



ASIC

Australian Securities & Investments Commission

REGULATION IMPACT STATEMENT

Australian equity market: Further proposals

October 2012

About this Regulation Impact Statement

This Regulation Impact Statement (RIS) addresses ASIC's proposed market integrity rules and guidance to address regulatory issues resulting from recent market developments in Australia. It focuses on issues relating to:

- the automated trading environment, including high-frequency trading;
- volatility controls for extreme price movements;
- enhanced data for market surveillance; and
- pre-trade transparency and price formation in the market.

What this Regulation Impact Statement is about

- 1 This Regulation Impact Statement (RIS) addresses ASIC's proposed market integrity rules and guidance to address regulatory issues resulting from recent market developments in Australia, including:
 - (a) new risks to market integrity resulting from the growth of automated trading; and
 - (b) risks to price formation and the quality of the public markets.
- 2 We are committed to promoting confident and informed investors and financial consumers by ensuring that risks to market integrity are minimised. We are also committed to ensuring that the Australian equity market has effective price formation and provides fair, orderly and transparent trading of financial products for fundamental investors,¹ both small and large. This will in turn facilitate efficient capital raising for companies. By focusing on market integrity, we aim to ensure that:
 - (a) prices are available;
 - (b) consumers receive fair prices;
 - (c) markets operate efficiently and in an orderly way, even when there is volatility; and
 - (d) the public market continues to be liquid and efficient.
- 3 We published Consultation Paper 168 *Australian equity market structure: Further proposals* (CP 168) on 20 October 2011 to consult on proposals to address changes in Australia's equity market structure. We received 28 written submissions from stakeholders on the various policy proposals set out in CP 168. We also met with industry associations, market participants and institutional investors. We have taken these submissions into account in preparing this RIS.
- 4 In developing our final position, we have considered the regulatory and financial impact of our proposals. We are aiming to strike an appropriate balance between:
 - (a) maintaining and facilitating fair and efficient markets;
 - (b) promoting confident and informed investors and financial consumers; and
 - (c) facilitating activity in the financial services industry, including not unreasonably burdening financial services providers and facilitating the international competitiveness of the Australian financial services industry.

¹ A fundamental investor is a person that buys or sells a security based on an assessment of the intrinsic value of the security.

- 5 This RIS sets out our assessment of the regulatory and financial impacts of our proposed policy and our achievement of this balance. It deals with:
- (a) the likely compliance costs; and
 - (b) other impacts, costs and benefits.

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A Introduction

Background

- 6 Exchange markets are a type of execution venue² that enables trading in listed products, including via a ‘central limit order book’ (CLOB). Many exchange markets also offer listing services for companies. They play an important role in business capital formation and household allocation of savings, as do other financial markets, intermediation services and internal finance. Trading also occurs in dark pools³ and on over-the-counter (OTC) markets.
- 7 We view the principal function of exchange markets as offering a cost-effective mechanism for companies to raise funds and a venue for fair, orderly and transparent trading of listed securities after they are issued.
- 8 The Australian equity market is made up of two major exchange market operators, ASX and Chi-X, competing for secondary trading in ASX-listed products.⁴ To operate a market in Australia, operators must hold an Australian market licence or an exemption: see s791 of the *Corporations Act 2001* (Corporations Act).
- 9 Further information on the structure of the Australian equity market is contained in CP 168 and Report 215 *Australian equity market structure* (REP 215).
- 10 Trading on these markets is conducted through market participants. Market participants can place orders for trading on the market on behalf of retail investors, institutional investors, principal traders, and for themselves (proprietary trading). Market participants must hold an Australian financial services (AFS) licence from ASIC, and also abide by the rules of the market operator(s).
- 11 In November 2010, we released Consultation Paper 145 *Australian equity market structure: Proposals* (CP 145) to consult on market integrity rules we considered necessary to address regulatory issues arising from recent developments in Australian equity markets (including most of the issues in this RIS), and to facilitate the introduction of competition in trading services in ‘equity market products’.

² An execution venue is a facility, service or location on or through which transactions in equity market products are executed and includes each individual order book maintained by a market operator, a crossing system and a market participant executing a client order against its own inventory otherwise than on or through an order book or crossing system.

³ These can be categorised as non-pre-trade transparent electronically accessible pools of liquidity.

⁴ There are a number of other smaller exchange markets and OTC markets that trade other products.

- 12 In April 2011, we made ASIC Market Integrity Rules (Competition in Exchange Markets) 2011, providing a regulatory framework for competition between public exchanges in equity market products. At that time, we also made market integrity rules dealing with the activities or conduct of the public exchange operated by Chi-X (Chi-X market): see ASIC Market Integrity Rules (Chi-X Australia Market) 2011.

Note: In this document, 'ASIC Market Integrity Rules (Competition)' refers to ASIC Market Integrity Rules (Competition in Exchange Markets) 2011, 'ASIC Market Integrity Rules (ASX)' refers to ASIC Market Integrity Rules (ASX Market) 2010 and 'ASIC Market Integrity Rules (Chi-X)' refers to ASIC Market Integrity Rules (Chi-X Australia Market) 2011.

- 13 We deferred making rules on the wider market structure proposals consulted on in CP 145 to facilitate the introduction of competition and to provide more time to consider some of the proposals. The resulting RIS on competition in exchange markets (April 2011) evaluated the impact of market integrity rules that are aimed at addressing the regulatory issues resulting from the introduction of competition. At the time, we indicated our intention to further consider market integrity rules that deal with market developments and implement those rules at another time.
- 14 In October 2011, we released CP 168 with our wider market structure proposals, taking into account feedback received in response to CP 145. Consultation on CP 168 closed on 10 February 2012.
- 15 CP 168 canvassed the further proposals and market integrity rules that were considered to be necessary to keep pace with technological and market developments, and sought views in relation to:
- (a) enhanced controls for an increasingly automated trading environment, to require participants to adequately test and filter algorithmic trading messages, have business continuity plans and review processes in relation to their automated order processing (AOP)⁵ and set minimum requirements for direct electronic access (DEA)⁶ to markets;
 - (b) refined volatility controls to automatically limit market activity during extreme movements in individual stocks and a new anomalous order entry and volatility controls for futures contracts on the market index;
 - (c) enhanced regulatory data requirements for ASIC's surveillance capabilities to better monitor potential market abuse to protect investors, and contribute to our analysis of market developments;
 - (d) broadening the scope of best execution so investors have the same protection for both equity and non-equity products listed or quoted on ASX; and

⁵ Orders generated by a system.

⁶ Access to markets via the infrastructure of a market participant.

- (e) exceptions to pre-trade transparency and mechanisms for promoting pre-trade transparency, such as requiring dark trades to offer meaningful price improvement, to address the impact of dark liquidity on price formation and market quality.

16 The proposals were revised in response to feedback received to CP 168. In response to the feedback received, we are not proceeding with proposal in paragraph 15(d) to broaden the scope of best execution. On 28 June 2012, we released Consultation Paper 179 *Australian market structure: Draft market integrity rules and guidance* (CP 179). It sought feedback on the drafting of the proposed rules and guidance we intended to proceed with, which is the subject of this RIS. It also included a short initial statement of what we perceived to be the impacts of the draft rules and guidance.

Structure of this paper

- 17 In this RIS we consider various approaches to addressing risks to market integrity in respect to four main issues consulted on in CP 168. While the issues are separately defined, they all relate to contemporaneous developments in trading and market structure that are rapidly shifting the landscape of the Australian market. The core elements are interlinked by our objective to maintain fair, orderly and transparent equity markets in Australia.
- 18 The issues addressed in this RIS include:
- (a) automated trading (see Section B);
 - (b) extreme price movements (see Section C);
 - (c) enhanced data for surveillance (see Section D); and
 - (d) pre-trade transparency and price formation (see Section E).

Developments in the Australian equity market

- 19 The two key themes that the proposed market integrity rules aim to address are:
- (a) new risks to market integrity resulting from the growth of automated trading; and
 - (b) risks to price formation and the quality of the public markets due to fragmentation of order flow into the dark.

Growth in automated trading

- 20 Equity markets globally are undergoing considerable change. They are now overwhelmingly electronic, and predominantly automated. Technology has increased the speed, capacity, automation and sophistication of trading for market operators and market participants. It has also opened the door for new types of market participants with innovative trading strategies.
- 21 High-frequency traders are becoming more prevalent. Feedback we have received from the industry and comments in the press suggest that high-frequency trading may account for 15–25% of equity market turnover in Australia. This is up from the 3–4% estimated by market participants in 2009 and reported in ASX’s February 2010 review, *Algorithmic trading and market access arrangements*⁷ (ASX Review). We anticipate this figure will grow, with the development of Chi-X and ASX’s new order book PureMatch that targets high-frequency trading, as well as ASX’s new data centre with enhanced co-location facilities. This is because high-frequency trading strategies are most successful in a low-latency multimarket environment.
- 22 It is generally understood that these trends are driving market practice. The introduction of competition in exchange markets has provided greater impetus for these changes.
- 23 Growth in automated trading has contributed to greater efficiency of trading, such as more expeditious execution, faster processing of information and more efficient detection of liquidity. However, it has also introduced new risks to market integrity. In analysing the sudden extreme price decline and rebound on 6 May 2010 in the United States (the ‘flash crash’), the Securities and Exchange Commission (SEC) and the Commodity Futures Trading Commission (CFTC) identified a triggering event and a subsequent confluence of market conditions and trading strategies as the cause of the market disruption.⁸
- 24 According to the SEC and CFTC, an automated execution of a large sell order in the E-mini (an equity-based index future traded on the Chicago Mercantile Exchange (CME)) was the trigger for additional trading by high-frequency traders and other traders in the futures market, as well as cross-market arbitrageurs (thereby affecting the equities markets). The cascading effect of the programmed reactions of automated trading systems to the price movements ultimately led to the ‘flash crash’.
- 25 We have seen similar but less dramatic instances of heightened intraday volatility here. For example, a high-frequency trading system recently placed more than 5,000 identical orders into the market erroneously. If executed,

⁷ ASX, *Algorithmic trading and market access arrangements*, review, ASX Limited, 8 February 2010.

⁸ CFTC–SEC, *Findings regarding the market events of May 6, 2010*, report, CFTC and SEC, 30 September 2010, www.sec.gov/news/studies/2010/marketevents-report.pdf.

these orders would have short sold almost 4% of the issued securities of the company involved.

Growth in fragmentation of order flow into the dark

- 26 The growth of new execution venues and dark trading in North America and Europe has resulted in significant fragmentation of order flow: see Section D of REP 215 and paragraphs 77–78 of CP 145 for a summary of overseas experience where there is competition for trading services. In Australia, there has been almost a fourfold growth in the number of crossing systems since 2009 to 18.⁹ The increase in dark liquidity means that more order flow is migrating to non-pre-trade transparent trading venues, which may result in the erosion of liquidity in pre-trade transparent markets and magnify surveillance challenges.
- 27 To the extent that desirable order flow is diverted from the public markets, there is evidence in other markets that at certain levels it does adversely affect the price formation process and execution quality for investors who display their orders in the public markets. This deterioration in pricing efficiency and execution quality will ultimately filter through to dark trading venues where there is reliance on prices in lit markets.
- 28 To provide a balanced incentive structure to support the pre-trade transparent price formation process, we consider that investors that contribute to the price formation process by displaying orders in pre-trade transparent order books should receive priority over dark orders (when below block size).

Affected parties

- 29 In this RIS, our assessment of impacts includes an analysis of the costs and benefits of each of the options available, and a consideration of how each proposed option will affect the following key stakeholders:
- (a) industry and investors (i.e. market operators, market participants and investors); and
 - (b) ASIC.

Qualification of impacts described in this RIS

- 30 In CP 145 and CP 168, we sought feedback from stakeholders on the qualitative and quantitative costs and benefits of the proposed policy

⁹ The number of crossing systems in 2009 was derived from the reports made to ASIC under Rule 4.3.1 of ASIC Market Integrity Rules (Competition) since May 2011. These reports indicated the time at which each crossing system commenced.

changes. In response to both consultation papers, we received very limited quantitative data. Specifically in relation to costs, industry provided little guidance to ASIC to facilitate the assessment of the impact of the proposals on operational budgets.

- 31 While we recognise that it may be costly and commercially sensitive for industry to obtain and provide data of this nature, a small number of stakeholders did offer us indications of cost of compliance for their business. The costs vary depending on the nature and size of market operators' and market participants' business activities, the extent to which they have already adopted the proposed requirements (many of which reflect international 'best practice'), and other factors.

B Issue 1: Automated trading

- 32 This section considers options to ensure that the increasing use of automated trading and order processing does not introduce vulnerabilities to the orderly operation of the market.

Context

- 33 One of the most significant recent developments in Australian and global exchange markets has been the dramatic growth in automated trading. Developments in technology and execution venues have facilitated this growth.
- 34 There is no commonly agreed definition of automated trading but it is typically characterised as trading by computer algorithms whose parameters are predetermined to deliver specific execution outcomes. These parameters may include trading volume, asset price, instrument type, market, volumes on offer for trading, timing and news.¹⁰

The benefits of automated trading

- 35 Algorithmic trading is used for a number of reasons. Algorithms are often used to supply liquidity. Algorithms are also used for statistical arbitrage, with systems processing a large amount of information and deriving trading strategies to take advantage of pricing discrepancies or the perceived mispricing of assets. Institutional investors use algorithms to execute large trading orders in a way that minimises adverse price impact. Automated systems are also important in multi-platform environments to determine the best venue in which to execute trades at any given time (smart order routing).
- 36 In general, automated trading has reduced the cost of trading and contributed to efficiency gains in exchanges. A number of different studies have shown that automated trading has increased trading efficiency, narrowed spreads, improved market liquidity and assisted price discovery.
- 37 For example, Hendershott and Riordan (2009) found the effect of algorithms on price formation was broadly positive. They concluded:¹¹
- (a) algorithmic trading improved the efficiency of the price formation mechanism (algorithmic trades imparted 40% more information than human trades); and

¹⁰ ASX, *Algorithmic trading and market access arrangements*, review, ASX Limited, 8 February 2010.

¹¹ T Hendershott & R Riordan, 'Algorithmic trading and information', NET Institute Working Paper No. 09-08, September 2009, www.netinst.org/NET_Working_Papers.html.

(b) that there was no evidence that algorithmic trading contributed to volatility.

38 Similarly, Hendershott, Jones and Menkveld (2011) found that as algorithmic trading in a market increased, liquidity improved—this is shown through reduced quoted and effective spreads (the study also found that quotes become more informative).¹²

Potential drawbacks

39 However, concerns remain about whether the development and increased usage of automated trading has introduced systemic risks to the market. For example, technology has increased the speed, automation and efficiency of trading, but it may have also opened the door to insufficiently monitored market access arrangements, extreme price movements from algorithms overreacting and disrupting the market, and algorithmic strategies being used to manipulate trading.

40 Events such as the 6 May 2010 ‘flash crash’, where prices of US stocks declined and suddenly rebounded before the close of the trading day, illustrate the potential risks of disruptive high-speed algorithms, and they provide a salient reminder of the need for greater controls.

41 The troubles of US broker Knight Capital Group on 2 August 2012 also highlight some of the risks involved with algorithmic trading. On that day, an algorithm malfunction caused Knight Capital to lose US\$440 million in erroneous trades. Effectively, the firm bought at the ‘ask’ (high price) side of the spread and sold at the ‘bid’ (low price) side of the spread, instead of the other way around. The speed in which the malfunctioning algorithm executed trades and the large number of trades filled dislocated prices in 148 stocks in the US market. The New York Stock Exchange (NYSE) cancelled trades on six securities, where prices had swung at least 30% in a period of 45 minutes.

42 Both human-based and computer-based trading systems are susceptible to errors. However, the high speed at which computer systems can trade means that one logical flaw can lead to severe losses and distortions—to both the algorithm operator and to the market as a whole. The Knight Capital episode has raised concerns about the appropriateness of existing safeguards against aberrant algorithmic trading in the United States, and highlights the importance of participants having the ability to quickly disable a system or algorithm.¹³

¹² T Hendershott, C Jones & A Menkveld, ‘Does algorithmic trading increase liquidity?’, *Journal of Finance*, vol. 66, no. 1, February 2011.

¹³ ‘Wait a second—the latest cock-up on Wall Street shows that more safeguards are needed’, *The Economist*, 11 August 2012.

- 43 It is also in the interests of the Australian market to safeguard against the risk of aberrant automated trading. All stakeholders would benefit from better filters and controls that would preserve the integrity and fairness of Australia's markets, lift investor confidence, and promote greater participation, trading volumes and market liquidity.

Algorithmic trading and DEA

- 44 Most algorithmic trading is dependent on speed. Traders often employ time-contingent strategies that exploit pricing inefficiencies (arbitrage), the provision of liquidity (the traders make a two-sided market and profit by capturing the bid–ask spread), or the detection of liquidity (traders send out small orders and find where large orders are resting before using that information to extract profit).
- 45 As such, there has been strong demand for DEA to markets. DEA refers to access to a market by persons that are not direct participants of an exchange market through another participant's access infrastructure. DEA is attractive because it enables clients to transmit their orders directly to a market, giving them greater control over trading decisions and reducing latency.¹⁴ However, DEA also has the potential to grant market access to traders outside of the infrastructure and control of local market participants and rules. This unfiltered sponsored access to the market challenges risk management frameworks and hinders surveillance efforts.
- 46 DEA is relatively common in developed markets. For example, in 2009, it accounted for approximately 60% of daily trading volumes in the United States.¹⁵

Automated trading in Australia

- 47 Currently, the share of algorithmic trading in Australia is relatively low compared to markets overseas. In 2010, an estimate of activity on ASX suggested algorithms accounted for approximately 30–40% of cash equity turnover.¹⁶ This compares with around 60% in US markets, according to some estimates.¹⁷
- 48 Australia's regulation of automated trading is already robust. For example, unfiltered sponsored access is not permitted. Market participants are responsible for all orders submitted through their access to exchange markets

¹⁴ Latency refers to the amount of time taken to electronically send or receive information. High-frequency traders rely heavily on low-latency environments for their trading strategies.

¹⁵ S Lee, *Land of sponsored access: Where the naked need not apply*, Aite Group, 14 December 2009, www.aitegroup.com/Reports/ReportDetail.aspx?recordItemID=619.

¹⁶ ASX, *Algorithmic trading and market access arrangements*, review, ASX Limited, 8 February 2010.

¹⁷ A Celestine, 'Markets crash due to faulty algorithm? Traders must be forced to bear the losses', *The Economic Times*, 6 May 2012.

(in addition, the ban on naked short selling and the absence of maker–taker pricing incentives may have restrained the growth of high-frequency trading in Australia).

- 49 However, automated trading in Australia is expected to grow, with the introduction of competition and the development of faster trading capabilities. Multiple low-latency, pre-trade transparent execution venues will create trading opportunities for more algorithms in Australia, particularly high-frequency trading. In overseas markets, a large portion of this high-frequency trading is by electronic liquidity providers. This is also likely to occur in Australia based on experience overseas (indeed, we are already seeing an expansion of electronic liquidity provision).
- 50 The growth in high-frequency trading may lead to further reductions in average order sizes in pre-trade transparent venues; many more orders per trade; increased trading volume; tightening of spreads, although potentially with lower depth at the best prices; and greater deployment of inter-market arbitrage strategies. In addition, there is likely to be more pressure on institutional buy-side firms to use algorithms in pre-trade transparent markets and seek block liquidity in dark pools.

Current regulatory framework

- 51 Parts 5.6, 5.7 and 5.9 of ASIC Market Integrity Rules (ASX) and ASIC Market Integrity Rules (Chi-X) require a market participant to ensure that all orders that are submitted through AOP systems to ASX or Chi-X are appropriately filtered, do not interfere with the efficiency and integrity of the market, and do not result in manipulative trading. ASX Market Rules Guidance Notes 19, 21 and 22 outline ASX’s previous and—since the transfer of market supervision from ASX to ASIC in August 2010—ASIC’s current expectations of market participants in relation to AOP.
- 52 Market participants are responsible for identifying and implementing controls to manage their risks, including maintaining organisational and technical resources to comply with the market integrity rules.

Automated trading and market failure

- 53 Ideally, equity prices should reflect ‘fundamental’ factors, including: information about the company, the competition, the operating environment or the economy in general; and investor sentiment and market conditions. Information is the essence of the price formation mechanism enabled by the exchange market. If prices do not reflect their true values, the market is operating inefficiently.
- 54 However, equity prices may at times be affected by extraneous influences. Buying or selling may result from the malfunctioning or ill-conceived

algorithm misinterpreting data or price signals and acting in a way that is different from the original intention of the human programmers. For instance, a malfunctioning or ill-conceived algorithm may erroneously buy or sell securities in volumes large enough to deviate prices from levels supported by fundamentals.

- 55 In some extreme instances, prices move sharply in the absence of any new relevant information pertaining to the stock, the market or the economy having been released. These instances where prices move for non-fundamental factors represent a breakdown of the price formation process, characterising a market failure.

Examples of disruptions

- 56 A commonly cited example of algorithms disrupting orderly markets is momentum ignition, where an algorithm submits erroneous orders into the market generating specific signals. These signals in turn cause other algorithms to react in a manner that reinforces the overall market disruption.¹⁸ The result is often a high volume of orders, large price dislocations, and potentially unwanted trades.
- 57 It is possible for algorithms to both:
- (a) initiate a market disruption by themselves (e.g. a software mistake creating an initial price dislocation from fundamentals);¹⁹ and
 - (b) propagate and exacerbate a disruption that is already taking place (e.g. from human error—‘fat fingers’).
- 58 The SEC has seen cases where order entry errors have suddenly and significantly exposed the US market to potential disruptions. For instance, on 30 September 2008, the price of Google stock became extremely volatile towards the end of the day’s trading, dropping 93% in value in a short period of time. This was due to an influx of erroneous orders onto an exchange from a single market participant, which resulted in the cancellation of numerous trades.²⁰
- 59 ASIC took pre-emptive action against 21 cases of potentially disruptive algorithmic programs in 2011.²¹ ASIC’s market surveillance has tentatively identified cases of algorithms causing large disruptions in Australian markets.

¹⁸ ASX, *Algorithmic trading and market access arrangements*, review, ASX Limited, 8 February 2010, p. 33.

¹⁹ ‘Knight Capital—desperate times’, *The Economist*, 3 August 2012.

²⁰ SEC, *Rule 15c3-5: Risk management controls for brokers or dealers with market access* (Release No.34-63241), rule, November 2010.

²¹ Report 277 *ASIC supervision of markets and participants: July to December 2011* (REP 277).

- 60 Research into automated trading shows sudden price movements are relatively frequent: studies by Golub and Keane (2011) and Johnson et al (2011) identified thousands of instances in the past five years where prices for US stocks inexplicably increased or fell by 0.8% in less than 1.5 seconds—a timescale deemed to be outside the reaction time of humans.²²
- 61 Whether high-speed algorithmic trading was the explicit source of the sudden price movements was not clear: neither study controlled for prevailing market conditions. However, both studies showed the occurrence of sudden price movements in modern, high-speed markets was remarkably common—the average was more than one per day—and, importantly, the price movements were overwhelmingly at the beginning and end of the day.
- 62 This is significant because if a price movement occurred at a material time (e.g. the final hour of the final day of a trading month), the market would not have enough time to adjust. Investors and firms could incur substantial losses, as market indices are often calculated and portfolios are often valued based on end-of-day pricing.
- 63 In addition, evidence of a link between automated trading and volatility has been growing: Dichev, Huang and Zhou (2011) found a substantial positive relationship between trading volumes and stock volatility,²³ while Boehmer, Fong and Wu (2012) found automated trading increased volatility, particularly in small stocks and during days when market making was difficult.²⁴

Assessing the problem

- 64 The problem this section addresses has two components. Firstly, automated trading in Australia has evolved in complexity and scale in ways the existing regulatory framework did not anticipate. The failure to modernise this framework and to clarify ASIC's expectations about testing and management of systems would leave local markets open to the possibility of disruptions and loss in investor confidence.
- 65 Secondly, some market participants have not kept their own control systems up-to-date. This shows the need to mandate regular reviews of AOP systems by participants.

²² A Golub & J Keane (2011) identified 9,766 ultra-fast mini-flash crashes between January 2006 and November 2011. E Johnson et al (2011) identified 18,520 ultra-fast mini-flash crashes on multiple exchanges during the same period. See A Golub & J Keane, 'Mini flash crashes', working paper, 15 April 2011; N Johnson et al, 'Financial black swans driven by ultrafast machine ecology', working paper, 12 February 2012.

²³ I Dichev, K.Huang & D.Zhou, 'The dark side of trading' Emroy Law and Economics Research Paper No 11-95; 2012 Chicago Meetings Paper; Emory Public Law Research Paper No. 11-143, 4 February 2011.

²⁴ E. Boehmer, K. Fong & J. Wu, 'International evidence on algorithmic trading', working paper, March 2012.

66 These two components are discussed in more detail below.

Evolution of automated trading beyond current controls

67 Automated trading in Australia has evolved considerably in the past few years and it has a profound impact on the operation of exchange markets in Australia. Automated trading has contributed to an increase in the intensity of trading in Australia.

68 At the same time, the complexity of automated trading in Australia (and the rest of the world) has grown considerably. For example, in the early stages of automated trading, buy-side investors developed algorithms to handle orders and reduce market impact. As a result, early algorithmic strategies were relatively simple in their goals and logic. However, over time automated strategies have evolved considerably, and algorithms are now used to implement strategies that mask trade activity and intent. A further evolution has been the development of intelligent logic: more modern algorithms can learn from activity in the market and adjust in real-time to what they perceive to be happening in the market, or they have been built to protect or to ‘game’ other algorithms.

69 How this greater activity and complexity relates to controls in Australia is best described by the following schematic: market participants and traders have pushed the development and technology of automated trading to create faster and more profitable trading strategies, but there has not been an equivalent evolution in the market’s protections and controls. As a result, the existing controls in Australia are, although comprehensive, not ideal; nor do they reflect the operation—and the risks—of modern algorithms. As a result, the controls in place in Australia also need to be updated (the present AOP market rules were introduced in 1998) to better address the risks to market integrity posed by increased levels of automated trading in Australia. It is important that algorithms be tested before use and when there are material changes to ensure compliance with the ASIC market integrity rules and market operating rules. The current ASIC Market Integrity Rules (ASX) and ASIC Market Integrity Rules (Chi-X) do not explicitly require this.

70 In addition, many of the current market controls are reactionary: they tend to be based on post-trade analysis or they take action after an event has occurred. For example, the current market integrity rules require market participants to have the organisational and technical resources to enable trading messages to be submitted to the trading platform without interfering with the efficiency and integrity of the market: see Rule 5.6.3 (ASX) and Rule 5.6.3 (Chi-X). However, these rules only ensure that systems screen orders before placing them; they do not require market participants to have the ability to remove orders already placed, nor do they require market participants to have the ability in real time to disconnect a trading system

from an exchange. Ideally, the market needs to move towards proactive and automated controls to better reflect the volume and speed of modern algorithmic trading.

- 71 The current rules require market participants to use pre-trade controls, including pre-trade filters, to prevent trading messages from interfering with the efficiency and integrity of the market (e.g. an erroneous order). However, market participants are required to consider orders on a single basis only; they are not required to consider (and ultimately limit) the impact on the market of a series of orders.
- 72 A series of orders may start and exacerbate an abnormal price movement (momentum ignition) even if each order analysed individually passes through existing controls.
- 73 Since CP 145 was released (November 2010), the International Organisation of Securities Commission (IOSCO) has settled its principles of DEA best practice;²⁵ Canadian regulators have published and finalised their market access rules;²⁶ and the US SEC has approved its rule changes relating to market access.²⁷
- 74 In considering the implications of automated trading, we have been mindful to minimise the possibility for cross-border regulatory arbitrage, including a desire not to introduce regulatory requirements that potentially make Australia less competitive. Therefore, enhancing controls in Australia would have two impacts: it would raise controls in Australia to international best practice; and it would bring Australia into line with other overseas jurisdictions, limiting the likelihood of cross-border arbitrage.
- 75 All these factors warrant an update to the current automated trading control framework in Australia.

Failure of market participants to upgrade systems

- 76 The problem of the failure of market participants to upgrade their systems and controls is emblematic of the previously discussed problem: algorithms and automated strategies are always evolving, but some market participants have given far less attention to reviewing and updating their controls to ensure compliance with market integrity rules.
- 77 By nature, algorithmic trading is extremely fluid. The life of any one algorithmic program or strategy may be very short because of the need to

²⁵ Technical Committee of IOSCO, *Principles for direct electronic access to markets* (IOSCOPD332), report, IOSCO, 12 August 2010.

²⁶ Ontario Securities Commission (OSC), *Proposed National Instrument 23-103 Electronic trading and direct electronic access to marketplaces*, consultation paper, 8 April 2011.

²⁷ SEC, *Rule 15c3-5: Risk management controls for brokers or dealers with market access* (Release No. 34-63241), rule, November 2010.

adapt to market developments and information (invariably the window of opportunity for traders is very short because competitive pressure can quickly remove any opportunities or discrepancies in the market). As a result, some algorithms in their original form have a life of only a matter of days or weeks, while others adapt to changing market conditions.

- 78 Under the current rules, market participants are required to continually review, update and cancel algorithmic programs to ensure compliance with market integrity rules (it is also in their interests to minimise the financial and reputational risks of aberrant algorithms). However, we believe some market participants have failed to meet this requirement. We have seen many cases where market participants have failed to update or test their systems for a dangerous period of time (e.g. a firm may have failed to update or retrain its staff; it may have failed to test its filters properly; or it may have failed to update its controls to reflect the development of new algorithms). In one case, we observed a market participant who had not upgraded their systems or automated controls for more than five years.
- 79 This discrepancy between certification and testing of controls is an obvious danger to the market. If controls do not keep pace with technology and the types of trading strategies being employed, the risk of an aberrant algorithm slipping through are higher, as are the risks to the orderly operation and integrity of the broader market.
- 80 Current rules require market participants to provide confirmation or further certification to ASIC each time the participant makes a material change to its AOP system. However, given the breakdown in the certification process, we believe there are a number of problems with the existing rules.
- 81 Firstly, there is an issue of ambiguity around what constitutes a ‘material’ change, particularly given how quickly algorithmic programs change.
- 82 Secondly, there is the related problem of long-term materiality. If a market participant alters their systems in a small way, it may not consider it to be consequential enough to warrant informing ASIC. However, if these small changes extend over a long period of time, there is the risk that they may eventually represent a ‘material’ change and a threat to the market system. (This problem has been compounded by a lack of continuity within trading businesses—for example, important staff may leave or internal procedures may change, making it difficult for market participants to review the previous changes holistically.)
- 83 Thirdly, there is the risk of creating a regulatory ‘bottleneck’ for market participants. Having to certify and notify ASIC after every material change is burdensome and it may make it difficult for participants to operate effectively in Australia.

Objectives

- 84 The objective of the proposals relating to automated trading is to manage the risk of potential adverse events (and their effects on market integrity) of automated trading, without imposing too great a regulatory burden on algorithmic traders.
- 85 We believe there are already robust controls in the Australian equity market to mitigate some of the risks from automated trading. However, these controls need to be updated to fully address emerging risks, as well as to align our regime with IOSCO principles and international best practice.

Options

Option 1: Status quo (minimal changes since 1998)

- 86 Option 1 is to maintain the status quo of ASIC Market Integrity Rules (ASX) and ASIC Market Integrity Rules (Chi-X) to ensure all orders submitted through AOP systems to ASX and Chi-X are appropriately filtered, do not interfere with the efficiency and integrity of the market, and do not result in manipulative trading.

Option 2: Proceed with new framework for automated trading and AOP as proposed in CP 168

- 87 Option 2 proposes to build on existing ASIC Market Integrity Rules (ASX) and ASIC Market Integrity Rules (Chi-X) with a number of new requirements for AOP and algorithmic programs. These include:
- (a) a requirement that market participants test algorithms before they are used for the first time and before they make any material changes;
 - (b) a requirement that market participants have direct and immediate control over all trading messages submitted through their system, including pre-trade controls, real-time monitoring and post-trade analysis;
 - (c) a requirement that market participants have in place adequate business continuity arrangements to ensure that connectivity to the trading platform is maintained and that they are able to recover their normal business operations as soon as practicably possible if there is a significant disruption; and
 - (d) the removal of the requirement that market participants have ASIC confirm new, and material changes, to their AOP systems (market participants must certify and confirm these changes internally instead). Market participants are also required to annually review their systems

and connectivity, and to provide an attestation to ASIC that they have done so.

- 88 Option 2 also includes minimum standards for DEA. These proposals include a requirement that:
- (a) market participants understand the nature of their AOP clients' business and the nature of any proposed delegation to a third party;
 - (b) AOP clients have the financial resources to meet their financial obligations;
 - (c) AOP clients have adequate procedures in place to ensure that all persons who use their AOP systems understand the order management system and the requirements of the dealing rules and/or market operator;
 - (d) AOP clients have adequate procedures to monitor all trading through their order management systems;
 - (e) AOP clients' order management systems are tested before use and before any material changes;
 - (f) all algorithms used through the AOP are tested before use and before any material changes; and
 - (g) market participants have legally binding agreements with each AOP client that is an Australian financial services (AFS) licensee.
- 89 Option 2 also includes a proposal to clarify through guidance our expectations for market operator systems and controls.

Option 3: Proceed with amended CP 168 proposals, but with revised propositions for automated trading and AOP (preferred option)

- 90 Instead of introducing a new market integrity rule to test individual algorithms before they are used for the first time (or when algorithms are changed materially), we will publish guidance under existing rules to clarify our expectations for testing of systems.
- 91 The guidance will focus on:
- (a) testing systems, filters and controls (rather than individual algorithms);
 - (b) managing highly automated trading; and
 - (c) stress testing of flow.
- 92 We intend to clarify our expectation that authorised persons' systems order flow should be tested against market participant AOP filters. Such testing should occur before use (i.e. at the developmental stage) and before implementing any material changes.

- 93 We intend to proceed with a new market integrity rule requiring market participants to have direct control over pre-trade filters, including an ability to stop an order (or series of orders) or connectivity to an exchange.
- 94 We intend to publish guidance clarifying expectations for real-time monitoring and post-trade analysis.
- 95 For business continuity arrangements, we do not intend to proceed with a new market integrity rule. Instead, we will rely on existing rules and clarify through guidance that we expect business continuity planning to reflect the nature and complexity of market participants' businesses.
- 96 For annual reviews of AOP systems, we intend to proceed with a new market integrity rule requirement of annual review of systems and documentation, policies and processes around AOP systems. For annual notifications to ASIC, we propose to proceed with removing the requirement for notification to ASIC following review of material changes, and make a new market integrity rule requiring an AOP system annual notification being submitted to ASIC to demonstrate that an internal review has been conducted.
- 97 We do not intend to proceed with a new rule for additional minimum standards for DEA. We, instead, have said we will publish new guidance clarifying our expectations of the existing rules for automated order processing.
- 98 Option 3 also includes the Option 2 proposal to clarify through guidance our expectations for market operator systems and controls.
- 99 The proposals in Option 3 are aimed at building a more rigorous framework of systems, filters and controls to guard against potential disruptions from aberrant algorithmic activity and will not disrupt the operation of the market in normal conditions. The automated trading controls—such as testing systems and stress testing order flows—would not negate the benefits of automation.

Impact analysis

Impact of Option 1: Status quo (minimal changes since 1998)

Impact on industry and investors

- 100 Option 1 will not impose any explicit extra costs on market participants, investors, market operators or government, and it will allow the Australian market to continue to evolve under the existing regulatory framework.

- 101 Our expectation is that the usage of automated trading in Australia will continue to grow, but it will do so without the benefits of extra protections against aberrant automated trading. The risk of an algorithm disrupting the market will remain unchanged, including the threat of an algorithm-induced chain reaction or ‘flash crash’ triggering a market failure.
- 102 Without the mitigation of potential disruptions from aberrant automated trading, confidence and participation in Australia’s markets may fall if market participants and investors believe they are being exposed to non-compliant or erroneous algorithms and access arrangements.
- 103 The potential loss of confidence in the efficiency and fairness of Australia’s markets would be positively related to the incidences of aberrant trading. Each time an investor or market participant was exposed to aberrant trading (e.g. if they had a trade cancelled against them) the damage would feed back into the market, further lowering investors’ confidence and participation.
- 104 The impact of the 6 May 2010 ‘flash crash’ on confidence in the US markets was substantial. Over 20,000 trades across more than 300 securities were executed at prices more than 60% away from their levels of just moments before.²⁸ Many of these trades were executed at prices unreasonably low (a ‘penny’, US\$0.01 per share, or less) or unreasonably high (US\$100,000 per share) before prices returned to pre-crash levels.
- 105 Post-crash daily trading volumes in US equities were lower, volumes of off-exchange trading were higher, and investments in domestic US equity mutual funds declined considerably. In the two years since the crash, retail investors have pulled US\$273 billion from US domestic equity mutual funds.²⁹ This compares with US\$174 billion withdrawn in the two years (2008 and 2009) before the ‘flash crash’.³⁰ (It is not possible to ascertain whether the difference between the US\$273 billion and the US\$174 billion was solely due to the ‘flash crash’. However, the steep rise in withdrawals is evidence that the disruption had a negative impact on investor confidence on equity markets and probably accelerated the rate of withdrawals from US domestic equity funds.³¹ Market commentators have suggested that retail investor sentiment was particularly negatively affected by the crash.³²)
- 106 According to SEC Chairwoman Mary Schapiro, the extreme volatility of 6 May had undermined investor confidence. She said less than 50% of buy-

²⁸ Technical Committee of IOSCO, *Regulatory issues raised by the impact of technological changes on market integrity and efficiency* (IOSCOPD361), IOSCO, October 2011.

²⁹ T Demos, ‘US “flash crash” measures suffer delays’, *Financial Times*, 6 May 2012.

³⁰ T Demos, ‘US “flash crash” measures suffer delays’, *Financial Times*, 6 May 2012.

³¹ Withdrawals from equities during 2010 and 2011 were certainly affected by the negative impact on confidence of the global debt crisis. However, in the comparison period of 2008 and 2009, market sentiment was also particularly weak as a result of large corporate failures and the global financial crisis.

³² M Mackenzie & A Massoudi, ‘Flash crash memories spur NYSE to review trading in 148 stocks’, *Financial Times*, 2 August 2012; ‘Wait a second—the latest cock-up on Wall Street shows that more safeguards are needed’, *The Economist*, 11 August 2012; J Zamansky, ‘Unlike Knight Capital, retail investors earn no lifeline’, *Forbes*, 9 August 2012.

side professionals—who represent the interests of many millions of individuals who invest directly in the US equity markets—had expressed confidence in the current market structure post the market failure of 6 May ‘flash crash’.³³

107 In the Knight Capital episode, a malfunctioning algorithm led to a loss of US\$440 million by a single broker. Observers believe that the algorithm in question had been ‘inadequately tested’.³⁴

108 While the likelihood of an equivalent crash in Australia appears to be low, the costs and negative repercussions should such a disruption occur could be substantial.

Impact of Option 2: Proceed with new framework for automated trading and AOP as proposed in CP 168

Impact on industry and investors

Testing of algorithms

109 Testing systems before connection would benefit investors and industry by reducing the likelihood of an aberrant algorithm creating unwarranted volatility. It would also reduce the systemic risk of automated trading. Having fewer faulty or poorly designed algorithms in Australia would reduce the risk of a chain reaction, where orders from one algorithm trigger a reaction in other algorithms, dislocating prices from fundamental levels.

110 Testing of algorithms may impose a large technology and full-time equivalent (FTE) staff cost on some market participants because it will require test plans and test scripts for each new algorithm (or a new materially changed version of an old algorithm). However, in feedback to CP 168, some respondents indicated mandatory testing of algorithms would be expensive (although no estimates of costs were provided to ASIC, despite requests). There was also a strong preference for ASIC to clarify expectations through guidance.

Direct and immediate control over trading message

111 The ability to stop an order—or series of orders—in real time delivers a number of benefits to investors and industry. Currently, market participants must have in place organisational and technical resources to enable messages to be submitted to the trading platform without interfering with the efficiency and integrity of the market or the proper functioning of the trading platform: Rule 5.6.3 (ASX) and (Chi-X). We propose to build on this by

³³ ML Schapiro, *Strengthening our equity market structure*, Address by SEC Chairman, Economic Club of New York, New York, 7 September 2010, www.sec.gov/news/speech/2010/spch090710mls.htm.

³⁴ Ezra Klein, ‘Bloomberg view: Faster, Knight Capital! Kill! Kill!’, *Businessweek*, 9 August 2012.

requiring a market participant to have direct and immediate control over all messages, including an ability to stop an order (or series of orders) or connectivity to an exchange (kill switch).

112 This proposal helps mitigate erroneous order entry and aberrant algorithmic programs. Requirements regarding pre-trade controls have also been extended to a series of trading messages. Market participants will not be able to submit a series of disruptive messages to the market, reducing the risk of disorderly trading and the likelihood of an aberrant chain reaction. Real-time monitoring and post-trade reporting will also increase the responsibility of market participants to monitor and self-deter manipulative behaviour—all benefits to the wider market.

113 The cost to market participants for implementing these changes will depend on their existing systems. Many market participants already have sufficient controls to comply, but others will have to undergo a technological upgrade and will face increased compliance costs from the need to review existing policies and introduce new procedures where necessary. In its feedback to CP 168, industry stressed that most market participants already had extensive filter systems and controls in place, while some respondents indicated real-time monitoring and the ability to control and stop order flow would have a significant impact because of compliance costs (although no cost estimates were submitted to ASIC, despite requests).

Adequate business continuity arrangements and periodic review

114 The proposed rules for business continuity planning and the annual review of systems and connectivity would generate greater accountability and monitoring of AOP systems. Market participants are currently required to review AOP systems before use and after a material change. However, we have seen instances where AOP systems have gone many years without undergoing a formal review. Under our proposal, market participants would continue to be required to submit their initial certification to us, but we have removed the requirement for ASIC to confirm the initial certification. If there is a material change, market participants would continue to be required to certify or confirm these changes internally, but would not be required to notify us of the material change or submit the certification or confirmation to us. This should speed up the deployment of systems and reduce the regulatory burden on market participants.

115 The annual attestation will make the market system safer. We understand from some market participants (those that have many material changes) that it will increase the costs. The new rule will ensure market participants review their systems annually to make sure they remain compliant with the relevant market integrity rules (irrespective of whether there has been a material change during the year). We regard this as imperative given the pace at which technology is evolving, and because we have seen numerous

examples of systems that have not been reviewed for many years (in some cases for more than five years).

- 116 Industry will incur a periodic FTE cost to ensure compliance, and the cost of the annual review is expected to be a function of business. Larger operators with more systems will incur more monitoring costs. However, feedback from industry was typically supportive. Most market participants said they did not regard the annual review requirement as overly expensive, and one large institutional broker indicated that to review, certify and declare a system's regulatory compliance would cost approximately 2–3 weeks FTE, at a rate of \$100,000 per annum (or the equivalent of \$4,000 to \$6,000 per annum).

Minimum standard for DEA

- 117 The reintroduction of testing of DEA clients' financial resources would benefit the market because it will reduce the ability of DEA clients to significantly trade beyond their means or in a size that is potentially disorderly. The requirement that market operators understand their clients' business will reduce the likelihood of disorderly trading—a benefit for the entire market—and it will assist market participants in the identification of unusual activity and market misconduct.
- 118 However, the proposed DEA rules will increase compliance costs for market participants because they will have to review existing policies, introduce new procedures and documentation where necessary, and undergo an extensive and costly IT upgrade. Industry will also have to increase its FTE because market participants will need greater resources to implement and monitor the new compliance rules. Industry indicated it was generally opposed to the proposal on the basis that it will be too onerous, costly and could potentially reduce the competitiveness of the Australian market due to added administration (no hard figures were provided about the cost or the risk of market participants exiting the Australian market).

Impact on ASIC

- 119 The new certification process, where market participants will be required to review their systems annually, rather than when every material change has occurred, will reduce the volume of certifications—and the burden—for ASIC. The annual attestation will also give ASIC a greater understanding of how the market operates because enforcing annual certifications will give ASIC a greater understanding of the algorithms and systems in use, and it should provide a better basis for ASIC to consider the evolution of the market and whether further reforms are necessary.

Impact of Option 3: Proceed with amended CP 168 proposals, but with revised propositions for automated trading and AOP (preferred option)

- 120 The Option 3 proposals will require stakeholders to make some changes in their systems, filters and controls.
- 121 However, once these changes are implemented, they should not hinder the performance of properly functioning automated trading systems or affect the normal running of markets.

Impact on industry and investors

Testing of systems, filters and controls

- 122 The proposed rule to test individual algorithms has been replaced with new guidance around the testing of systems, filters and controls; a focus on managing highly automated trading; and the stress testing of flow. However, the revised guidance is expected to help minimise the prevalence of aberrant trading disrupting the market and do so at a lower cost to industry (the testing of systems, filters and controls is a more efficient approach to limiting aberrant automated trading than testing every individual algorithm).
- 123 Feedback from retail and institutional brokers has been generally positive of the changes. Neither felt the expected cost of the new guidance would be large. However, we are anticipating some costs for industry. All participants will have to review existing policies and put in place new procedures where necessary, resulting in compliance costs.

Direct control over pre-trade filters

- 124 We intend to proceed with the proposed market integrity rule that requires market participants to have the capability to shut down aberrant order flow. Market participants will be required to have direct control over pre-trade filters, but on real-time monitoring and post-trade analysis we intend to publish guidance clarifying our expectations of the existing rules.
- 125 It will be mandatory for market participants to have the ability to stop aberrant order flow from disrupting the market once detected. The impacts of the revised proposal are the same as the impacts described in Option 2.
- 126 Feedback from industry of the revised proposal was positive. Smaller brokers who use third-party vendor solutions for their AOP said they expected that their vendors would provide compliant filter functionality, reducing the expected impact on smaller brokers. Some institutional brokers indicated that they had comprehensive pre-trade filters in place already.

Periodic review of systems

- 127 We intend to proceed with the proposed rule for annual reviews of systems. Instead of requiring market participants to notify ASIC of every material change to their AOP systems, market participants will be required to provide ASIC with an annual notification demonstrating an internal review of their AOP system (to ensure compliance) has been conducted.
- 128 The impacts of the proposed rule are as described in Option 2.

Minimum standard for AOP

- 129 The consolidated and revised guidance of minimum AOP standards will reinforce existing expectations and practice and contribute to the fair and orderly operation of the market, but it will not be as expensive as the proposed rules in Option 2.
- 130 We expect the revised guidance will involve a one-off cost to all market participants because market participants will have to review existing policies and introduce new procedures where necessary. We believe there may also be a one-off legal cost for introducing a contract between the market participants and their AFS licence holders, to the extent that such agreements are not already in place. While we expect that there will be an impact on staff numbers to initially set participants up to comply with these proposals, we do not expect that the proposals for minimum AOP standards will result in an ongoing impact on headcount costs.

Impact on ASIC

- 131 The new certification process, where market participants will be required to review their systems annually rather than when every material change has occurred, will reduce the volume of certifications—and the burden—for ASIC.

Conclusion

- 132 We recommend Option 3 for the reasons discussed below.
- 133 Option 1 does not address the potential risks of automated trading. The current regulatory rules (which were developed in the early stages of automated trading and are more than a decade old) need to be enhanced to better reflect the risks of today's automated markets.
- 134 We believe Option 2 would improve Australia's automated trading environment; however, it would result in significant compliance costs for market participants (according to qualitative feedback from industry).

- 135 Option 3 offers a more balanced outcome. It introduces greater safeguards to limit aberrant automated trading, but it does so without the compliance costs of Option 2.
- 136 The proposed automated 'kill switch' will mandate market participants to have direct control over pre-trade filters. This will ensure market participants have the ability, in real time, to control and prevent aberrant order flow before it disrupts the market.
- 137 The consolidated and revised guidance of minimum AOP standards will reinforce existing expectations and practice, and contribute to the fair and orderly operation of the market, but it will not be as expensive as the originally proposed rules.

C Issue 2: Extreme price movements

- 138 This section considers options to ensure that markets operate efficiently and in an orderly way, even in the presence of high volatility.
- 139 Issue 1 in Section B dealt with the risk of market disruptions stemming from malfunctioning automated trading programs. It proposes a first line of defence against potentially disruptive orders placed by abnormal automated activity. However, market disruptions can still be caused by factors other than malfunctioning algorithms, and, for that reason, additional market-level measures are needed. The options in this section build on existing volatility controls that were implemented in October 2011.

Context

Price formation

- 140 Movements in share prices should reflect fundamental factors, such as economic developments, company-specific events and market forces (e.g. the cost and availability of investment funds, investor appetite for risk). These factors are the foundation of ‘price formation’—the mechanism through which prices reflect all relevant information.
- 141 Stock prices should change over time to reflect the different fundamental influences affecting company valuations. In this context, price volatility in itself is not a problem. Rather, it is the mechanism through which equity prices reflect the ever-changing evaluation of the company and the economy.

Externalities and market failure

- 142 However, share prices are sometimes disturbed by factors other than fundamentals. Examples of such externalities are price movements as a result of malfunctioning algorithms (e.g. trade execution, strategy implementation, arbitrage) or erroneous entry of orders (‘fat-finger’ errors). For instance, an algorithm that executes an excessive number of sell orders because of a logical fault in the programming may bring the price of a stock below the level supported by fundamental market forces.³⁵ Similarly, human

³⁵ An example of a malfunctioning trade execution program disrupting markets is the ‘flash-crash’ price dislocation in the United States on 6 May 2010. It was triggered by an algorithm that placed large quantities of a futures contract for sale in a short period of time. The original goal of the algorithm was to minimise price impact—that is, to reduce the price decline caused by its own selling. However, a poorly designed feature of the algorithm meant that the high trading volumes observed early in 6 May 2010 in E-mini futures contracts allowed the algorithm to place a large volume of contracts for sale in a relatively short period of time—causing prices to decline: see CFTC–SEC, *Findings regarding the market events of May 6, 2010*, report, CFTC and SEC, 30 September 2010, www.sec.gov/news/studies/2010/marketevents-report.pdf.

error in entering order details may cause temporary price distortions as the market reacts to the erroneous input.³⁶

143 Another example of price changes resulting from non-fundamental factors is the reaction of investors to incomplete or false information. Ideally, information would be disseminated throughout markets immediately it is produced. Rational investors would study the information available and obtain a clear picture of the accuracy and implications of the new information in order to react in a measured way. In practice, however, this does not always occur.

144 For example, during severe crises (such as the failure of major institutions, the release of bad economic data, natural catastrophes, geopolitical emergencies), it may be difficult or impossible for markets to distinguish true and relevant information from false information, rumours or deliberate fabrications. This is particularly true when crisis events occur in rapid succession. Faced with a breakdown of the usual price discovery mechanism and an inability to value specific assets with confidence, the rational investor may choose to exit (or minimise exposure to) the whole market indiscriminately.³⁷ This could generate a rapid sale of assets leading to price declines that will be most likely self-reinforcing.³⁸ This process may lead to very large losses that could be incurred even before the market has had the time and the means to assess whether the selling pressure was warranted or not.

145 Whether caused by malfunctioning algorithms, human error or investors' unconsidered and misinformed response to a crisis, disruptions in the price formation mechanism constitute a market failure.

An example of the cost of externalities

146 As an illustration of the impact of severe price volatility, consider the use of stop-loss orders during the 6 May 'flash crash'. Stop-loss orders are designed to help limit losses by automatically selling a stock after it drops below a specified price (many individual investors use stop-loss orders as a safety tool to protect against a sudden downturn in the market).

³⁶ On 30 April 2012, for instance, what is thought to have been a human ('fat-finger') error caused a sudden reduction of almost 1% in the price of highly traded gold futures contracts in the CME.

³⁷ The crisis of September 2008 in the United States and Europe is a case in point. Unsure about which banks were exposed to credit derivative losses, investors chose to sell stock in most major US and European financial institutions indiscriminately. Another example was the market disruption that took place in the United States after the terrorist attacks of 11 September 2001.

³⁸ The tendency of uninformed trading—or trading based on human emotions such as panic—is sometimes called 'animal spirits'. Some academics and practitioners suggest that equity markets sometimes operate erratically because investor decisions are influenced by emotional factors. This means that investors do not always trade in a completely rational and perfectly informed way.

147 The fundamental premise of stop-loss orders is to rely on the integrity of the market prices to signal when the investor should sell a holding. However, during the 6 May ‘flash crash’, investors’ confidence in the appropriateness of stop losses was shaken. According to SEC Chairwoman Mary Schapiro, US\$2 billion worth of stop-loss orders were estimated to have been triggered during the half hour between 2.30 pm and 3 pm on 6 May 2010. Ms Schapiro said, as a hypothetical illustration, if each of those orders was executed at 10% less than the closing price (a very conservative estimate), then those individual investors suffered losses of more than US\$200 million compared to the closing price on that day.³⁹

Extreme price movements and externalities

148 In an ideal market, rational investors would not act in a misinformed way. Trading would only respond to fundamental market signals. If investors were unable to distinguish between fundamental and extraneous signals, trading should ideally pause to allow time for analysis. Alternatively, if an error by a trader triggers an undue price dislocation, rational arbitrage by all other investors should quickly restore price equilibrium.

149 In practice, however, these idealised self-stabilising mechanisms do not always work as theory suggests. Investors do not always act in a fully informed and rational manner. Destabilising errors do occur and the price dislocations caused by them are not always ‘arbitrated away’. Because of this, prices in real markets can move sharply due to fundamental but also non-fundamental reasons (externalities).

150 In practice, it is often impossible to ascertain in real time whether a sharp price dislocation was a result of a fundamental factor or an externality. In some cases, even the *ex-post* analysis is complex and protracted.⁴⁰ For this reason it is impossible to set up market-wide controls that would operate only on those dislocations caused by externalities. The only practical solution is that controls refer to the effect—extreme price movements—rather than the cause.

151 This opens the possibility that a control could be (erroneously) activated in a circumstance where the price dislocation was caused by fundamental factors. However, if market prices have a good reason to change abruptly, it is expected that this movement or trend would resume after the control is lifted.

³⁹ ML Schapiro, *Strengthening our equity market structure*, Address by SEC Chairman, Economic Club of New York, New York, 7 September 2010, www.sec.gov/news/speech/2010/spch090710mls.htm.

⁴⁰ As an illustration, the US regulators needed a comprehensive and lengthy investigation to ascertain the cause and mechanisms of dissemination of the 6 May 2010 ‘flash crash’. Their full report was only released in September that year.

Competition

- 152 In a monopoly framework, the incumbent exchange market has an incentive to provide controls for extreme price movements. Preserving investor confidence will avoid declines in turnover and fee income.
- 153 However, in a competitive scenario, the incentives for rival markets may not always lead to the best overall outcome. For instance, there may be incentives for one market to continue to trade while another is in a trading pause. If a trading pause occurred as a result of excessive price declines, continued trading by the competitor may lead to further prices falls. The first market operator to impose a trading pause runs the risk of incurring a cost (i.e. loss of market share and fee revenue) without obtaining the benefit (e.g. stabilisation of prices).
- 154 The rational outcome of such first-mover-disadvantage interaction between competitors is that no trading halt would be called and the original externality would be allowed to inflict maximum disruption in markets.
- 155 A study conducted on behalf of ASIC by the Capital Markets Cooperative Research Centre (CMCRC) confirms the observation that extreme price movements do occur in our market.⁴¹ The analysis found that from 2006–10, there were 72 instances where the price of large market capitalisation stocks changed by 20% or more over a period of five minutes. This equates to an average of 14 instances per year. Under the proposed market integrity rules, these instances of extreme price fluctuation would trigger an automatic trading pause.
- 156 While market operators are required to have some controls for extreme price movements (e.g. Chapter 2 of ASIC Market Integrity Rules (Competition) on anomalous order thresholds and the extreme cancellation range), there is not currently a requirement for a trade prevention control. ASX and Chi-X have, however, implemented the extreme cancellation range by preventing trades from occurring in the range. Such preventative controls are important for managing extreme price movements, but if automated trade prevention controls are not mandatory it opens the possibility that future market operator entrants may choose not to implement them or that circumstances in the years ahead may prompt current market operators to relax their controls.
- 157 A further deficiency is the lack of automated controls on ASX 24. The response to extreme price movement controls in the ASX SPI 200 futures contract is currently manual and determined on a discretionary basis.⁴² In

⁴¹ CMCRC Limited, *A study of abnormal price movement on the ASX*, 9 December 2010, published in our CP 168.

⁴² There have been a number of instances where the Australian futures index has experienced sudden and extreme movements. For example, in December 2008 the SFE SPI 200 futures contract rallied 207 points and fell back 129 points moments before the trading close. The index rallied the next day and fell immediately by 352 points. A number of trades were cancelled: see REP 215.

addition, the lack of automated controls opens the door to cross-market contagion, where an error in the futures market could flow through and disrupt the cash market (or vice versa).

Volatility

- 158 Share markets have always been volatile, with sharp movements in prices being observed regularly throughout history. Schwert (2011) conducted a 200-year survey of stock returns in the United States to find that volatility (the standard deviation of rates of return) has been relatively stable over the period.⁴³ The study found that, on average, volatility has not increased over time, although there have been periods of spikes, such as 1929, 1987 and 2008.
- 159 Unlike the volatility (measured by relatively low frequency observations) referred to in Schwert (2011), this section contemplates intraday extreme price movements (measured tick by tick) not explained by fundamental economic factors—in particular, volatility driven by anomalous trading activity, especially disruptions caused by algorithmic trading, which is a relatively recent phenomenon. (Examples include the ‘flash crash’ of 6 May 2010 and the abnormal algorithmic trading by Knight Capital in 2012.)
- 160 There has been a growing body of literature that suggests the increasing incidence of automated trading may have contributed to heightened levels of stock return volatility in recent times. For example, Dichev, Huang and Zhou (2011) found a substantial positive relationship between trading volumes and stock volatility;⁴⁴ Boehmer, Fong and Wu (2012) found automated trading increased volatility, particularly in small stocks and during days when market making was difficult;⁴⁵ and Zhang (2010) found a positive correlation between high-frequency trading and price volatility, and he argued that high-frequency trading hindered the incorporation of fundamental information into asset prices, causing stock prices to overreact to fundamental news.⁴⁶

Assessing the problem

- 161 Australia’s existing market integrity rules regarding volatility controls do not include automated trade prevention controls and do not address the risk of cross-product contagion. Therefore, they may not sufficiently protect the integrity of the market from extreme price movements.

⁴³ G Schwert, ‘Stock volatility during the recent financial crisis’, *European Financial Management*, Vol. 17, No.5, 2011, pp. 789–805.

⁴⁴ I Dichev, K Huang & D Zhou, ‘The dark side of trading’ Emroy Law and Economics Research Paper No 11-95; 2012 Chicago Meetings Paper; Emroy Public Law Research Paper No. 11-143, 4 February 2011.

⁴⁵ E Boehmer, K Fong & J Wu, ‘International evidence on algorithmic trading’, working paper, March 2012.

⁴⁶ XF Zhang, ‘The effect of high-frequency trading on stock volatility and price discovery’, working paper, December 2010.

Excessive volatility

162 It is difficult to ascertain what level of volatility is ‘acceptable’ and what level is excessive. However, after consultation with industry, academia and foreign regulators, and independent analysis of historical data, we have formed a view about what level of volatility is clearly disruptive and represents an unambiguous breakdown of the price formation mechanism. This view is the basis of the proposed reforms detailed in the section under ‘Options’ below.

Objectives

163 The objective of the extreme price movement rules is to minimise the incidence and impact of sudden price distortions from non-fundamental factors and to ensure markets remain orderly and are able to cope with periods of volatility without major disruptions.

164 We believe, given the speed of automated trading, that the market requires an automated response to extreme price movements in addition to the existing controls. This is because order entry controls (e.g. filters) may not screen out every order or series of orders from disrupting the orderly operation of the market. In addition, market participants have said the cancellation of trades should be minimised. Therefore, implementing automated volatility controls that prevent trades from occurring will deliver a more immediate and fair response to sudden price movements and it will provide greater certainty and comfort to investors because the controls will mitigate the occurrence of unwarranted volatility disrupting the market (e.g. episodes of volatility that follow a ‘fat finger’ error).

165 In addition, implementing mandatory and standardised preventative volatility controls will remove any potential inconsistencies or incentives for Australia’s current and future exchanges to operate with diluted or sub-optimal volatility controls.

Options

Option 1: Status quo

166 Option 1 is to maintain the existing extreme cancellation range, in conjunction with the anomalous order thresholds, to limit short-term price dislocation in equity market products. The current manual and discretionary processes for the ASX SPI 200 futures contracts would remain.

Option 2: Limit up–limit down volatility control

- 167 Option 2 proposes new market integrity rules to require market operators to implement an automated limit up–limit down volatility control to prevent trades from occurring outside a specified price band:
- (a) for S&P/ASX 200 products and associated domestic-index EFTs—15% above and below the average price of the product over the preceding five-minute period; and
 - (b) for the S&P ASX SPI 200 Index Future (SPI Future)—250 points above and below the average price of the index future over the preceding five-minute period.
- 168 In each case, if order book equilibrium is not restored in one minute, trading should pause for five minutes. Limit prices would be determined by a dynamic reference price rather than a static reference price.
- 169 For the SPI Future, we propose market integrity rules to require market operators to implement anomalous order thresholds.

Option 3: Build on existing rule framework (preferred option)

- 170 Rather than the limit up–limit down proposal of Option 2, we are proposing to introduce:
- (a) a requirement that market operators have an automated trade prevention control in equity market products that would prevent trades from executing beyond a specified range (the extreme trade range) (see draft Part 2.2 of ASIC Market Integrity Rules (Competition) and Section B of draft updated Regulatory Guide 223 *Guidance on ASIC market integrity rules for competition in exchange markets* (draft updated RG 223)); and
 - (b) a requirement for ASX 24 to introduce an anomalous order threshold and an extreme trade range to prevent trades in the ASX SPI 200 futures contract from executing beyond a specified range (see draft Parts 2.1 and 2.2 of ASIC Market Integrity Rules (Competition) and Section B of draft updated RG 223).

Impact analysis

Option 1: Status quo

Impact on industry and investors

- 171 Option 1 will impose no explicit costs on ASX or Chi-X. However, the downside will be that instead of introducing proactive volatility controls,

Australia's market operators will remain reactive. They would continue to rely on the cancellation powers of the existing rules to reverse erroneous trades *ex post*, without limiting contemporaneous price volatility.

172 As it stands, technology has evolved beyond the existing market rules. Both ASX and Chi-X have automated controls that go beyond the current market integrity rules. Therefore, if the status quo were to be maintained, Australia would effectively have a sub-optimal outcome. New entrants would be allowed to subsist with controls inferior to what is currently available, and future market operators would still be able to rely on trade cancellations to control volatility, instead of being mandated to use proactive and preventative controls—one of ASIC's stated priorities.

173 In addition, while ASX and Chi-X may have trade prevention controls for equity market products, there is the implicit risk that without mandatory automated controls:

- (a) ASX and Chi-X may relax their approach and revert back to just cancelling trades in the extreme cancellation range, rather than preventing anomalous orders; and
- (b) new entrants may adopt minimum standards and rely on the extreme cancellation approach rather than introducing preventative controls.

174 The status quo would also not remove the potential costs of manual controls in the futures index. The risk of cross-market contagion would therefore remain. An error in the futures market could still potentially spread across to Australia's equities markets and create damaging price volatility. Estimating the costs of cross-market contagion is difficult, but we believe they could be very large. Consider the dramatic decline in investor confidence after the 6 May 2010 'flash crash': average daily trading volumes in US equities after the crash are lower; volumes of off-exchange trading are higher; and investments in domestic US equity mutual funds are considerably lower. In the two years since the flash crash, retail investors have pulled \$273 billion from US domestic equity mutual funds, versus \$174 billion in the two years before the 'flash crash', according to figures from the Investment Company Institute.⁴⁷

Option 2: Limit up–limit down volatility control

Impact on industry and investors

175 Introducing a limit up–limit down control would change how the market currently deals with volatility. Market operators will have to establish new systems, policies and procedures to prevent trades from occurring outside the price bands and to implement any resulting limit state and trading pause. As

⁴⁷ T Demos, 'US "flash crash" measures suffer delays', *Financial Times*, 6 May 2012.

a result, market operators will face material costs because they will have to replace the existing regime—which the market agreed to during a market-wide review in 2010—with the new controls (quantifying the expected cost was not possible because no hard figures were provided to ASIC).

176 Consultation with industry indicated most respondents were generally supportive of the proposed measures. However, based on the submissions received, there was no consensus on the 15% limit band or the one-minute limit state for an automated limit up–limit down volatility control. The introduction of the limit up–limit down controls—despite their expected costs—would benefit the orderliness of the market substantially. No trades would occur in any S&P/ASX 200 product and associated domestic index EFTs outside a specified price band if there was a significant price movement during a short period of time. However, trading could continue within the band, limiting the disruption. Similarly, the automated limit up–limit down controls (in conjunction with an automated anomalous order threshold) would prevent anomalous trades in the SPI Future, reducing price volatility and the risks of cross-market contagion.

177 We believe reducing price volatility benefits all investors and market participants. It mitigates the risks of disorderly trading; it promotes transparency by removing human discretion from volatility controls on the futures index (this is increasingly important given the growing and expected intensity of high-frequency trading in Australia); it minimises the risk of cross-market contagion; and it boosts confidence among investors and market participants because it reduces trading mistakes and cancellations from creating price volatility.

Impact on ASIC

178 If implemented, we would need to do a one-off review of the new controls and may do so periodically; and we would have to monitor the effectiveness and appropriateness of the controls, including the limit band and the limit state.

Option 3: Build on existing rule framework (preferred option)

Impact on industry and investors

179 Anticipated costs for market participants are expected to be negligible for two reasons. Firstly, any costs involved with mandating an extreme cancellation range would occur at the exchange level. Secondly, market participants have their own controls in place already—they are not supposed to rely on exchanges' controls cancellation ranges to prevent trading mistakes. Therefore, market participants are not expected to incur any substantial costs from the proposals.

- 180 The proposed extreme cancellation range trade prevention control will have minimal impact on ASX and Chi-X because both operators have automated preventative controls already (with the exception of one order type on ASX which will need to change). The aim of Option 3 is not to impose new costs on industry, but to bring the existing rules in line with the controls and technology of ASX and Chi-X (importantly, ASX and Chi-X have both said they support the proposed extreme cancellation range regime).
- 181 However, if a new market operator does enter the Australian market, the benefits to the market of a mandatory extreme cancellation range would be substantial. Every new market operator would have to comply with the revised rules, ensuring consistent and effective extreme price movement controls. For a potential new entrant, the cost of implementing the proposed extreme cancellation range regime would be insignificant compared to all of the other set-up costs associated with establishing a trading platform; nor would it amount to a barrier to entry in Australia.
- 182 Introducing an automated extreme cancellation range for the ASX SPI 200 futures will protect Australia's public markets from damaging trading errors, and it will help ensure that our markets operate efficiently and in an orderly way, even when there is volatility. Building an automated extreme cancellation range into the futures market will improve consistency between index stocks and SPI products, and it will minimise extreme price contagion in these products.
- 183 In addition, although some investors or market participants may adjust their systems or strategies to deal with the proposed extreme cancellation range, we believe this cost will be marginal given the proposed extreme cancellation range is already being used in the market. The most substantial impact for introducing a preventative extreme cancellation range will accrue to ASX and Chi-X. However, because both operators already have an automated extreme cancellation range in place, residual costs are expected to be negligible. Finally, we believe the expected future cost to new entrants will be, as we have argued above, insignificant relative to the cost of setting up an additional trading platform in Australia.
- 184 We do not believe the proposed extreme cancellation range will interfere with, or impede, legitimate price discovery in the market (a potential cost) because given the width of the extreme cancellation range's parameters (and the presence of anomalous order thresholds), we think the chances of a legitimate order being placed outside these ranges are remote. In addition, an automated extreme cancellation range offers, compared to the current human-based protections in the futures market, a more immediate, transparent and fair process to deal with extreme volatility. Finally, it gives markets the benefit of a unified guide on the extreme cancellation range frameworks, potentially avoiding discrepancies and duplication of systems.

185 Market operators and participants will benefit from the automated extreme
 cancellation range because it will mitigate the likelihood of an extreme price
 movement event occurring, which economic theory suggests would lift
 investor confidence and thereby encourage greater market participation. In
 addition, the automated extreme cancellation range would benefit market
 participants because it will enable them to more efficiently manage their risk
 because they will have greater certainty of avoiding one side of their hedge
 being cancelled.

Impact on ASIC

186 If implemented, we would need to do a one-off review of the new controls
 and may do so periodically, and we would have to monitor the effectiveness
 and appropriateness of the controls.

Conclusion

187 We recommend Option 3 for the following reasons.

188 Option 1 does not address the potential risks. Without clear, transparent and
 harmonised controls, including across index equity-linked products and the
 index future, the risk of one market operator failing to pause could still lead
 to large price disruptions. The same risk applies to any potential new entrant.

189 We believe the limit up–limit down proposal under Option 2 would reduce
 the expected cost to markets of extreme price movements, but we expect—
 after industry consultation—that the implementation costs would be material
 and outweigh the benefits to our market at this stage..

190 We believe Option 3 offers a more cost-effective outcome. Having a
 standardised and mandated control reduces the risk of extreme price
 movements. Since most of the infrastructure is in place already (for equity
 market products at least), the expected costs to market operators are
 predicted to be substantially less than Option 2.

D Issue 3: Enhanced data for surveillance

191 This section considers options to ensure that ASIC has sufficient data to perform surveillance, in an environment where the volume and speed of trading is increasing, to fulfil our function and promote the ongoing integrity of the Australian financial market.

Context

192 Market integrity is a fundamental pillar of a well-developed financial market. Investor confidence in market integrity can provide incentives for other investors to participate, contributing to liquidity and stimulating more competitive pricing. In markets where investors perceive that they are at an unfair disadvantage, they usually protect themselves by reducing their exposure to the markets. Akerlof (1970) studied the relationship between information asymmetry and market failure, and concluded that market participants would withdraw from the market if they faced severe adverse selection.⁴⁸ Reduced investor participation in the market will cause lower turnover, higher costs of trading and an inefficient allocation of capital from savers to borrowers (issuers).

193 ASIC is responsible for supervising trading activity of market participants on Australia's domestic licensed markets. One of the factors that influences our capacity to perform surveillance is the quality of the data we receive. Our surveillance capability needs to keep pace with new trading strategies and changing market structure.

Assessing the problem

194 The essential problem is that developments in trading technology and market fragmentation have increased the complexity and speed of trading, making it increasingly difficult for regulators to detect market misconduct. To promote market integrity, ASIC needs to adapt to this changing market environment by improving our market surveillance capabilities, through introducing enhanced data.

Market development and surveillance data availability

195 Currently, we have limited real-time visibility of:

⁴⁸ G Akerlof, 'The market for "lemons": Quality uncertainty and the market mechanism', *Quarterly Journal of Economics*, vol. 84 (3), 1970, pp. 488–500.

- (a) where trades are being executed, when done off a market operator's order book;
- (b) the source of trading instructions, which has direct relevance to market manipulation, insider trading and account hacking;
- (c) whether trading is done as principal or agent and on behalf of a wholesale or retail client;
- (d) whether orders and trades originate with an indirect market participant; and
- (e) whether trading is computer or human generated.

196 Given the rapid developments and innovations in trading such as automated trading and dark liquidity, our surveillance capability requires more granular information about trading. Lack of information on the trading venue and origin of order impede the detection of the strategies used by those engaged in market misconduct (such as insider trading and market manipulation). In supervising increasingly complex and technologically advanced markets, we need appropriate access to surveillance data to be able to support ongoing market integrity. As the market evolves, data requirements for surveillance have changed. For example:

- (a) additional data are required for surveillance, as the use of complex trading strategies grows;
- (b) data processing and analysis capabilities will need to be enhanced to process the data into forms meaningful to achieve our objectives as order volumes and speeds increase; and
- (c) the interconnections and associations of traders, markets and trading events have become more complex.

197 To stay abreast of developments in market structure, including off-order book liquidity (or liquidity in 'dark pools'), we believe it is important to uniquely identify the execution venue for transactions executed off-order book.

198 Origin-of-order information allows regulators to detect and investigate market manipulation and insider trading with greater efficiency. Without origin-of-order information, our surveillance and deterrence functions may be constrained at the client level, in Australia's rapidly developing market.

199 Over recent years, the number of indirect market participants has grown significantly and information relating to this segment's contribution to the market is limited. Identification of indirect market participants on transactions will allow ASIC to better monitor this important market segment and provide efficiencies for our trading inquiries.

Inconsistent standards of time measurement

- 200 In today's market, orders are being entered, modified, cancelled and executed at extraordinary speed. This applies pressure on market operators and market participants' clocks to be more granular in their measurement of time, especially in trade and reporting data systems.
- 201 An improved standard of time measurement by market operators will assist our surveillance of the market to keep pace with market developments such as high-frequency trading. The lack of consistency in time measurement may also impede our deterrence and prosecution of microsecond level manipulations in the market. In addition, the accurate and efficient creation of a national best bid and offer (NBBO) will rely on a high standard of accuracy and precision of time-stamped orders by market operators.

Objectives

- 202 The objective of obtaining enhanced data for surveillance is to ensure that we are able to obtain sufficient and appropriate market data in a timely and efficient manner. Obtaining sufficient and appropriate data will ensure we are able to continue to monitor and detect market misconduct in light of rapidly developing technology and increasingly complex strategies.
- 203 This will assist ASIC to preserve market integrity and promote fair, orderly and transparent Australian equity markets. It is important that the Australian obligations are consistent with international standards and that Australia is able to maintain international competitiveness and continue to attract business from investors and issuers.
- 204 There have been various initiatives from security regulators around the world (such as IOSCO, SEC and European Commission) on enhanced data requirements for market supervision. We believe that the enhanced regulatory data reflects a range of steps that are important for maintaining market confidence and for setting future market structure policies. These would bring Australia more in line with arrangements overseas, while having substantially less impact on market participants (i.e. provision of information that market participants already routinely capture about their clients).

Options

Option 1: Status quo

- 205 Option 1 is to maintain the status quo under which we would continue to rely on the existing regulatory data to conduct market surveillance.

Option 2: Proceed with the enhanced data, clock synchronisation regulation proposed in CP 168

206 Option 2 proposes to introduce new market integrity rules to require market participants to provide additional regulatory data on order messages and/or trade reports to market operators and require market operators to pass it to ASIC (information visible only to ASIC). This proposal seeks to address the problem of insufficient real-time order and trade-level information for market surveillance. The data requirement includes:

- (a) the execution venue;
- (b) the category of client (specifying whether the trade is principal or agency and whether it is wholesale or retail);
- (c) the origin of the order (i.e. client account identifier);
- (d) the AFS licensed intermediary (AFS licence number); and
- (e) the algorithm that generated the order.

207 Under this option, we would also require market operators to improve the precision and accuracy of their synchronised clocks for trading, supervision and reporting systems to a precision of one microsecond and accuracy of +/- one millisecond. Market participants would be required to synchronise their co-located trading, compliance monitoring and reporting system clocks to a precision of one microsecond and accuracy of +/- one millisecond, and other clocks to a precision of one millisecond and accuracy of +/- 20 milliseconds. This proposal seeks to address the problem of inconsistent standard of time measurement.

Option 3: Proceed with enhanced data proposals, with amendments (preferred option)

208 Option 3 proposes to introduce new market integrity rules to require market participants to provide additional regulatory data on order messages and/or trade reports to market operators and require market operators to pass it to ASIC (information visible only to ASIC). Under this option, the content of enhanced data is revised to ensure the information required will be easier to source. The data requirement includes:

- (a) the execution venue;
- (b) the capacity of participant (principal or agent only);
- (c) a reference indicating the origin of the order, to the extent that information is available to a market participant taking reasonable steps to ascertain it;
- (d) the AFS licence number where an order originates from an indirect market participant and the information is readily available; and
- (e) flagging for directed wholesale orders.

- 209 Under this option, we would propose no new rule regarding the synchronisation of system clocks.

Impact analysis

Option 1: Status quo

Impact on industry and consumers

- 210 Under Option 1, there will be no immediate impact to industry or consumers that is directly attributable to this option.
- 211 However, in the absence of enhanced data for market surveillance, both industry and consumers would have less robust assurance in market integrity in the longer term. Investor confidence may suffer if investors perceive that the regulator's market surveillance capabilities are limited by the availability of data to better detect market abusive behaviour (such as insider trading or market manipulation), which would lead to a reduction in trading revenue of market participants.
- 212 This may also result in higher cost of capital for companies raising funds if investor confidence is lacking. Empirical evidence presented in the *Journal of Finance* paper, 'The world price of insider trades', suggested that the mere existence of insider trading laws did not lower costs of capital. Rather, the evidence pointed to the actual enforcement of insider trading laws as the factor leading to significant reduction in cost of capital for listed companies.⁴⁹ In a sample of 103 countries, effective insider trading enforcement was associated with a decrease in cost of capital ranging from 0.3% to 7%.⁵⁰ Although enhanced data for surveillance is not the means to an end of improving market integrity, effective detection is a vital early step to effective enforcement.
- 213 Furthermore, Atkin and Harris (2011) suggest that insider trading and information leakage costs Australian markets the equivalent to 6.4 basis points (bps) of turnover every year.⁵¹ This figure represents the average annual abnormal profits earned by insider and information-leakage trading from 2003–09 on ASX. Applying this proportion to a hypothetical scenario of constant market turnover of \$1.4 trillion per year, the total 'rent' extracted from the economy by inside traders would equate to almost \$900 million per

⁴⁹ U Bhattacharya & H Daouk, 'The world price of insider trading', *Journal of Finance*, vol. LVII, no. 1, 2002.

⁵⁰ Dollar cost of capital equals market capitalisation multiplied by the percentage cost of capital (e.g. for a market worth \$1.2 trillion (approximately the size of the Australian equity market) a change of 0.1% to cost of capital would translate into \$1.2 billion per year.

⁵¹ M Aitken & F Harris, 'Evidence-based policy making for financial markets: A fairness and efficiency framework for assessing market quality', *Journal of Trading*, Summer 2011.

year—or a total of \$4.5 billion (in FY2011 dollar terms) from FY2011 to FY2015.

Impact on ASIC

214 There will be no immediate impact to ASIC that is directly attributable to this option.

215 The developments and innovations of trading in financial markets pose challenges for the market surveillance functions of the regulator. In the absence of enhanced data feeds, ASIC may not adapt to offer the most effective market surveillance solution to achieving its priority of ensuring fair and efficient financial markets.

Option 2: Proceed with the enhanced data, clock synchronisation regulation proposed in CP 168

Impact on industry and consumers

Enhanced data requirements

216 Under this option, we anticipate data to be routed to market operators and then to ASIC for surveillance. Order management systems, order routing systems, trade validation systems, data feeds, storage capacity and network capacity will all be affected. The enhancement of data will also increase the demand on storage and network capacity.

217 We anticipate market participants will need to amend their current data feed, order management and other systems to be able to collect and report the required enhanced surveillance information to ASIC. These changes to market participants' systems will impose costs to market participants. Despite the relatively simple change of adding new data fields to an order message, we recognise that the scope of the change may be significant in relation to the order management systems because it is an end-to-end change that involves the entire lifecycle of the order. The enhanced order information may require additional network and storage capacity. It has been suggested that it may slow down messages, resulting in certain latency-sensitive participants needing wider bandwidth to maintain minimal latency.

218 Changes will also be required to IT systems and infrastructure of market operators through which the order information is routed. ASX and Chi-X currently provide a live feed of market data to ASIC for surveillance purposes in the cash equities market. They will need to provide additional data fields for the provision of additional order information. ASX has indicated that adding new data fields is a significant change to its systems.

219 To minimise the impact on market participants and other stakeholders, and to preserve confidentiality of client details, order-origin data required by

ASIC is to be provided in new ‘ASIC only’ data fields on orders and trade reports.

220 We also recognise that it may not always be possible to identify a single client responsible for an order and intend to provide guidance on the treatment of ‘basket orders’ and orders booked to a market participant ‘suspense account’.

221 The enhanced data for surveillance will support the data mining and relationship mapping functions of our surveillance systems. More effective detection of market misconduct would in turn benefit the wider market through improvements in market integrity.

Clock synchronisation

222 In this option, market operators will need to amend their clock synchronisation requirements to ensure the precision and accuracy of time stamps for pre-trade and post-trade information. There will be an initial cost to market operators to embed new synchronised clock technology into market operator systems. One market operator estimates the implementation cost to be \$200,000. One data vendor estimated that the implementation cost would be \$10,000, while another estimated that the cost would be \$25,000 plus ongoing costs.⁵²

223 Market operators and market participants will need to synchronise their system clocks to the legal reference time in Australia, maintained by the National Measurement Institute (NMI). The NMI uses network time protocol (NTP) servers and rubidium clocks to provide a means for market operators and market participants to satisfy the clock synchronisation rules under this option. Access to the NTP servers is free and provides traceable accuracy of around 20 milliseconds. A rubidium clock, which would be required by market operators and co-located participants, costs around \$25,000 and provides accuracy to around 0.5 milliseconds (500 microseconds) with fewer synchronisations.

224 The promotion of more accurate consolidation and correct sequencing of orders and trades within very short periods of time will be beneficial for data vendors in their consolidation and dissemination of market data. Further, the accurate and efficient creation of a national best bid and offer (NBBO) will benefit from a high standard of accuracy and precision of time-stamped orders by market operators.

⁵² Data vendor responses to CP 145 outline the cost of the equipment.

Impact on ASIC*Enhanced data requirements*

- 225 We will incur costs in making changes to our current data feed and surveillance systems to be able to accept and process the data. Integration testing and end-to-end testing will need to be performed. We are currently upgrading our surveillance system, and expect to incorporate enhanced data feed and analysis functions as part of the upgrade.
- 226 For market users to be confident in the integrity of the market, there must be adequate surveillance to detect unlawful trading behaviour. The enhancement of surveillance data will allow ASIC to more effectively fulfil our statutory obligations to detect, investigate and deter misconduct. The proposal will benefit surveillance functions by improving the ability to conduct timely and accurate trading analysis for market reconstructions and perform more complex surveillance tasks. Timely pursuit of potential violations can be important in, among other things, seeking to freeze and recover any profits received from illegal activity. The proposed enhancements to surveillance data such as origin of order, order type and algorithmic trading data will strengthen our oversight of markets and enable us to:
- (a) quickly identify persons making trading decisions and to systematically detect misconduct by these persons;
 - (b) more efficiently assess market trends and the impact of certain types of trading activity on the market; and
 - (c) respond to parties trading in and around market crashes or other extreme price movements (e.g. the 6 May 2010 ‘flash crash’).

Clock synchronisation

- 227 This proposal will not impose any cost on ASIC; however, the promotion of more accurate consolidation and correct sequencing of orders and trades within very short periods of time will allow ASIC to better deter and prosecute microsecond level manipulations in the market.

Option 3: Proceed with enhanced data proposals with amendments (preferred option)**Impact on industry and consumers**

- 228 Under this option, we revised our requirements for enhanced data, following consultation with industry. We recognise that changes to market participants’ order management and trading systems were material. The anticipated impact to industry for the revised set of enhanced data

surveillance rules is expected to be less than Option 2 because the data requirements are now more readily available and practical to collate.

- 229 We will no longer require client classification to distinguish between retail and wholesale. We recognise that the provision of origin-of-order data may not always be possible (e.g. some may bundle clients' orders, to achieve volume-weighted average price (VWAP) execution). To minimise the impact on market participants and other stakeholders, we require much of the enhanced data to be provided to the extent that it is reasonable to do so, and propose a staggered implementation approach to allow sufficient time for market participants to upgrade their systems. We require the AFS licence number where an order originates from an indirect market participant and the information is readily available. A directed wholesale flag (a dummy variable indicating whether or not the order is wholesale direct) will be required in lieu of an algorithm identifier.
- 230 Further, we do not propose to make a new market integrity rule requiring clock synchronisation, which will lower the compliance costs to industry compared to Option 2.
- 231 Smaller brokers that use vendor solutions for their order management systems will not incur direct systems costs associated with enhanced data for surveillance. A large institutional broker indicated that the change would cost 12 months of internal FTE, charging \$200,000 per annum to implement. Market operators are expected to provide new data fields and system capacity for enhanced surveillance data.
- 232 The requirement to provide the new data requirements on the current real-time data feed avoids the expense of implementing new regulatory reporting infrastructure specifically for this purpose.

Impact on ASIC

- 233 The revised policy proposals will aid ASIC in our efforts to limit abusive market behaviour such as insider trading and manipulation of security prices. We believe the proposed rules will help to preserve the integrity of the Australian equity market, by enhancing our surveillance capabilities to keep up with the developments in automated order processing and the proliferation of trading venues. We expect improved market efficiency to increase investor confidence, and potentially benefit market liquidity and capital formation. The cost to ASIC will be qualitatively similar to that of Option 2.

Conclusion

- 234 We recommend Option 3 for the following reasons.

- 235 Option 1 does not deliver enhanced data for surveillance. In the absence of enhanced data feeds, we may not adapt to offer the most effective market surveillance solution to achieving our priority of ensuring a fair, orderly and transparent market.
- 236 We do not recommend Option 2 because it imposes relatively higher compliance burdens on market participants due to the nature of data required and the additional obligation of clock synchronisation. Following consultation with stakeholders, we believe that the majority of benefits from the proposed rules to enhance data for surveillance can be achieved with lower compliance costs imposed on industry.
- 237 Option 3 is the most reasonable option because it provides ASIC with considerably more useful information that it has today to enhance our surveillance functions but with lower compliance costs imposed on industry. Option 3 incorporates feedback from CP 168 and revises the data required to information that is more readily available, with some data to be provided where possible rather than mandated.

E Issue 4: Pre-trade transparency and price formation

- 238 This section considers options to protect price formation and the quality of the public markets. Recognising the important role that dark liquidity plays in the market, we consider alternatives to the current regulatory framework around pre-trade transparency to ensure:
- (a) the price discovery process is efficient; and
 - (b) displayed liquidity is protected in order to encourage pre-trade transparent limit orders and ensure a liquid market.

Context

- 239 Pre-trade transparency refers to information about orders being made publicly available before trades occur. It enables investors to identify trading opportunities, contributing to investor confidence that they will be able to execute a trade. Investor confidence in a market can provide incentive to other investors to participate, contributing to liquidity and stimulating more competitive pricing. Pre-trade transparency also plays an important role in supporting lit market quality, which is crucial for listed companies in valuing their assets and their ability to raise further funds, and it contributes to market participants' ability to achieve and evidence best execution.
- 240 In markets with multiple execution venues, transparency is even more important than in markets with a single execution venue. Where liquidity is fragmented across multiple venues, transparency is essential to ensure that investors are able to obtain a consolidated view of the multiple sources of liquidity. This allows investors to more efficiently search for and access liquidity. Consolidated information also allows issuers to monitor trading activity in their stocks.
- 241 There have always been rules in the Australian market requiring market participants to transact on an order book of a licensed market with pre-trade transparency, subject to exceptions for large orders. This is based on the notion that prices are most efficient when all orders are reflected in the demand and supply of a stock in the CLOB observed by all investors. This process is important because it establishes a reference price, which in addition to its role in trading is important for capital allocation decisions and capital raising, as well as creating a deeper pool of 'accessible' liquidity to minimise spreads and transaction costs.
- 242 Various forms of non-pre-trade transparent trading mechanisms have long been a necessary part of our market structure. The existence of dark liquidity dates back to 'upstairs trading', where a trade is negotiated between the

counterparties directly through their brokers, instead of executed on the stock exchange.

- 243 The main benefit of dark trading is that it allows market participants to conceal their trading intentions from the public market in order to minimise information leakage and price impact of block transactions. Disclosure of orders that are large in size (relative to the liquidity of the security) attracts imitation and front running by opportunistic and predatory traders, who seek to make short-term profits from the price impact of the large orders.
- 244 This can not only increase transaction costs and reduce investment returns of the large order, but may also increase volatility, and affect the price formation and orderliness of the market. It can cause considerable disruptions and increase the costs for entities that need to legitimately conduct larger trades because they will not be able to enter larger orders without causing a price impact and incurring significant transaction costs. Therefore, there is a need for the ability for investors to execute large orders with pre-trade transparency exceptions.⁵³
- 245 For example, when the portfolio of a large passive fund is rebalanced for reasons unrelated to the fundamental value of securities (e.g. a change in reference index composition or liquidity reasons), imitation and front running by opportunistic and predatory traders seeking short-term profits, along with the price impact of the large orders, may push prices away from their fundamentals.
- 246 Our policy proposals in this RIS are designed to strike the appropriate balance between accessible liquidity in the market, transparency in the price formation process and the orderly facilitation of large transactions.

Recent trends

- 247 What has changed in recent years is that:
- (a) new technologies and trading strategies have made it more efficient from the perspective of the market participant to execute transactions without displaying them on a pre-trade transparent order book, and for market participants to operate their own trading facilities—this has resulted in significant growth in the number of non-pre-trade transparent electronically accessible pools of orders, such as crossing systems;
 - (b) the removal in 2009 of the 10-second exposure requirement of the priority crossing rule also means that crossings are no longer exposed to

⁵³ Before November 2009, ASX Market Rule 17.2.4 required orders to appear on market for at least 10 seconds before priority crossing could be executed, allowing interaction with other lit orders.

the market before being crossed internally on the books of a market participant;⁵⁴

- (c) participants can offer more timely trading to their own clients and better prices in some cases (typically in less liquid stocks), albeit at the expense of orders queuing in the lit market; and
- (d) participants can benefit from lower exchange fees, from trading as principal with clients and by avoiding the message-based supervision fee.

248 Recently, there has been evidence suggesting that dark liquidity in Australia has reached the point where liquidity and price formation on exchange markets are being affected.⁵⁵ We are concerned that the situation can deteriorate rapidly as market share of dark liquidity continues to grow. Already we see trends that are concerning:

- (a) We see significant growth of dark trading in smaller orders, including trades on behalf of retail investors on dark pools. The number of dark trades below block size increased to 15% of total trades at end 2011, up from 8% in September 2009. This suggests dark liquidity is no longer just being used for its original purpose for managing larger orders.
- (b) There has been significant growth in the number of dark pools—market-participant-operated dark pools have trebled since 2009 to 18 (operated by 15 market participants). They account for around 4% of trading value as of March 2012, up from 2% in mid-2011. ASX operates two dark pools and Chi-X permits fully dark orders to interact with lit orders on its order book. This confirms there are increased avenues for trading in the dark.

249 Together, this evidence points to the growth of dark liquidity and a shift away from its traditional functions of minimising price impact for large trades. Our market is in the early stages of transformation. As the number and sophistication of dark pools grow further, there may be greater resistance to new regulation once there has been serious investment in dark pool technology.

International developments

250 The proliferation of dark pools and the growth in dark liquidity internationally have generated a great deal of public debate and regulatory scrutiny. Regulators in the United States, Canada and Europe are all considering the impact of dark liquidity on price formation, including price

⁵⁴ The 10-second priority crossing rule is a now-repealed rule that only permitted a priority crossing to be effected when the second bid or offer was entered into the execution venue at least 10 seconds after the first.

⁵⁵ C Comerton-Forde & TJ Putniņš, 'Dark trading and price discovery', ANU working paper, 2012; G Hutchens, 'Dark pool growth may harm markets', *The Age*, 2 July 2012.

volatility and spreads, and the functioning of markets more generally.⁵⁶ In addition, IOSCO has released draft principles to address regulatory concerns about trading in dark pools and other dark orders.⁵⁷

- 251 In general terms, the regulatory debate has focused on the impact of dark liquidity on:
- (a) ensuring sufficient displayed liquidity;
 - (b) the price formation process where there is a substantial volume of trading executed on dark pools and/or internalised;
 - (c) the potential fragmentation of information and greater liquidity search costs; and
 - (d) market integrity due to possible differences in access to markets and information.
- 252 It is standard practice here and abroad (including by IOSCO principles)⁵⁸ that orders should be executed based on:
- (a) *price–time priority*, where the order entered earliest at a given price executes first; and
 - (b) *lit order priority*, where pre-trade transparent orders execute before dark orders at the same price, even if the dark order was entered earlier.
- 253 After two years of study and consultation, Canadian regulators will implement new rules for trading in dark pools (covering alternative trading system but not other broker internalisation). If a trade is to be executed in the dark on one of these venues, it must offer meaningful (i.e. one tick size or half a tick if the stock is trading at minimum tick) price improvement over the best prices on displayed markets.⁵⁹ Visible orders must have priority over dark orders on the same venue. There is an exception for trades of 50 or more standard trading units or C\$100,000 or more (whichever is smaller).
- 254 Like regulators internationally, we are concerned about the importance of balancing pre-trade transparent liquidity and dark liquidity so as not to undermine the price formation process on public markets. We note the inherent tension between the short-term private advantages for a subset of the market of trading in the dark (e.g. lower exchange fees) and the long-term public good of contributing to the price formation process, which gives

⁵⁶ SEC, *Equity market structure* (Release No. 34-613358), concept release, 13 January 2010; Investment Industry Regulatory Organization of Canada (IIROC), *Update on forum to discuss CSA/IIROC Joint Consultation Paper 23-404—‘Dark pools, dark orders and other developments in market structure in Canada’ and next steps* (10-0156), notice, 28 May 2010; Council of European Securities Regulators (CESR), *CESR technical advice to European Commission in the context of the MiFID Review—Equity markets* (CESR/10-802), technical advice, 29 July 2010; CSA–IIROC, *Dark pools, dark orders, and other developments in market structure in Canada* (23-404), joint consultation paper, CSA and IIROC, 30 September 2009.

⁵⁷ Technical Committee of IOSCO, *Principles of dark liquidity* (IOSCOPD353), final report, IOSCO, May 2011.

⁵⁸ Technical Committee of IOSCO, *Principles of dark liquidity* (IOSCOPD353), final report, IOSCO, May 2011.

⁵⁹ That is, the price must be set at a certain level within the bid–ask spread. ‘Meaningful’ is defined by ASIC and IIROC as one minimum tick or half a tick if the stock is already trading at minimum tick.

investors confidence and promotes the interests of issuers and the broader community through an efficient secondary market for equities.

Assessing the problem

- 255 The essential problems are that:
- (a) The proliferation of dark liquidity below block size reduces the overall pre-trade transparency of the market, which may impair the efficient price formation process of the market.
 - (b) The migration of order flow away from pre-trade transparent venues into the dark can also reduce liquidity and increase transaction costs for the wider market.
 - (c) As the regulation currently stands, dark orders are allowed to take time priority over lit orders in the limit order book at the same price without offering price improvement. This is contrary to the fairness of time priority principles and discourages the submission of lit orders which contribute to price formation and market liquidity.

Reduced efficiency of price formation

256 Market efficiency refers to the ability of market participants to transact business easily and at a price that reflects all available market information.⁶⁰ Price formation is the process through which the security prices are established from the supply of and demand for the security. Available market information about the security is impounded into its price through the interaction between buy and sell orders. If enough orders are not transparent to investors, or there is unequal or incomplete information about orders, there may be insufficient information about prices for investors to identify trading opportunities. This hinders the efficiency of the price formation process, which may result in market prices that are not reflective of the fundamental valuations of companies.

257 When executed in the dark, orders contribute substantially less to price discovery. One academic study that analysed securities in the S&P/ASX 200 estimated that pre-trade information (both at the best bid and offer prices and other orders in an order book) accounted for 77% of the price discovery, while post-trade information accounted for only 23%.⁶¹

⁶⁰ IOSCO Committee on Secondary Markets—factors considered when determining if a market is efficient include liquidity, price discovery and transparency.

⁶¹ C Cao, O Hansch & X Wang, 'The information content of an open limit-order book', *Journal of Futures Markets*, vol. 29, 2009, pp. 16–41. The paper assess the contribution to price discovery made by the last traded price (23%), the best bid and ask prices (54.5%) and the orders in book at 2–10 price steps away from the midpoint (22.5%).

- 258 This is because the dark orders are not reflected in the demand and supply of stocks in the CLOB observed by all investors. If this information is incomplete (because a growing portion of the trading takes place in the dark) the quality of prices in the market may be diminished. Because dark orders contribute little to pre-trade price formation, there may also be concerns about whether they free-ride on the revealed intentions of other participants in the market.⁶²
- 259 The original intention for the introduction of dark pools and dark order types was to manage information leakage and price impact of large orders. In our market, we are seeing a sudden and significant change in the nature of dark liquidity, away from its original purpose of facilitating the execution of large orders.⁶³ While we recognise the benefits of dark liquidity for managing the price impact costs of larger orders, the increasing usage of dark liquidity for smaller orders is not attributable to the need to manage price impact. As a greater number of smaller orders migrate into dark trading venues, the public price formation process may be negatively affected due to further decreases in pre-trade transparent liquidity.
- 260 If confidence is lacking in the pricing efficiency of the market, the rational response of an investor (concerned about buying or selling a share at the wrong price) is to diminish the amount of trading. Therefore, a lowering in the effectiveness of the price formation mechanism may lead to a reduction in liquidity and increase in overall transaction costs.
- 261 A study of the decision by the off-market crossing service US ECN Island (Island) to ‘go dark’ in three actively traded exchange-traded funds (ETFs) in 2002 showed that price formation declined and transaction costs increased following the decision. ETF prices adjusted more slowly to new information when Island went ‘dark’, particularly compared to the corresponding futures market. Trading costs on Island increased, while trading costs of the same ETFs traded on other platforms remained stable—the net effect was an increase in overall costs.⁶⁴ When Island later redisplayed its orders a year later, price formation and market quality improved as a result of increased transparency.

Impact of dark liquidity on market quality

- 262 The proliferation of dark trading venues has increasingly attracted order flow away from the lit exchanges’ CLOBs. There is evidence to suggest that too high a proportion of liquidity being diverted from pre-trade transparent order

⁶² Technical Committee of IOSCO, *Principles of dark liquidity* (IOSCOPD353), , final report, IOSCO, May 2011.

⁶³ There has been a strong decline in the average size of dark trades below block size, from \$14,775 in September 2009 to \$9,405 in July 2011. The median size of these dark trades below block size is extremely small, at just \$1,540 in September 2009, falling to \$814 in June 2011.

⁶⁴ Hendershott & C Jones, ‘Island goes dark: Transparency, fragmentation and regulation’, *Review of Financial Studies*, vol. 18, 2005, pp. 743–93.

books results in wider spreads and worse prices for trades transacted both on pre-trade transparent order books and in the dark. This is because spreads in pre-trade transparent order books are likely to widen in response to there being fewer uninformed traders placing transparent orders (i.e. because traders want to avoid trading with informed traders to reduce the risk of the market moving against them after they enter into a position).⁶⁵ Deterioration in on-market liquidity is also associated with a higher cost of capital for companies seeking to raise funds.⁶⁶

263 Wider spreads mean worse prices on pre-trade transparent order books, as well as for those transacting in the dark, because off-order book trades reference prices on pre-trade transparent order books. This will be detrimental to market quality in general, and increase the transaction costs of the investing public. This is a classic case of a collective action problem, where individual incentives conflict with what would be a better outcome for all.

264 There is relatively scant literature that defines the precise volume threshold at which dark liquidity will have a serious negative impact on liquidity and price formation, but empirical evidence suggests that the relationship between dark liquidity and market quality is not a linear one. Experience in overseas jurisdictions where dark liquidity has proliferated generally indicates that:

- (a) dark liquidity can exist at low levels without causing harm to liquidity and price formation;
- (b) there is a tipping point that once dark liquidity achieves a certain market share, liquidity and price formation will be materially impaired;⁶⁷
- (c) market quality significantly degenerates when dark liquidity reaches 40% for consolidated trading volume;⁶⁸ and
- (d) pre-emptive regulatory action should be taken before the structural change occurs.

⁶⁵ D Easley, NM Keifer & M O'Hara, 'Cream-skimming or profit sharing? The curious role of purchased order flow', *Journal of Finance*, vol. 51, 1996, pp. 811–33.

⁶⁶ Y Amihud & H Mendelson, 'Asset pricing and the bid–ask spread', *Journal of Financial Economics* vol 17, 1986, pp. 223–49.

⁶⁷ J D'Antona, Jr, 'Nasdaq frets over internalization', *TradersMagazine.com*, 24 February 2010, www.tradersmagazine.com/news/nasdaq-internalization-dark-pools-level-direct-edge-sec-105265-1.html; F Hatheway, 'Testimony of Dr Frank Hatheway, Chief Economist, Nasdaq OMX', presented to the Securities, Insurance and Investment Subcommittee of the US Senate Banking, Housing and Urban Affairs Committee, 28 October 2009.

⁶⁸ J D'Antona, Jr, 'Nasdaq frets over internalization', *TradersMagazine.com*, 24 February 2010, www.tradersmagazine.com/news/nasdaq-internalization-dark-pools-level-direct-edge-sec-105265-1.html; D Weaver, *Off-exchange reporting and market quality in a fragmented market structure*, Comment on Concept Release *Equity market structure* (Release No. 34-61358), 16 April 2010, www.sec.gov/comments/s7-02-10/s70210-127.pdf; D Weaver, *Off-exchange reporting and market quality in a fragmented market structure*, Rutgers Business School, Rutgers University working paper, 2 May 2011.

Dark orders jumping the queue of the lit market

- 265 The existing rules on pre-trade transparency for non-block size trades permit trading to occur in the dark at the prevailing best bid and offer on lit markets: see Rule 4.2.3 on trades at or within the spread in ASIC Market Integrity Rules (Competition). These dark trades take time priority over lit orders at the best bid and offer. This means that dark orders are effectively jumping the queue of investors whose orders are displayed on an order book.
- 266 Dark trading has existed under pre-trade transparency exceptions⁶⁹ that were designed to ensure an appropriate balance between exposure of trading on the market and facilitating large transactions. The current regulatory failure is partly an inadvertent consequence of the removal (in 2009) of the ‘10-second priority crossing rule’ that required priority crossing participants to appear in the CLOB for 10 seconds before the crossing could be executed.
- 267 This results in investors that display liquidity waiting longer for their orders to be executed, which exposes their orders to greater risk of non-execution and adverse price movements. Dark trades at the spread may therefore undermine confidence in public markets if investors believe their orders will frequently be stepped ahead of by dark orders at the same price. We consider this unfair and it promotes order migration into the dark.
- 268 It is a widely accepted principle among international securities regulators that transparent orders should take time priority over dark orders. The current regulation does not require dark orders to follow the IOSCO principles of price–time priority or lit order priority, thereby putting price formation and investor confidence at risk.
- 269 If dark orders are allowed to jump the time priority queue at the same price, investors would be discouraged from placing lit orders on market. In turn, this would further reduce pre-trade transparency and harm market quality and the price formation process.

Objectives

- 270 With the proposed pre-trade transparency and price formation rules, we seek to promote investor confidence and allow market prices to reflect the maximum amount of information about market conditions. This would promote our objectives of ensuring:
- (a) the price discovery process is efficient; and

⁶⁹ Before November 2009, ASX Market Rule 17.2.4 required orders to appear on market for at least 10 seconds before priority crossing could be executed, allowing interaction with other lit orders.

- (b) displayed liquidity is protected in order to encourage investors to post limit orders—therefore, ensuring a liquid market.

271 Our aim is to balance the benefits of dark liquidity for larger sized orders against protecting the pre-trade price formation process, and the overall quality of the Australian market. In particular, our focus has been to:

- (a) continue to enable institutional investors with large orders to manage their market impact costs through the use of dark liquidity;
- (b) maximise pre-trade transparency through incentives to display orders;
- (c) protect displayed limit orders by requiring that dark orders below block size to offer meaningful price improvement. This will also ensure investors at least get a better price outcome when their orders are executed in the dark; and
- (d) treat similar activity consistently across lit exchanges and dark forms of execution.

Options

Option 1: Status quo

272 Option 1 is to maintain the status quo under which we would continue to rely on the existing regulation for pre-trade transparency exceptions to regulate dark liquidity.

Option 2: Proceed with the pre-trade transparency and price formation rules proposed in CP 168

273 Option 2 proposes:

- (a) to amend the ‘at or within the spread’ exception to pre-trade transparency to require dark trades below block size to provide meaningful price improvement (of one tick or at midpoint). This proposal seeks to address the impact of dark liquidity on price formation and market quality, and the time priority of dark orders over lit orders at the same price;
- (b) that if dark liquidity below ‘block size’ grows by 50% within three years from July 2011, to amend the existing minimum threshold for dark trades in the market integrity rules from \$0 to \$50,000 and apply it to passive (limit) orders. This proposal seeks to address the problem of migration of smaller order flow to trade in the dark;
- (c) to amend the ‘block trade’ exception to pre-trade transparency from a static \$1 million to a tiered threshold structure of \$1 million for the most liquid equity market products, \$500,000 for comparatively liquid

equity market products and \$200,000 for all other equity market products. This proposal aligns the block order threshold with the different liquidity profiles of listed stocks and is a concession for part (a) of the proposal; and

- (d) other minor adjustments to the market integrity rules to align the rules with industry practice.

Option 3: Proceed with pre-trade transparency and price formation proposals (a), (c) and (d) in CP 168, while continuing to monitor the need for increasing the minimum threshold for dark trades (preferred option)

274 Option 3 proposes to proceed with proposals (a), (c) and (d) in Option 2, while monitoring the need for increasing the minimum threshold for dark trades from \$0.

275 We will continue to monitor the development and impact of dark liquidity in our market. Since the release of CP 168 and CP 179, there has been further growth in the number of dark pools in Australia and new research providing evidence of dark liquidity increasing bid–ask spreads and adverse selection while reducing the efficiency of the price formation process in our market.

276 In addition to assessing the developments that may necessitate an increase in the minimum threshold for dark trades, we propose to evaluate the feedback and efficacy of alternative options on the size, trigger and target securities for which a minimum threshold should apply.

Impact analysis

Option 1: Status quo

Impact on industry and investors

277 As Option 1 maintains the existing market integrity rules for the regulation of dark liquidity, there will be no immediate impact to industry or consumers that is directly attributable to this option.

278 Recent studies on dark liquidity from both abroad and Australia provide evidence on the impacts that dark liquidity has on bid–ask spreads and price formation.

279 An academic study by Dan Weaver of Rutgers University examining the impact of internalisation and dark liquidity on price formation on the NYSE, Nasdaq and AMEX in October 2009 showed that the increasing proportion of off-order book trading has adversely affected price formation in the

- United States.⁷⁰ It has also led to a widening of spreads and a reduction of depth in the market (i.e. the volume of orders at each price point). He found that stocks with 40% of their volume traded in the dark will on average have a dollar spread that is \$0.0128 wider than a similar stock with minimal dark trading. This amounts to a transaction cost difference of around \$3.9 million per stock per year to investors.⁷¹
- 280 Weaver re-ran the study based on October 2010 data. The results showed an even stronger adverse impact on price formation than the earlier study. Consistent with Weaver, studies by Nasdaq suggest that market quality begins to degenerate when internalisation levels reach 40% or more.⁷²
- 281 It is reasonable to assume that under the status quo and kept unchecked, Australia's market will follow this trend. Professor Alex Frino from the University of Sydney, in the context of his work on dark liquidity, stated that 'Australia's market would be too small to handle the volume of dark trading that occurs in larger markets such as the US, and that if dark trading continued to grow it could severely damage market quality, while raising the cost of trading'.⁷³ The results suggest that if 20% of our trading activity went dark, the increase in the cost of trading on the main exchange would be about one basis point, which is approximately three times the ASX exchange fee.
- 282 Other international studies provide additional empirical evidence on the impact of dark liquidity on market quality, and show that internalisation at best is neutral and at worst harmful to market quality.⁷⁴ For example, Nimalendran and Ray from the University of Florida find that following dark pool transactions, bid-ask spreads tend to widen and price impact tends to increase, especially if the relative bid-ask spreads are already wide.⁷⁵ Easley, Keifer and O'Hara show that spreads widen in response to there being fewer uninformed traders placing lit orders (i.e. because traders want to avoid

⁷⁰ D Weaver, *Off-exchange reporting and market quality in a fragmented market structure*, Comment on Concept Release *Equity market structure* (Release No. 34-61358), 16 April 2010, www.sec.gov/comments/s7-02-10/s70210-127.pdf; D Weaver, *Off-exchange reporting and market quality in a fragmented market structure*, Rutgers Business School, Rutgers University working paper, 2 May 2011.

⁷¹ Given that the average NYSE stock traded 2,431,640 shares a day during October, and assuming that trades occur at the quotes and that investors pay one half of the spread, this would result in investors paying \$15,562.49 extra per day per stock (2,431,640 multiplied by half of \$0.0128) or \$3,890,624 per year per stock (250 multiplied by \$15,563.49) due to dark liquidity.

⁷² J D'Antona, Jr, 'Nasdaq frets over internalization', *TradersMagazine.com*, 24 February 2010, www.tradersmagazine.com/news/nasdaq-internalization-dark-pools-level-direct-edge-sec-105265-1.html; F Hatheway, 'Testimony of Dr Frank Hatheway, Chief Economist, Nasdaq OMX', presented to the Securities, Insurance and Investment Subcommittee of the US Senate Banking, Housing and Urban Affairs Committee, 28 October 2009.

⁷³ G Hutchens, 'Dark pool growth may harm markets', *The Age*, 2 July 2012;

⁷⁴ See for example, B Battalio, J Greene & R Jennings, 'Order flow distribution, bid-ask spreads and liquidity costs: Merrill Lynch's decision to cease routinely routing orders to regional stock exchanges', *Journal of Financial Intermediation*, vol. 7, 1998, pp. 338-58; HK Chung, C Chuwonganan & DT McCormick, 'Order preferencing and market quality on Nasdaq before and after decimalization', *Journal of Financial Economics*, vol. 71, 2004, pp. 581-612.

⁷⁵ M Nimalendran & S Ray, 'Informational linkages between dark and lit trading venues', University of Florida, working paper, 2011.

trading with informed traders to reduce the risk of the market moving against them after they enter into a position).⁷⁶

283 If investor order flow in Australia is allowed to continue to migrate into the dark, it will create further negative externalities for the wider market by diverting liquidity away from pre-trade transparent venues, impairing efficient price formation, increasing transaction costs and jumping the time-priority queue of lit orders.

284 Current market integrity rules allow dark orders below block size to execute ‘at or within the spread’. This means that under this option, dark orders will continue to be executed before lit orders at the spread. This undermines confidence in public markets if investors believe their orders will be stepped ahead of by dark orders at the same price. As investors in the lit market are left waiting longer for execution, they are discouraged from displaying liquidity and may migrate into the dark causing further impairment to price formation and market quality.

Impact on ASIC

285 There will be no immediate impact on ASIC that is directly attributable to this option.

286 Given the rapid developments of dark liquidity in the financial market, our current policies may no longer offer the most effective solution to achieving our priority of ensuring fair and efficient financial markets.

287 The growth in dark trading means that there is more activity away from the market where it is increasingly difficult to perform market surveillance.

Option 2: Proceed with the pre-trade transparency and price formation rules proposed in CP 168

Impact on industry and investors

Meaningful price improvement

288 Market operators will need to make one-off amendments to their systems (potentially trading and post-trade reporting systems) to reflect the requirement that dark trades below block size must only be executed with meaningful price improvement by referencing the NBBO. For ASX, this means changes to, or the removal of, the on-market priority crossing functionality and changing the reference price of Centre Point to the NBBO. Chi-X hidden orders already reference the NBBO.

⁷⁶ D Easley, NM Keifer & M O’Hara, ‘Cream-skimming or profit sharing? The curious role of purchased order flow’, *Journal of Finance*, vol. 51, 1996, pp. 811–33.

- 289 For both ASX and Chi-X, it means amendments to their off-market reporting function. They will need to amend their validation criteria for hidden orders and off-book trades to require price improvement. Market operators may also need to update the parameters of their trade rejection technology.
- 290 Market participants operating dark pools that do not already meet the meaningful price improvement proposal will need to make one-off changes to their order routing systems and matching algorithms to only match and execute orders in the dark when there is meaningful price improvement. Market participants that cross trades off-market (but not through automated means—that is, not a dark pool) will need to amend their policies and procedures to reflect the proposed requirement. Market participants that use the meaningful price improvement exception will need to amend their validation criteria for these off-book trades to require price improvement.
- 291 We received the following information on costs from soft soundings with a number of market participants:
- (a) One retail broker suggested that systems costs directly attributable to the meaningful price improvement rule are limited due to the limited circumstances in which they conduct dark trades below block size. They have manual processes for crossing orders and would only need to make minor changes to internal policies and procedures to ensure that they comply with the new rule. The cost of these changes is not expected to be material.
 - (b) One large institutional broker that operates a dark pool indicated that its systems already cater for the requirement of price improvement for dark orders, and will need to make minor adjustments to central configuration parameters. It indicated that the change would require approximately one month of internal system development work, at a cost of around \$17,000. It also indicated that economic costs would be medium to small because most crossings within its dark pool already occur at the midpoint.
 - (c) Another large institutional broker indicated that changes would be required to its smart order router, crossing engine and execution algorithms. It anticipates the changes will take ‘many months’, involving a team of internal development staff, charging up to \$2000 per day to implement.
- 292 Since the meaningful price improvement rule would apply to dark trades below block size, it will have a greater impact on dark pools with a great proportion of non-block size trades, while continuing to allow the price of block trades to be negotiated between counterparties at any price.
- 293 Under this option, dark trades between clients away from a lit order book would need to provide meaningful price improvement (by one tick size or the midpoint) upon the prevailing NBBO for both counterparties. Otherwise,

the order must be routed to a lit order book where the order will follow ordinary price–time priority (i.e. go to the back of the queue at that price). Both counterparties would receive a better price than they would receive if they were to submit a market order and cross the spread. However, neither of them would be able to capture the whole spread while gaining time priority over existing displayed liquidity, which improves the fairness of our market as a whole.

- 294 One impact to existing market practice is that market participants that currently cross client flow below block size and capture the spread themselves, including facilitated trades, would be required to share the spread with their clients or route the order to a lit order book. This will affect the participant’s profit margin from crossed trades. Soft soundings with two large institutional brokers indicated that 60–80% of crossings already occur at midpoint, and indicated that the impact to their broader business would be limited. This means the client will receive a better price than they would today if the market participant currently crosses at the best price and does not offer price improvement.
- 295 Clients that have benefited from receiving time priority by having their orders crossed by a market participant off-market at the spread (i.e. ‘jumping the queue’) will no longer be able to do so. We believe that it is important for there to be sufficient and complementary incentives in place for investors to display limit orders because limit orders drive the price formation process on market, which is important for capital allocation decisions and capital raising. The price in the underlying market may also feed back into the non-transparent market as part of the pricing process. Therefore, for orders executing in dark venues to gain priority over pre-trade transparent orders, they should offer meaningful price improvement.
- 296 This is expected to result in more orders being routed to a lit order book, and consequently improve price formation and liquidity on market. Market participants may incur higher aggregate exchange fees because the cost of executing an order on market is generally higher than the cost of reporting a crossing.⁷⁷ The actual cost to each market participant would depend on the volume of order migration from the dark to the lit market.
- 297 It is worth noting that the impact on competition is expected to be limited, because the proposed rule does not limit access to dark pools and applies equally to broker-operated and exchange-operated dark pools. It promotes fair competition by requiring meaningful price improvement for trades in the dark that currently takes time priority over limit orders in the lit market at the same price. Not allowing dark orders to bypass queues in the limit order

⁷⁷ The ASX on-market trading fee is 0.15 bps and the NBBO crossing reporting fee is 0.10 bps. The Chi-X on-market trading fee is 0.12 bps for aggressive orders and 0.06 bps for passive orders (average 0.09 bps), and the NBBO crossing reporting fee is 0.08 bps.

- book at the same price is consistent with the fairness of order priority principles and removes this unfair competitive advantage of dark pools.
- 298 Given the smaller market participants typically conduct fewer crossings and do not operate crossing systems, we expect the impact on smaller brokers would be minimal.
- 299 The proposal will primarily affect market participants operating crossings systems (which on average account for a relatively small part of their business) and is not expected to have a material impact on the competitive dynamics of the industry.
- 300 We expect the proposal to result in more liquidity interacting on public markets, helping to limit unexplained volatility, and ensure that prices are determined on the maximum information. This means prices relied on by broader society for valuing assets and superannuation, for example, are more representative of actual trading interests and are as accurate as possible.
- 301 This proposal will provide a balanced incentive structure to support the pre-trade transparent price formation process, because investors that contribute to the price formation process by displaying orders in pre-trade transparent order books will receive time priority over dark orders below block size at the spread. Under this proposal, orders that are displayed in an order book will no longer be stepped ahead of by trades executing at the same price in the dark. This should encourage more investors to display their orders, contributing to price formation and narrowing of spreads, which ultimately means more accurate valuation and lower transaction costs.
- 302 This has been demonstrated in academic research. For instance, Larrimore and Murphy conducted a study on the impact of disallowing internalisation without price improvement on the Toronto Stock Exchange's Price Improvement Rule in 1998. The results show that when the price improvement requirement is introduced, there is an increase in the price improvement rate, sharp declines in both quoted and effective spreads, lower return volatility, greater market depth, and higher overall market quality as measured by pricing error.⁷⁸
- 303 The authors also note that in markets with high levels of internalised retail order flow, the adverse selection in the market increases to reflect the greater risk of trading against informed order flow. The outcome of improved market quality implies that market makers could compete more aggressively for order flow following the rule change, as more limit orders came back on to the order book, thereby reducing adverse selection risk as reflected in the narrowing of spreads.

⁷⁸ NL Larrimore & AJ Murphy, 'Internalization and market quality: An empirical investigation', *Journal of Financial Research*, Fall, 2009, vol 32(3), pp. 337–63.

304 We expect that the proposed rule for dark orders below block size to offer meaningful price improvement will enhance the fairness and transparency of the Australian equity market by achieving qualitatively similar results.

305 One industry representative group has suggested that the price improvement requirement will devalue the order flow of retail brokers. Retail order flow is valuable because it is considered as relatively uninformed by market participants and institutional investors. In some jurisdictions, this has led to brokers selling their retail clients' order flow.

306 This issue is under close scrutiny in the United States and Europe. We see considerable risks in allowing such payment for order flow (PFOF). PFOF creates a clear conflict of interest between the participant and the client. It risks compromising a client's right to best execution (e.g. a broker may direct client orders based on who pays the most) and may be contrary to the ban that the Future of Financial Reforms (FOFA) will introduce on conflicted remuneration structures for advisers. The UK FSA has said that PFOF is a cost that may:

... have a number of adverse implications for the operation of a market and for the end users of the market. It may result in spreads being wider than might otherwise be the case. It may make firms less willing to narrow their quoted spreads than would otherwise be the case. Additionally, it may reduce the incentive of brokers receiving payments to seek price improvements over a displayed quote.

Minimum order threshold of dark orders

307 Under this option, we propose to increase the minimum threshold from \$0 to \$50,000 for dark orders below 'block size',⁷⁹ if dark liquidity below 'block size' grows by 50% within three years of July 2011. This proposal seeks to address the problem of migration of order flow to dark execution venues and the shrinking average size of dark orders. While we recognise the benefits of dark liquidity for managing the price impact costs of larger orders, the increasing usage of dark order types for smaller orders is not attributable to the need to manage price impact.

308 If the 50% trigger is met, passive orders (e.g. limit orders) below \$50,000 would need to be directed to pre-trade transparent order books, and would be protected against other dark orders below block size from stepping ahead of them.⁸⁰

309 If the minimum threshold for dark orders is increased to \$50,000, trading activity off-order book would be impacted because a proportion of current trading does not satisfy this size threshold. A threshold of \$50,000 would

⁷⁹ The block size threshold is currently \$1 million. We propose a tiered structure in the next section.

⁸⁰ Passive orders are orders that are not immediately matched when they are received by a market operator—they rest in an order book (e.g. a limit order priced away from the best bid or offer). In contrast, aggressive orders are those that are immediately matched (e.g. market orders).

mean that 69.2% (6.2%) of aggressive dark orders and 44.1% (4.2%) of passive dark orders by value (number of orders) would satisfy the proposed criterion during the month of May 2011 (sample period in CP 168: see Table 27 in CP 168, Appendix 2).

- 310 In response to the proposed increase in minimum order threshold, we expect that some smaller dark orders (such as child orders of sizable parent orders) would not be sliced into sizes below the threshold, limiting the impact of the policy on institutional investors. The exact dynamics of such changes would also depend on other factors, including the compounding effects of the meaningful price improvement rule and the tiered block threshold. Non-pre-trade transparent orders of a size below the threshold would not be allowed to be done in the dark. The threshold would not only limit the migration of order flow away from pre-trade transparent markets, but would also restrict smaller orders from becoming dark.
- 311 The expected order migration from the dark into lit exchanges may benefit exchange market operators. We do not expect exchange market operators to abuse this benefit, because there is competition between exchange markets that applies downward pressure on exchange trading fees and allows new entrants (including brokers and dark pool operators) to establish lit exchange markets in Australia.
- 312 In assessing the impact on business and competition, it is important to balance the trade-off between the short-term private advantages for a subset of the market of trading in dark venues (e.g. lower exchange fees) and the long-term public good of contributing to the price formation process, which gives investors confidence and promotes the interests of issuers and the broader community through an efficient secondary market for equities.
- 313 Operationally, market operators and market participants will need to make one-off changes to their systems to ensure only trades exceeding the minimum size threshold can be executed in the dark. Market operators and participants will need to amend their validation criteria for hidden orders and off-book trades to satisfy the minimum threshold. Market operators may also need to update the parameters of their trade rejection technology.
- 314 Market participants that cross trades off-market (but not through automated means—that is, not a dark pool) will need to amend their policies and procedures to reflect the proposed requirement. A threshold for dark order size currently exists under Rules 4.1.5 and 4.2.3 of ASIC Market Integrity Ruled (Competition) but is set at \$0. We have warned the industry since November 2010 of the possibility of increasing this threshold from \$0. For example, in RG 223 we have said at RG 223.182: ‘Market participants should anticipate that a threshold greater than zero may apply in the future and should factor this into their business plans and system development’. We

expect market participants to have built their systems with this in mind and, therefore, the cost for any further change is likely to be minor.

Tiered block order threshold

- 315 To implement this change, the configuration parameters within the order management systems of market participants and trade validation and rejection systems of market operators need to be changed to reflect the new tiered thresholds. The cost is not likely to pose a significant compliance burden. One large institutional broker that executes block crossings manually indicated that the change would result in two weeks of internal FTE (around \$10,000) to undertake staff training and configure system checks for block crossings. Another large institutional broker indicated that the proposal would not result in a mandatory change to systems and it would not necessarily make the change. But if it did choose to make the change, the change would cost six months of internal development (around \$100,000).
- 316 Market operators may need to amend their validation of post-trade information reported to them to reflect the tiered threshold.
- 317 Market participants have expressed strong support for the tiered block size threshold structure. Market participants will have more flexibility in how they manage large orders as the price impact of large orders decreases. The proposed tiered threshold structure will take into account the difference in size and liquidity of the listed stocks. This makes the block-sized exceptions to pre-trade transparency more relevant and effective.
- 318 We expect the tiered thresholds will allow more trading to take place in block size in less liquid stocks than is currently the case. To date, the use of block-sized crossing has been largely restricted to the most liquid stocks in the ASX universe. A \$1 million threshold for block-sized crossings is not practical for listed stocks for small companies with lower trading volume. For small cap/illiquid stocks, orders much smaller than \$1 million could have significant market impact. Therefore, this threshold would be more effective at allowing investors to minimise market impact if tiered based on liquidity.
- 319 It will enable market participants facilitating trades to better manage their risk by trading in block sizes off market. In addition, this creates new opportunities for market participants to trade in size, without pre-trade transparency. To the extent that large orders above the proposed new thresholds but below the current \$1 million are taken off market, the reduction in pre-trade transparency may detract somewhat from the price formation process, but this is balanced against the expected benefits of the meaningful price improvement proposal.
- 320 The tiered block size thresholds need to be viewed together with the meaningful price improvement rule. This will mitigate, to a significant

extent, the impact of the meaningful price improvement rule on market participants by allowing more trades to be classified as block specials and take place off book. We believe the proposed rules, taken together, will strike the right balance between dark liquidity's traditional function of minimising information leakage and price impact of block orders, and protecting efficient price formation, fair time priority and liquidity of the wider market.

- 321 The rules also strike a balance between large and small traders. Institutional traders will be able to continue to execute large orders with 'minimal market impact', while investors with smaller orders will receive 'meaningful price improvement' when they trade with dark orders.
- 322 Existing trade validation and rejection technologies of market operators are by and large compliant with the proposed rules. However, it has been suggested that real-time validation and rejection of facilitated large principal trades and large portfolio trades may be costly to implement for at least one market operator. The cost is mainly associated with a lack of economies of scale and difficulties in identifying stocks in trading suspensions. Given the feedback we received, we have modified our expectations for facilitated large principle trades and large portfolio trades to require post-trade validation instead of real-time validation. We also decided to pursue a simple method of determining meaningful price improvement (i.e. not volume weighted NBBO reference).⁸¹

Impact on ASIC

- 323 The proposed rules regarding 'meaningful price improvement' and 'minimal size threshold for dark orders below block size' will have minimal impact on ASIC. The processes in place for overseeing compliance with the 'at or within the spread' rule will be amended to reflect price improvement.
- 324 Under the proposed tiered block size threshold, the list of stocks that fall within each tier will need to be updated periodically. We will identify the stocks that fall within each tier based on their average daily value—market operators and participants will need to incorporate these lists into their systems. We also need to monitor and identify when the dark volume has reached the point where the \$50,000 threshold would be applied. Monitoring and development of dark liquidity will be conducted with a view to evaluating how a minimum threshold should apply; and at what level it should be set. We will also need to undertake staff training about the new rules and adjust our supervisory processes.

⁸¹ Real-time validation by a market operator of trades reported to it can impose significant costs (particularly with regard to system complexity) for limited benefit if the exception conditions are overly complex (e.g. being required to calculate a volume-weighted NBBO) or allow a margin or tolerance for error. A much simpler and more effective system would involve a validation process based on the top of order book NBBO at the time of reporting of the trade.

Option 3: Proceed with pre-trade transparency and price formation proposals (a), (c) and (d) in CP 168, while continuing to monitor the need for increasing the minimum threshold for dark orders (preferred option)

Impact on industry and investors

- 325 This option includes the ‘meaningful price improvement’ and ‘tiered block order threshold’ described under Option 2. The impacts are the same as described in Option 2. We believe that, at this stage, the meaningful price improvement rule will continue to allow innovation, while protecting lit orders and the price formation process.
- 326 One industry association suggested targeted implementation of the minimum threshold for dark orders to less liquid stocks, where migration of orders to the dark would have greater impact on spreads. Others have suggested alternative threshold sizes to the proposed \$50,000 (e.g. \$25,000) and different triggers (e.g. based on percentage of dark trading rather than an absolute value). The ultimate impact of any minimum order threshold would depend on such parameters. For example, a smaller threshold would have a smaller impact on industry, while a restricted implementation of the minimum threshold for dark orders may achieve a more targeted regulatory outcome.

Impact on ASIC

- 327 The impacts on ASIC are the same as under Option 2, except we would need to monitor the development and impact of dark liquidity in our market, and evaluate the feedback and efficacy of alternative options on the size, trigger and target securities for which a minimum threshold should apply.

Conclusion

- 328 We recommend Option 3 for the following reasons.
- 329 Option 1 does not address the risks that the proliferation of dark liquidity poses on maintaining a fair, orderly and transparent market. It also fails to address concerns associated with dark orders being allowed to step ahead of lit orders at the same price.
- 330 Option 2, as it currently stands, may potentially be improved with regards to the minimum dark order threshold rule to moderate its impact on market participants’ business models, while better addressing the risks of dark liquidity.
- 331 Finally, the basis of our proposals in Option 3 is to get the incentives right for displaying liquidity to support the price formation process. Australia’s

financial markets should operate with maximum transparency and fairness to investors—to give investors confidence and promote the interests of issuers and the broader community through an efficient secondary market. Our proposed meaningful price improvement rule protects those that display liquidity from being traded through by a dark order at the same price (i.e. to reward them for contributing to pre-trade price formation). At this stage, we propose to monitor the development and impact of dark liquidity and evaluate whether and how a minimum threshold should apply.

F Consultation

Consultation Paper 145 *Australian equity market structure: Proposals*

- 332 On 4 November 2010, we released a consultation package on enhancing regulation of Australia's equity markets, including proposals to address risks associated with the introduction of competition between exchange markets and from recent market developments.
- 333 The consultation package included a detailed consultation paper, Consultation Paper 145 *Australian equity market structure: Proposals* (CP 145), an overview summary document (reproducing Part 1 of the consultation paper), draft market integrity rules and a supporting economic report on Australian equity market structure, Report 215 *Australian equity market structure* (REP 215) (November 2010).
- 334 On 3 March 2011, we released Media Release (11-38MR) *ASIC announces timetable for the introduction of market competition*, which included a summary of the intended market integrity rule framework that would apply, as well as a preliminary summary of the submissions to CP 145.

Consultation Paper 168 *Australian equity market structure: Further proposals*

- 335 On 20 October 2011, ASIC released a second-phase consultation package which looks at equity market structure issues arising from developments in Australia's financial markets. The consultation package included:
- (a) Consultation Paper 168 *Australian equity market structure: Further proposals* (CP 168); and
 - (b) *Australian equity market structure: Further draft market integrity rules*.
- 336 CP 168 built on the findings of CP 145, and canvassed a number of proposals and market integrity rules that were considered to be necessary to keep pace with technological and market developments, and sought views in relation to:
- (a) enhanced controls for an increasingly automated trading environment;
 - (b) volatility controls to automatically limit market activity during extreme market movements;
 - (c) enhanced regulatory data requirements for ASIC's surveillance capability;

- (d) broadening the scope of best execution so investors have the same protection for both equity and non-equity products listed or quoted on ASX; and
- (e) exceptions to pre-trade transparency and mechanisms for promoting pre-trade transparency to address the impact of dark liquidity on the price formation process.

337 The key issues that arose out of the submissions received to CP 168 and our responses to those issues are summarised in Report 290 *Response to submissions on CP 168 Australian equity market structure: Further proposals* (REP 290).

Responses to CP 168

338 The submissions provided valuable feedback and suggestions. We have considered concerns about the interpretation and practical application of the market integrity rule. We have consulted with a range of stakeholders since receiving the submissions to seek further comment and to provide some background and guidance to the proposed rule.

339 We received 28 written submissions to CP 168 from a broad range of stakeholders, including market operators, market participants, fund managers, associations, high-frequency trading firms, law firms and a data vendor and technology firm.

340 We had over 50 meetings with stakeholders since the consultation paper was published on 20 October 2011 and held information sessions for members of the Australian Financial Markets Association (AFMA), the Financial Services Council (FSC) and the Stockbrokers Association of Australia (SAA).

341 For a list of the non-confidential respondents to CP 168, see Report 290 *Response to submissions on CP 168 Australian equity market structure: Further proposals* (REP 290). Copies of these submissions are available on the ASIC website at www.asic.gov.au/cp under CP 168.

Overview of feedback to CP 168

342 Respondents were generally appreciative of our holistic approach to consulting on the market structure framework. Some respondents commended ASIC on the breadth of our vision for the regulatory reform of Australia's financial markets and for engaging with a variety of stakeholders and global financial markets.

- 343 There was widespread support for ASIC to focus on the rules most necessary considering the current financial pressure in the industry, and for ASIC to issue guidance rather than make new rules where possible.
- 344 Respondents were generally supportive of measures to address risks created by the increasingly high-speed and automated nature of markets. However, they also stressed that such measures should be straightforward, transparent and flexible, to ensure legitimate trading is not inhibited, and suggested that we should continue to monitor developments in the market and respond where necessary. On some proposals, respondents suggested that competition between exchange markets should be allowed to develop further before introducing further regulatory change.
- 345 Some submissions stated that the proposals are likely to impose a significant cost burden in an environment where there is already financial pressure on industry. A number of respondents questioned the impact of some proposals on Australia's international competitiveness and questioned whether the benefits of our proposed approach outweighed the costs.
- 346 Respondents also sought certainty via a public timetable to allow them to allocate resources and to prepare for the proposed changes. The majority of market participant respondents suggested they require more than six months after the rules are settled to prepare for the changes required by the rules.
- 347 There was limited feedback received on the appropriate maximum penalty to be imposed for the proposed new market integrity rules. Responses received were generally in agreement with the maximum penalty, although one respondent noted that it was inappropriate to apply the same maximum penalty across the board for rules that apply to market operators and those for market participants, as incentives to breach the rules were not the same.
- 348 Some respondents continued to express caution about the pace of change in the Australian market and, in particular, the impact of high-frequency trading and dark pools on the fair and efficient functioning of the market.
- 349 Table 1 provides a summary of industry feedback on the main policy issues covered in this RIS and the adjustments we made in response to industry consultation. For a more detailed discussion of feedback to CP 168 and ASIC's response, see REP 290.

Table 1: Summary of industry feedback on main policy issues and our proposed amended approach

Issue	Industry feedback	Our proposed amended approach
Testing of systems before connection	<p>Respondents supported a greater focus on the quality and integrity of filters as opposed to targeting algorithms. Filters can more efficiently control for a broader range of activity and inhibit orders that might disrupt the market, irrespective of where and how those orders are entered. It is impractical to expect market participants to test algorithms for every possible scenario, especially scenarios that depend on the responses of other algorithms, systems or traders, or unforeseen market events.</p> <p>Other respondents expressed concern about the complexity and limitations of a testing environment where not every scenario can be tested. Some respondents submitted that regulatory requirements in this area must be in line with other jurisdictions, especially regions in which Australia's markets compete.</p>	<p>We will not proceed with a new rule on testing of algorithms. Instead, we intend to publish guidance under existing rules to clarify our expectations for testing of systems.</p> <p>The guidance will focus on: testing systems, filters and controls (rather than individual algorithms); managing highly automated trading; and stress testing of flow.</p> <p>We intend to clarify our expectation that authorised persons' systems order flow should be tested against market participant AOP filters. Such testing should occur before use (i.e. at the developmental stage) and before implementing any material changes.</p>
Direct control over messages and monitoring	<p>There were mixed views on this proposal. Some respondents supported it, noting that comprehensive trading filter systems and controls were already in place: see Rule 5.6.3 of the ASIC Market Integrity Rules (ASX) and ASIC Market Integrity Rules (Chi-X). Other respondents thought the requirements placed a monitoring burden on market participants in an environment where their resources are already stretched.</p> <p>A number of respondents thought that the existing rule framework is adequate. Many respondents suggested ASIC publish guidance to clarify our expectations of conduct under the existing rules, rather than make new rules. In particular, guidance was requested to elaborate on recommended practices for pre-trade controls and filter settings, real-time monitoring and post-trade analysis.</p>	<p>We intend to proceed with a market integrity rule requiring direct control over pre-trade filters.</p> <p>We will not make a new rule for real-time monitoring and post-trade analysis. Rather, we intend to publish guidance clarifying our expectations for these trading system controls under existing rules.</p>

Issue	Industry feedback	Our proposed amended approach
Controls for extreme price movements in equities and futures index	<p>Many respondents were supportive of measures to address risks associated with the increasing use of technology in trading in equities.</p> <p>Based on the submissions received, there was no consensus on the 15% limit band and one-minute limit state for an automated limit up–limit down volatility control. Most agreed with the five-minute trading pause.</p> <p>Respondents who did not support the proposal said existing order limit and extreme cancellation range controls should be monitored before introducing more complex controls and costs. They also said the Australian market has not reached the point where volatility controls are required, and the proposal was overly complicated and needed to be simplified.</p> <p>In relation to anomalous order entry controls for the ASX SPI 200 Future, there was general support for this proposal. Reasons included that it maintained consistency with equities, and was easy to understand and implement.</p> <p>There were a number of respondents who suggested it was more appropriate to implement a percentage price movement rather than a fixed limit as a parameter.</p> <p>Those respondents who did not support the proposal submitted that order entry controls along with a dynamic extreme cancellation range reference price is a more appropriate volatility control for the futures market and is less complex.</p>	<p>We do not intend to proceed with the limit up–limit down proposal.</p> <p>Instead, we intend to amend existing rules on anomalous order thresholds and extreme cancellation range to require that market operators should effectively minimise the incidence of transactions executing in this range (i.e. the process will be preventative rather than reactive). The rules now refer to ‘extreme trade range’ rather than ‘extreme cancellation range’.</p> <p>We intend to extend the amended rules for anomalous order thresholds and extreme trade range to the ASX SPI 200 Future: see draft rules in Chapter 2 of ASIC Market Integrity Rules (Competition) and Section B of draft updated RG 223.</p>
Data to assist ASIC with surveillance	<p>While there was in-principle support to have more efficient data to assist ASIC’s market monitoring function, many respondents raised concerns about costs involved and the amount of time required to implement the proposal. Other issues raised included administrative difficulties, privacy concerns, drag on innovation and the likely impact on performance and capacity, particularly around speed of execution.</p> <p>A number of respondents suggested that additional data could be provided on a post-trade basis, which would be more cost effective and aligned with most international practice. Industry noted its willingness to work with ASIC to provide additional data that could be readily provided.</p> <p>To reduce the cost of implementation for market participants, one respondent suggested the proposal be deferred to take advantage of global initiatives such as the Global Legal Entity Identifier standard of identification. Another respondent suggested that ASIC review the new suspicious activity reporting regime before requiring market participants to invest in significant technology requirements.</p>	<p>We intend to proceed with a rule to require a smaller set of data and client information to the extent it is available. The data requirement include:</p> <ul style="list-style-type: none"> • execution venue; • capacity of participant (e.g. principal or agent only); • a reference indicating the origin of the order, to the extent that information is available to a market participant taking reasonable steps to ascertain it; • the AFS licence number where an order originates from an indirect market participant and the information is readily available; and • flagging for directed wholesale orders.

Issue	Industry feedback	Our proposed amended approach
Meaningful price improvement	<p>There was support from some respondents, particularly market operators, for the meaningful price improvement proposal. One market operator suggested an acceptable price improvement would be a minimum of half a tick and agreed that the regulatory framework should support an outcome where both buyer and seller meet their trading objectives on a lit venue with meaningful price improvement (including dark orders on lit venues).</p> <p>Feedback received from market participants was mixed. While some respondents agreed there should be price improvement, others did not concur with the proposed one tick size. There were also suggestions that minimum price improvement should only apply to orders executed by way of a dark venue and an exemption should apply for instances where a market participant executes as principal against a client order for facilitation purposes.</p> <p>Market participants that rejected the proposal stated it was unnecessary to displace the current 'at or within the spread' exception, and that there was no compelling argument to support dark liquidity intervention at this point in time.</p> <p>The majority of respondents preferred meaningful price improvement to refer to top-of-book rather than volume-weighted averaging, suggesting that volume-weighted averaging would be too complex, costly and susceptible to gaming.</p>	<p>We intend to proceed with replacing the 'at or within the spread' exception with a requirement to obtain price improvement of one tick size or midpoint. The reference price for both on-order book hidden orders and off-order book transactions will be the top-of-book national best and bid offer (NBBO): see draft Rule 4.2.3 of the ASIC Market Integrity Rules (Competition) and Section D of draft updated RG 223.</p> <p>We intend to continue to engage with the industry on tick sizes, including considering whether there are certain products that would benefit from smaller tick sizes to minimise incentives to trade in the dark.</p>
Minimum size for dark orders	<p>There were widely divergent views with respect to the appropriate minimum size threshold.</p> <p>Market operators expressed strong support for the threshold.</p> <p>However, some respondents disagreed with the proposal on the basis that it would conflict with best execution obligations, introduce ongoing and unjustified uncertainty and may make dark pools unviable. Others did not consider there to be supporting evidence of actual deterioration of pre-trade price formation or market quality in the Australian market and suggested that the proposal should be given further consideration at a later time when the need for intervention becomes more definitive.</p>	<p>We do not intend to proceed with this proposal at this stage.</p> <p>We will continue to monitor developments in the Australian market and abroad, including the impact of the new meaningful price improvement rule.</p> <p>We will also continue to discuss with industry potential triggers for future application of an increased minimum size threshold for dark orders.</p>

Source: Report 290 *Response to submissions on CP 168 Australian equity market structure: Further proposals* (REP 290).

G Implementation and review

- 350 We intend to implement our proposals through market integrity rules. This is a rule-making power under the *Corporations Amendment (Financial Market Supervision) Act 2010*. Market integrity rules are legislative instruments. ASIC requires Ministerial consent before making any rules and any rules are subject to Parliamentary disallowance.⁸²
- 351 The proposed market integrity rules would supplement the existing ASIC Market Integrity Rules (ASX), which came into effect on 1 August 2010, and will supplement any new market integrity rules that are created for new market operators.
- 352 We recognise that certain proposals that form part of the new regulatory framework will take time and investment to implement and may affect the businesses of stakeholders. Following feedback from consultation, we have made amendments to our initial proposal to promote a fair, orderly and transparent equity market, while limiting the impact to stakeholders.
- 353 In relation to some proposed rules, we recognise that substantial system and process changes may be required, and intend to provide transitional arrangements to allow market participants some flexibility in their implementation strategy. Depending on the rule, we allow staggered implementation up to about 18 months from when rules are made.

Compliance regime

- 354 We intend that each market integrity rule will have a penalty amount, categorised as Tier 1 (\$20,000), Tier 2 (\$100,000) or Tier 3 (\$1 million), consistent with the existing penalty ranges under the ASIC Market Integrity Rules (Competition) and described in Regulatory Guide 216 *Markets Disciplinary Panel* (RG 216). RG 216 also outlines the policies that the Markets Disciplinary Panel will apply in determining penalties, and other remedial action that may apply.
- 355 We consulted on the proposed maximum penalties for contravention of each market integrity rule in CP 168 and CP 179 and received little feedback on the appropriate maximum penalty for each rule.
- 356 The proposed guidance outlines our expectations for compliance with the market integrity rules. The guidance does not add new obligations; nor does

⁸² A House of Parliament may disallow a market integrity rule within 15 sitting days after it is tabled in the House if a motion to disallow has been given and, within the 15 days, a resolution to disallow is passed, the motion is not withdrawn or the motion is not acted upon.

it incur penalties for non-compliance over and above those applicable to the rules.

- 357 In addition to the penalties for breaches of market integrity rules, ASIC may add conditions to the AFS licence of a market participant or revoke that licence and the Minister may do the same for market operators. In certain circumstances, ASIC may also direct a market operator to take certain action or refrain from taking certain action.

Regulatory guidance

- 358 We propose to publish regulatory guidance to assist industry to comply with the proposed regulation.

Education

- 359 We intend to engage industry about the best mechanism to educate the wider marketplace on the issues raised in relation to the proposed new regulatory framework. Education for retail investors may be required about the changing market landscape, proposed new investor protections (e.g. best execution), what the changes mean and where to get advice. It may be communicated, for example, through:
- (a) our consumer website (MoneySmart);
 - (b) articles in relevant financial and industry association magazines; and
 - (c) specific ASIC publications.

Review of regulatory framework

- 360 On an ongoing basis, we intend to review the regulatory framework to make any adjustments as a result of developments in the market and the international regulatory environment. We expect to comprehensively consult on any future proposed amendments.

Key terms

Term	Meaning in this document
(ACOP) automated client order processing	See 'DEA'
AFS licence	An Australian financial services licence under s913B of the Corporations Act that authorises a person who carries out a financial services business to provide financial services Note: This is a definition contained in s761A of the Corporations Act.
agency	Where a market participant acts on behalf of a client
algorithm/algorithmic trading	Electronic trading activity where specific execution outcomes are delivered by predetermined parameters, rules and conditions
algorithmic program	Automated strategies using programmable logic/system-generated orders (rather than human-generated orders) based on a set of predetermined parameters, logic rules and conditions. These include algorithmic trading, automated order generation, high-frequency trading and automated market making
AOP (automated order processing)	The process by which orders are registered in a market participant's system, which connects it to a market. Client or principal orders are submitted to an order book without being manually keyed in by an individual (referred to in the rules as a DTR). It is through AOP systems that algorithmic programs access our markets
arbitrage	The process of seeking to capture pricing inefficiencies between related products or markets
ASIC	Australian Securities and Investments Commission
ASIC Market Integrity Rules (ASX)	ASIC Market Integrity Rules (ASX Market) 2010—rules made by ASIC under s798G of the Corporations Act for trading on ASX
ASIC Market Integrity Rules (Chi-X)	ASIC Market Integrity Rules (Chi-X Australia Market) 2011—rules made by ASIC under s798G of the Corporations Act for trading on Chi-X
ASIC Market Integrity Rules (Competition)	ASIC Market Integrity Rules (Competition in Exchange Markets) 2011—rules made by ASIC under s798G of the Corporations Act that are common to markets dealing in equity market products quoted on ASX
ASX	ASX Limited (ACN 008 624 691) or the exchange market operated by ASX Limited

Term	Meaning in this document
ASX 24	The exchange market formerly known as Sydney Futures Exchange (SFE), operated by Australian Securities Exchange Limited
ASX guidance notes	Guidance notes providing assistance to ASX market participants on ASX's interpretation of the former ASX Market Rules
ASX Operating Rules	ASX Limited's new operating rules, which replace the pre-existing ASX Market Rules
ASX SPI 200 Index Future (SPI Future)	The ASX 24 futures contract listed with S&P/ASX 200 as the underlying product
Australian domestic licensed financial market	A financial market licensed under s795B(1) of the Corporations Act
Australian market licence	Australian market licence under s795B of the Corporations Act that authorises a person to operate a financial market
best available bid and offer	See 'NBBO'
best bid or offer	The best available buying price or selling price
best execution	Where a market participant achieves the best trading outcome for its client
bid–ask spread	The difference between the best bid and the best offer
block crossing/trade	A crossing where the consideration for the transaction is not less than \$1 million (pre-trade transparency exception in ASIC Market Integrity Rules (Competition))
Centre Point	An ASX-operated execution venue that references the midpoint of the bid–ask spread on ASX's CLOB
Centre Point priority crossing	A type of crossing that occurs on Centre Point, allowing an ASX market participant to match orders at the midpoint of the prevailing best bid and offer on the ASX CLOB
Chi-X	Chi-X Australia Pty Limited or the exchange market operated by Chi-X
CLOB (central limit order book)	A central system of limit orders, where bids and offers are typically matched on price–time priority
CFTC	Commodity Futures Trading Commission
CMCRC	Capital Markets Cooperative Research Centre

Term	Meaning in this document
CME	Chicago Mercantile Exchange
co-location	Facility offered by a market operator whereby market participants (and possibly clients of market participants) are able to place their trading processing servers within the same physical location as the market operator's processing servers to minimise latency
Corporations Act	<i>Corporations Act 2001</i> , including regulations made for the purposes of that Act
CP 145 (for example)	An ASIC consultation paper (in this example numbered 145)
crossing	A type of transaction where the market participant is the same for both the buyer and the seller. The market participant may be acting on behalf of the buying client and the selling client, or acting on behalf of a client on one side of the transaction and as principal on the other side of the transaction
crossing system	An automated service provided by a market participant to its clients that matches or executes client orders with orders of the market participant (i.e. against the participant's own account) or with other clients of the market participant. These orders are not matched on a pre-trade transparent order book
dark liquidity	Non-pre-trade transparent orders
dark liquidity/trading below block size	Trades using the 'at or within the spread' exception to pre-trade transparency. These include priority crossings, Centre Point priority crossings, and Centre Point trades
dark pool/venue	Non-pre-trade transparent, electronically accessible pools of liquidity
dark trades/trading	See 'off-order book trading/transactions'
DEA (direct electronic access)	Electronic access to markets via the electronic infrastructure of a market participant. Also known as ACOP in Australia, DEA is the process by which an order is submitted by a client, agent or participant representative into a market participant's AOP system directly without human intervention. DEA enables a client to access a market without being a direct market participant and without being directly bound by the operating rules of the market they are accessing
DTR	Representative of the market participant that has been authorised by the participant to submit trading messages to the execution venue on behalf of the participant

Term	Meaning in this document
ELP (electronic liquidity provider)	Typically, high-frequency traders or algorithmic traders who attempt to profit by providing continuous two-sided quotes for liquid securities on an unofficial basis to capture the bid–ask spread of a product
equity market	The market in which shares are issued and traded, either through exchange markets or OTC markets
equity market products	Shares, managed investment schemes, the right to acquire by way of issue shares and managed investment schemes, and CDIs admitted to quotation on ASX
ETF	Exchange-traded fund
ETF special trade (exchange-traded fund special trade)	Has the meaning given to the term ‘ETF Special Trade’ by the ASX Operating Rules
exchange market	A market that enables trading in listed products, including via a CLOB Note: Not all exchange markets offer primary listings services.
execution venue	An execution venue is a facility, service or location on or through which transactions in equity market products are executed and includes: <ul style="list-style-type: none"> • each individual order book maintained by a market operator; • a crossing system; and • a market participant executing a client order against its own inventory otherwise than on or through an order book or crossing system. This includes an order book and other matching mechanisms
extreme cancellation range	Range within which trades are required to be cancelled, as outlined in Chapter 2 of ASIC Market Integrity Rules (Competition)
extreme trade range	Has the meaning given in Rule 2.2.1 of ASIC Market Integrity Rules (Competition]
financial market	As defined in s767A of the Corporations Act. It encompasses facilities through which offers to acquire or dispose of financial products are regularly made or accepted
financial product	Generally a facility through which, or through the acquisition of which, a person does one or more of the following: <ul style="list-style-type: none"> • makes a financial investment (see s763B); • manages financial risk (see s763C); and • makes non-cash payments (see s763D)

Term	Meaning in this document
financial market	As defined in s767A of the Corporations Act. It encompasses facilities through which offers to acquire or dispose of financial products are regularly made or accepted
financial product	Generally a facility through which, or through the acquisition of which, a person does one or more of the following: <ul style="list-style-type: none"> • makes a financial investment (see s763B); • manages financial risk (see s763C); and • makes non-cash payments (see s763D) <p>Note: See Div 3 of Pt 7.1 of the Corporations Act for the exact definition.</p>
fragmentation	The spread of trading and liquidity across multiple execution venues
fully hidden order	An order on an order book that is not pre-trade transparent
high-frequency traders	High-frequency traders that adopt a specialised form of algorithmic trading characterised by the use of high-speed computer programs
high-frequency trading	While there is not a commonly agreed definition of high-frequency trading, we characterise it as: <ul style="list-style-type: none"> • the use of high-speed computer programs to generate, transmit and execute orders; • the generation of large numbers of orders, many of which are cancelled rapidly; and • typically holding positions for very short time horizons and ending the day with a zero position
institutional investor	Advising institutions typically concerned with buying, rather than selling, assets or products. The most common types of institutional investors include private equity funds, mutual funds, unit trusts, hedge funds, pension funds and proprietary trading desks
IIROC	Investment Industry Regulatory Organization of Canada
indirect market participant	A broker that is not itself a market participant, but that accesses the market through a market participant
internalisation	Where a client order is transacted against a market participant's own account
IOSCO	International Organization of Securities Commissions
issuer	A company that has issued shares
latency	An expression of how much time it takes for data to get from one point to another

Term	Meaning in this document
limit order	An order for a specified quantity of a product at a specified price or better
limit up–limit down	A control mechanism that aims to address volatility in markets by preventing trades in products from occurring outside a specified price band over a period of time. Sometimes referred to as a ‘collar’
liquidity	The ability to enter and exit positions with a limited impact on price
market impact	The effect on the formation of price, volume and market depth created by order flow or trading activity. This includes the associated cost incurred when the execution price differs from the target price, or when the liquidity required by the execution is different from the liquidity available
market integrity rules	Rules made by ASIC, under s798G of the Corporations Act, for trading on domestic licensed markets
market licence	An Australian market licence
market maker	An entity that provides liquidity to a market when it is generally absent or weak, and manages short-term buy and sell imbalances in customer orders by taking the other side of transactions. Market makers often take on this role in return for rebates and/or various information and execution advantages
market manipulation	As defined in Pt 7.10 of the Corporations Act
market operator	A holder of an Australian market licence that is the operator of a financial market on which equity market products are quoted
market order	An order at the best price currently available
market participant	An entity that is a participant of a financial market on which equity market products are quoted
meaningful price improvement	Where the trade is for a volume less than or equal to the volume displayed at the best available price, we consider ‘meaningful’ price improvement to be a one tick size price improvement or the midpoint of the best available bid and best available offer.
	Where the trade is for a volume greater than the volume available at the best bid and offer across the pre-trade transparent order books, price improvement may take into account the volume-weighted average price of the available orders rather than best prices only
MiFID	Markets in Financial Instruments Directive

Term	Meaning in this document
NBBO (national best bid and offer)	The highest bid (best buying price) and the lowest offer (best selling price) for a product that is available across all pre-trade transparent order books at the time of the transaction. The best bid and best offer may not necessarily be on the same order book. It may be that the best bid is on the order book of Market X and the best offer is on the order book of Market Y
NYSE	New York Stock Exchange
off-order book trading/transactions	Transactions that take place away from a CLOB and that are not pre-trade transparent. It is often referred to as 'dark liquidity' or 'upstairs trading'. It includes bilateral OTC transactions and transactions resulting from a market participant matching client orders or matching a client order against the participant's own account as principal. When this type of trading is done in an automated way and is part of a pool of liquidity, it is referred to as a 'dark pool'
operating rules	As defined in s761A of the Corporations Act
order book	An electronic list of buy orders and sell orders, maintained by or on behalf of a market operator, on which those orders are matched with other orders in the same list
OTC	Over-the-counter
partly disclosed order	An order on an order book that is pre-trade transparent with the exception of either price or volume
passive order	The unfilled balance of an active order, or any limit price order which is not immediately executable (i.e. priced to buy below the current offer, or priced to sell above the current bid)
portfolio crossing	See 'large portfolio trade'
post-trade transparency	Information on executed transactions made publicly available after transactions occur
pre-trade transparency	Information on bids and offers being made publicly available before transactions occur (i.e. displayed liquidity)
price formation	The process determining price for a listed product through the bid and offer trading process of a market
price step	The difference in price of one tick size

Term	Meaning in this document
price–time priority	A method for determining how orders are prioritised for execution. Orders are first ranked according to their price; orders of the same price are then ranked depending on when they were entered
priority crossing	A type of crossing on ASX's CLOB that is transacted at or within the spread with time priority
PureMatch	An ASX-operated low latency order book that provides trading in a subset of ASX-listed securities (intended for commencement in the Australian market in the fourth quarter of 2011)
REP 215	ASIC report <i>Australian equity market structure</i> , released 4 November 2010
RG 223 (for example)	An ASIC regulatory guide (in this example numbered 223)
Rule 5.6.3 (ASX) (for example)	A rule of the ASIC Market Integrity Rules (ASX) (in this example numbered 5.6.3)
Rule 5.6.3 (Chi-X) (for example)	A rule of the ASIC Market Integrity Rules (Chi-X) (in this example numbered 5.6.3)
Rule 4.2.3 (Competition) (for example)	A rule of the ASIC Market Integrity Rules (Competition) (in this example numbered 4.2.3)
S&P/ASX 200 Index or S&P/ASX 200	An index of the largest 200 shares listed on ASX by market capitalisation
SPI Future	ASX SPI 200 Index Future
s912 (for example)	A section of the Corporations Act (in this example numbered 912), unless otherwise specified
SEC	Securities and Exchange Commission (US)
settlement	The exchange of payment and delivery for purchased securities
SFE	The market formerly known as Sydney Futures Exchange (now ASX 24)
short selling	The practice of selling financial products that are not owned by the seller, with a view to repurchasing them later at a lower price. Short sales can be naked or covered
spread	The difference between the best bid and offer prices
synchronised clock	A system time clock that matches a reference source clock

Term	Meaning in this document
tick size	The minimum increment by which the price for an equity market product may increase or decrease
trade report	An electronic message created when a transaction is executed, detailing the terms of the transaction
trade-through	A model and rule that embeds price–time priority across multiple pre-trade transparent venues to protect displayed bids and offers from being bypassed
trading halt or suspension	A temporary pause in the trading of a product for a reason related to market integrity, such as when an announcement of price-sensitive information is pending (this does not include a halt or suspension caused by a technical problem, including a power outage, affecting a market operator’s trading system)
volatility	Fluctuation in a product’s price
volatility control	A post-order control that prevents certain orders from being matched beyond set price limits. These controls aim to limit the disruptive effect of anomalous trades

Appendix 1: Summary of key CP 168 policy proposals and refined propositions

Table 2: Summary of key CP 168 policy proposals and refined propositions

Issue	Key proposal in CP 168	Substance of refined propositions
Automated trading	'Kill switch' capability and other trading system controls.	<p>Make a new rule for 'kill switch' capability and requiring direct control over filters, with amended drafting.</p> <p>No new rule for real-time monitoring and post-trade analysis. Publish guidance clarifying our expectations for these trading system controls under existing rules.</p>
	Testing of algorithms and annual review of systems.	<p>Amend existing rules to incorporate an annual review of systems.</p> <p>No new rule on testing of algorithms. Publish guidance clarifying our expectations on testing of systems under existing rules (including of order flow via algorithms).</p>
	Additional minimum standards for direct market access.	No new rule. Publish guidance clarifying our expectations for additional minimum standards for direct market access under existing rules.
Extreme price movements	Limit up–down control for cross-traded products	No new rule. Amend existing rules on anomalous order thresholds and extreme cancellation ranges.
	Limit up–down control for ASX SPI 200 Index Future.	Apply the amended anomalous order thresholds and extreme cancellation ranges rules to the ASX SPI 200 index futures contract.
Enhanced data for surveillance	Identification of: <ul style="list-style-type: none"> • execution venue; • the category of client (e.g. principal or agent, retail or wholesale); • the origin of order (including if indirect broker); and • the algorithm that generated the order. 	<p>Make a new rule requiring identification of:</p> <ul style="list-style-type: none"> • execution venue; • principal or agency orders; • the origin of order (including client reference) where information is readily available (guidance to be provided); • the AFS licence number of a client order (where this originates from a shadow broker/indirect market participant and information is readily available); and • orders originating from wholesale clients through DEA with non-discretionary routing and execution instructions. <p>No new rule for client legal identifier on all orders.</p>
	Enhanced clock synchronisation for market operators and new requirement for participants	No new rule. Keep under review.
	Records to ASIC in standard format.	No new rule. Publish guidance on a standard format for provision of information. Revise content to ensure information required will be easier to source.

Issue	Key proposal in CP 168	Substance of refined propositions
Pre-trade transparency (dark liquidity)	Meaningful price improvement for dark trades below block size (one tick or at midpoint).	Make new rule on price improvement as proposed.
	If dark liquidity below 'block size' grows by 50% in next 3 years—impose \$50,000 threshold for dark trades from passive (limit) orders.	No new rule on minimum size threshold. Keep under review. Remain prepared to introduce if the price discovery function of the market is likely to be compromised.
	Tier 'block size' exception (currently \$1m) to range from \$200,000 to \$1m.	Amend the 'block size' threshold rules as proposed—in conjunction with the new price improvement rule.
Implementation timetable	Depending on the proposals, staggered implementation up to 12 months from when rules made.	Depending on the rule, staggered implementation up to about 18 months from when rules made.