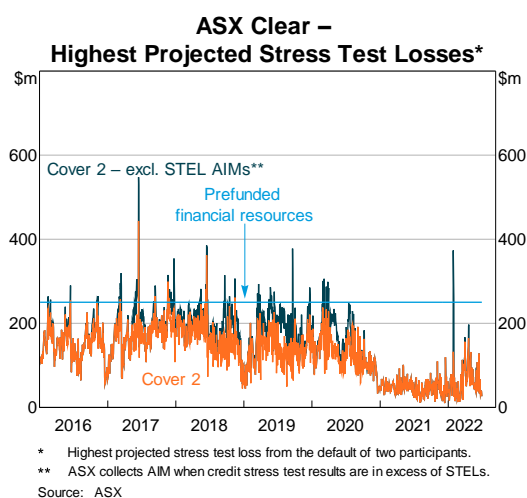
Source: ASX

## 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.

Neither ASX Clear (Futures) (Graph 3) or ASX Clear (Graph 4) experienced any days on which their credit stress test Cover 2 requirement exceeded their respective prefunded financial resources in 2021/22.

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 a participant's Stress Test Exposure Limits (STEL). The STELs are based on external agencies' credit ratings and ASX's internal creditworthiness model, 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.

**Graph 3****Graph 4**

## Liquidity risk management

Credit exposures faced by the CCPs from a participant default also create liquidity exposures. The CCPs may also face additional default liquidity exposures in excess of their credit exposures due to the timing of when payment obligations fall due. These additional exposures may be particularly large for ASX Clear, since it clears equity trades with delivery obligations. For example, if a participant with net equity purchase obligations were to default, ASX Clear’s initial liquidity exposure would include the cost of settling the payment obligations of the defaulted participant. However, the CCP must wait two days for funds to become available from selling the purchased securities due to the T+2 settlement cycle. 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 their 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 \$130 million during the assessment period. Cover 2 cash market liquidity exposures regularly exceeded the buffer over 2021/22, in which case ASX Clear would have had to rely on offsetting transactions arrangements (OTAs, which are essentially liquidity commitments from its participants) to settle any exposures above the buffer. The buffer also implicitly defines a liquidity threshold for ASX Clear’s derivatives-market exposures of \$350 million. During the assessment period, liquidity exposures at both ASX Clear and ASX Clear (Futures) remained within their respective thresholds.

A liquidity stress test breach at either CCP could, depending on the number and magnitude of the breaches, result in an increase to the CCPs' prefunded resources, or the establishment or increase in 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.

## 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 (i.e. no market risk on its net positions) 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's and ASX Clear (Futures)' default funds would be replenished up to \$150 million and \$400 million, respectively.

## Appendix C: The Assessment Framework

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This 2022 Assessment 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 2022. 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*.<sup>53</sup> 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 must, to the extent that it is 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 assessment of compliance with the FSS is based on information gathered:

- through the Bank's regular liaison with ASX staff
- as part of detailed review against specific FSS ('special topics')
- via the supply of regular data and reports by ASX
- through a series of specific information requests and meetings with ASX during and immediately following the assessment period.

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<sup>53</sup> BIS (2012), 'Principles for Financial Market Infrastructures: Disclosure Framework and Assessment Methodology', CPMI Paper No 106, 14 December.

## 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.<sup>54</sup> 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.

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54 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

ACCC	Australian Competition and Consumer Commission	CRWG	Credit Risk Working Group
AGS	Australian Government Securities	CS	Clearing and settlement
AIM	Additional initial margin	DA	Digital Asset
AMO	Approved Market Operator	DCS	Derivatives Clearing System
APRA	Australian Prudential Regulation Authority	DLT	Distributed-ledger technology
ARC	Audit and Risk Committee	DMC	Default Management Committee
ASIC	Australian Securities and Investments Commission	DMG	Default Management Group
ASX	Australian Securities Exchange	DMRF	Default Management and Recovery Framework
ASXCC	ASX Clearing Corporation	DMRWG	Default Management and Recovery Working Group
ASXSOR	ASX Settlement Operating Rules	DvP	Delivery-versus-payment
AUD	Australian dollar	EMIR	European Market Infrastructure Regulation
BAU	Business-as-usual	ERICA	Enterprise Risk, Internal Audit & Compliance Application
BCBS	Basel Committee on Banking Supervision	ERMF	Enterprise Risk Management Framework
BoE	Bank of England	ESMA	European Securities and Markets Authority
CBPL	Capital-based position limit	ETO	exchange-traded option
CCP	Central counterparty	EU	European Union
CEO	Chief Executive Officer	EUR	Euro
CFR	Council of Financial Regulators	FINMA	Financial Market Supervisory Authority
CHESS	Clearing House Electronic Sub-register System	FMI	Financial market infrastructure
CIO	Chief Information Officer	FSB	Financial Stability Board
CME	Chicago Mercantile Exchange	FSS	Financial Stability Standard(s)
COO	Chief Operating Officer	GBP	British pound sterling
CPMI	Committee on Payments and Market Infrastructures	IBM	International Business Machines Corporation
CRA	Counterparty Risk Assessment	ICC	Inter-commodity spread concession
CRO	Chief Risk Officer	IMF	International Monetary Fund
CRP	Clearing Risk Policy	IRD	Interest rate derivatives
CRQO	Clearing Risk Quantification and Oversight	IOSCO	International Organization of Securities Commissions



ITSM	IT Service Management	PSB	Payments System Board
JPY	Japanese yen	PSNA	Payment Systems and Netting Act 1998
KRI	Key risk indicator	RBNZ	Reserve Bank of New Zealand
LST	Liquidity stress testing	RITS	Reserve Bank Information and Transfer System
MoU	Memorandum of understanding	RCC	Risk Consultative Committee
MPOR	Margin period of risk	RQWG	Risk Quantification Working Group
NBFI	Non-bank financial intermediaries	SPAN	Standard Portfolio Analysis of Risk
NBO	Net broker obligation	SSF	Securities settlement facility
NSXA	National Stock Exchange of Australia	STEL	Stress test exposure limit
NTA	Net tangible assets	TAS	Trade Acceptance Service
NZD	New Zealand dollar	TMC	Tailor Made Combinations
OTA	Offsetting transaction arrangement	TRR	Temporary Recognition Regime
OTC	Over-the-counter	TRWG	Technology Risk Working Group
PFMI	Principles for Financial Market Infrastructures	UK	United Kingdom
PIRG	Participant Incident Response Group	USD	United States dollar