

MECHANISMS USED BY TRADING VENUES TO MANAGE EXTREME VOLATILITY AND PRESERVE ORDERLY TRADING

Consultation Report

**The Board
OF THE
INTERNATIONAL ORGANIZATION OF SECURITIES COMMISSIONS**

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Foreword

The Board of the International Organization of Securities Commissions (IOSCO) has published this Consultation Report on Mechanisms Used by Trading Venues to Manage Extreme Volatility and Preserve Orderly Trading, with a view to encouraging the public to comment on its analysis and recommendations.

How to Submit Comments

Comments may be submitted by one of the three following methods **on or before 6th May 2018**. To help us process and review your comments more efficiently, please use only one method.

Important: All comments will be made available publicly, unless anonymity is specifically requested. Comments will be converted to PDF format and posted on the IOSCO website. Personal identifying information will not be edited from submissions.

1. Email

- Send comments to consultation-03-2018@iosco.org.
- The subject line of your message must indicate ‘Mechanisms Used by Trading Venues to Manage Extreme Volatility and Preserve Orderly Trading.’
- If you attach a document, indicate the software used (e.g., WordPerfect, Microsoft WORD, ASCII text, etc) to create the attachment.
- Do not submit attachments as HTML, PDF, GIFG, TIFF, PIF, ZIP or EXE files.

2. Facsimile Transmission

Send by facsimile transmission using the following fax number: + 34 (91) 555 93 68.

3. Paper

Send 3 copies of your paper comment letter to:

Giles Ward
International Organization of Securities Commissions (IOSCO)
Calle Oquendo 12
28006 Madrid
Spain

Your comment letter should indicate prominently that it is a ‘*Public Comment on mechanisms used by trading venues to manage extreme volatility and preserve orderly trading.*’

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1. Executive Summary

One of IOSCO's core objectives is to ensure that "markets are fair, efficient and transparent." Events of extreme volatility can undermine this objective, weaken the integrity of the securities markets and lessen investor confidence in the markets. The use of technology has grown exponentially in recent years. At the same time, there have been events of extreme (including abnormal) volatility in financial markets.

This Consultation Report (Consultation Report) explores the measures currently being used by trading venues in member jurisdictions to address the risks to orderly markets resulting from extreme volatility events. In particular, the report discusses:

- the various automated mechanisms used by trading venues to halt or constrain trading during extreme volatility events;
- the process for establishing and monitoring the thresholds and reference prices used in these mechanisms;
- how and what kind of information regarding the design, operation and triggering of these mechanisms is disseminated to regulatory authorities, marketplace participants and the public; and
- the level of communication between trading venues both inside and outside the trading venue's home jurisdiction.

The Consultation Report identifies the use of price constraint mechanisms that reject or constrain certain orders rather than halt trading, allowing trading and price formation to continue. In addition, the report identifies the importance of information sharing and communication between trading venues where securities or related asset classes are traded on multiple venues and the challenges where this occurs across jurisdictions.

The Consultation Report makes a number of recommendations intended to assist trading venues and regulatory authorities when making decisions about the implementation, operation and monitoring of volatility control mechanisms. Specifically, the report recommends that:

- trading venues should have volatility control mechanisms to manage extreme volatility and that these mechanisms should be appropriately calibrated and monitored;
- regulatory authorities should consider what information they require to effectively monitor the overall volatility control mechanism framework in their jurisdiction, and make sure that trading venues maintain relevant records;
- information about volatility control mechanisms and when they are triggered should be made available to regulatory authorities, market participants and if appropriate, the public; and
- communication amongst trading venues should be considered where the same or related securities are traded on multiple trading venues in a particular jurisdiction. In addition, where the same or related instruments are traded in different jurisdictions and the mechanism is triggered, communication may be appropriate.

2. INTRODUCTION

Recent events illustrate how extreme volatility can negatively impact securities markets and related asset classes across geographic jurisdictions. For example, U.S. market volatility on August 24, 2015 may have been associated with volatility in Asian markets, and the “flash crash” on May 6, 2010 impacted both U.S. equity and futures markets¹ with “knock-on” effects on markets outside of the U.S., such as the Canadian equity market. Other volatility events include:

- October 15, 2014 – U.S. Treasury market experienced significant volatility between 9:33 and 9:45 a.m. when the 10-year yield decreased 16 basis points and market depth declined 20% of its year-to-date average.²
- May 31, 2016 – PRC Futures Crash occurred when Chinese equity futures crashed over 12.5% and returned to previous levels seconds later.
- October 6, 2016 – GBP Crash occurred when values dropped more than 6% recovering to prior levels soon after.
- February 16, 2017 – French government bond (OAT) futures experienced a volatility event with yields falling 11bps within 85 seconds, in a period of significant illiquidity, before recovering most of the drop within eight minutes.
- Volatility events such as the above have led many regulatory authorities to review and assess the consequences of extreme volatility events and to determine appropriate policy responses. In a number of jurisdictions, trading venues and regulatory authorities have or are considering implementing mechanisms to address extreme volatility and help maintain orderly markets.³

Volatility controls are often thought to provide a calming influence on the market in times of market distress, as a theoretical study by Greenwald and Stein (1991)⁴ showed. However, empirical literature on the efficacy of market-wide circuit breakers has been limited owing perhaps to the fact that there has just been one market-wide circuit breaker trigger event in the U.S.⁵ Goldstein and Kavajecz (2004)⁶ studied the episode on October 27, 1997, with the finding that there was a decrease in liquidity in the following trading session. They attributed this decrease to limit order traders being reticent to resubmit expired orders from the previous trading session when the circuit breaker was invoked. Santoni and Liu (1993)⁷ found that a market-wide trading halt failed to moderate volatility, after studying the impact of coordinated

¹ See <https://www.sec.gov/news/studies/2010/marketevents-report.pdf>

² See Joint Staff Report: The U.S. Treasury Market on October 15, 2014 (July 13, 2015), available at <https://www.sec.gov/files/treasury-market-volatility-10-14-2014-joint-report.pdf>

³ In addition, other safeguards such as price checks conducted prior to order entry and trade reversal processes may be used to provide additional protection against excess volatility and help ensure fair and efficient price discovery.

⁴ Greenwald, B.C., and Stein, J.C., (1991) Transactional Risk, Market Crashes, and The Role of Circuit Breakers, *J Business* 64, 443-462.

⁵ “These halts were triggered for the first time on October 27, 1997 when the DJIA fell 350 points by 2:35 p.m. In the 25 minutes following the reopening at exactly 3:05 p.m., the Dow fell an additional 200 points to trigger a second halt, which closed the market for the day.”

⁶ Goldstein, M., and Kavajecz, K., (2004) Trading strategies during circuit breakers and extreme market movements, *J Financial Markets* 7, 301–333.

⁷ Santoni, G. J., and Tung Liu (1993) *Circuit breakers and stock market volatility*. *Journal of Futures Markets* 13(3), 261–277.

circuit breakers as adopted by NYSE, CME and other derivatives exchanges. Fama (1989)⁸ found that circuit breakers delay price discovery and harm efficiency, noting that rational pricing does not imply lower volatility. Subrahmanyam (1994)⁹ found that circuit breakers exacerbated price changes in subsequent periods and on other markets.

More recent studies, particularly post- “flash crash”, have reappraised the efficacy of these mechanisms, where on balance circuit breakers are perceived to benefit the markets. Kirilenko et al. (2017)¹⁰ argued that circuit breakers would act as a calming influence on the market and build investor confidence, and noted that “appropriate safeguards must be implemented to keep pace with trading practices enabled by advances in technology”. Ackert (2012)¹¹ contended that whilst market-wide circuit breakers interrupt the price discovery process, they provide the exchange and market participants time to reassess the market after a large volume shock, thereby putting a pause to a herd-type reaction to misinformation. She also notes the importance of coordinating across markets to minimize risks to other markets. Furthermore, as many financial instruments can be traded at different trading venues, and with some orders being internalized or traded away from a trading venue, Ackert posits that regulations need to be simple and easy to implement so that market participants fully understand the implications. A study by Brugler and Linton (2014)¹² found that although trading suspensions may not improve the trading process of a particular financial instrument, they do play an important role in preventing the spread of poor market quality across securities in falling markets and therefore can be effective tools for promoting market-wide stability.

In other markets, where similar mechanisms have been introduced, findings on the efficacy of these mechanisms have also been mixed. Lauterbach & Ben-Zion (1993)¹³ researched instances of circuit breakers triggered on the Tel-Aviv Stock Exchange during the crash of 1987 when the market experienced extreme order imbalances resulting in the closure of the exchange. They found that while trading halts did not stop the overall decline in the market, they appeared to have lessened price volatility by minimizing order imbalances.

Previous IOSCO work, specifically the “*Report on Trading Halts and Market Closures*”¹⁴ (2002 Report), examined interruptions¹⁵ in securities trading, including how such interruptions

⁸ Fama, E. (1989). *Perspectives on October 1987, or, What Did We Learn from the Crash?* In R. J. Barro, & R. W. Kamphuis Jr., *Black Monday and the Future of Financial Markets* (pp. 71-82). Homewood, IL: Irwin.

⁹ Subrahmanyam, A. (1994). *Circuit Breakers and Market Volatility: A Theoretical Perspective*. *J Finance*, 49(1), 237-254.

¹⁰ Kirilenko, A., Samadi, M., Kyle, A., & Tuzun, T. (2017). *The Flash Crash: High-Frequency Trading in an Electronic Market*. *The Journal of Finance*.

¹¹ Ackert, L (2012) *The Impact of Circuit Breakers on Market Outcomes*, Foresight UK Government Office for Science, EIA9

¹² Brugler, J., and Linton, O. (2014) *Circuit breakers on the London Stock Exchange; Do They Improve Subsequent Market Quality?* Cambridge- INET Institute Working Paper Series No: 2014/04

¹³ Lauterbach, Beni, and Uri Ben-Zion (1993) *Stock market crashes and the performance of circuit breakers: Empirical evidence*. *J Finance* 48(5), 1909–1925.

¹⁴ <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD138.pdf> (Oct. 2002).

¹⁵ In the 2002 Report, “trading interruptions” were described as referring to “trading halts” or “trading suspensions. The 2002 Report further noted that a “trading halt generally is a temporary interruption in the trading of a financial instrument, group of securities or a securities derivative in anticipation of, or in reaction to, an unusual event or condition affecting a financial instrument or group of securities. Certain regulatory trading halts are sometimes referred to as trading suspensions, and are often broader in scope and of longer duration than a trading halt imposed by a market.”

are authorized, how information is shared, as well as related issues involving multi-listed securities and derivative products and made a series of recommendations.¹⁶

In addition, in 2011, IOSCO published the report “*Regulatory Issues Raised by the Impact of Technological Changes on Market Integrity and Efficiency*”¹⁷ (2011 Report), which addressed the broad technological changes impacting markets, including high frequency trading and measures used to address volatility, including trading halts, circuit breakers and price limits. In Recommendation 2 of the 2011 Report, IOSCO stated that “regulators should consider the extent to which trading venues should be required to have volatility control mechanisms (e.g., circuit breakers, limit-up-limit-down controls or volatility thresholds) for risk management and the prevention of market disruptions due to sudden volatile price movements.”¹⁸

Since the publication of the 2011 Report, the complexity and the interconnectedness of markets has continued to grow, brought about by further advances in computational and communication technology. The IOSCO Board has therefore mandated Committee 2 on the Regulation of Secondary Markets (C2) to review the measures used or being considered by trading venues and regulatory authorities to manage the impact of extreme volatility in member jurisdictions and/or preserve orderly trading, with the goal of building on the recommendations in the 2011 Report.

In preparing this Consultation Report, C2 surveyed regulatory authorities and trading venues in its member jurisdictions. This Consultation Report examines the current regulatory frameworks and the associated policy rationales. It also analyzes the mechanisms to manage extreme volatility that are in place or being considered, and the reasons for the approaches taken. However, this Consultation Report does not examine how changes in market structure or technology may have impacted volatility¹⁹ nor does it identify and measure any causality for such volatility. This Consultation Report contains a series of recommendations applicable to the establishment, use and on-going monitoring of mechanisms to manage extreme (including abnormal) volatility, and/or preserve orderly trading.

Given the prevalence of automated trading in many markets, this Consultation Report focuses on “automatic” volatility interruptions and mechanisms to halt trading or reject orders, including, for example:

- a) Volatility-based mechanisms that are triggered automatically with the intent of pausing or otherwise managing trading in a pre-defined manner such as where:

¹⁶ The recommendations included determining if a general continuation in trading of a given financial instrument should be permitted where trading has been halted in the initial listing market. More generally, participants should be aware of the basis on which halts might occur and communication mechanisms should be in place so that participants are aware of when halts take place. In addition, the report recommended that, when a primary market is closed because of an “extreme event” or an infrastructure failure, the reaction of other markets, including derivatives markets, should depend on their assessment of all the relevant facts.

¹⁷ <http://www.iosco.org/library/pubdocs/pdf/IOSCOPD361.pdf>

¹⁸ The recommendation goes on to state that “[t]rading systems and algorithms should be robust and flexible such that they are capable of dealing with, and adjusting to, evolving market conditions. In the case of trading systems, this should include the ability to adjust to changes (including sudden increases) in message traffic”.

¹⁹ This Consultation Report does not look at non-automated mechanisms to halt or constrain trading, such as trading suspensions due to technical outages.

- trading is paused (or continuous trading is automatically changed to an auction) for a few seconds or minutes in single or specific securities to permit market participants to reconsider their orders/quotes²⁰ (single-stock circuit breakers); or
 - trading is halted for a certain time period in all or part of the securities in the market (market-wide circuit breakers); and
- b) Mechanisms to automatically reject or freeze certain orders without temporarily halting the market. These price constraint mechanisms may use order price or volume collars, where continuous trading is maintained but any new bids and offers outside pre-determined thresholds are rejected.

In 2016, the World Federation of Exchanges (WFE) undertook a survey on price-change induced circuit breakers,²¹ where it was found that 86% of the responding trading venues used some form of circuit breakers to ensure investor protection and improve market integrity and stability. Of these, market-wide circuit breakers have been most widely adopted, accounting for 72% of circuit breakers in the cash markets.

Where volatility control mechanisms are implemented, they are often designed to take into consideration, amongst others:

- historical instances of extreme market movements that have impacted their respective market (including trading venues' back testing of historical events);
- frequency of limits triggered; and
- input and feedback from the industry and market participants.²²

In addition, regulatory authorities and/or trading venues have taken into account significant global events and simulations of such events into their review of the effectiveness of their mechanisms.²³

²⁰ In these cases, trading usually but not always resumes through an auction.

²¹ Gomber, P., Clapham, B., Haferkorn, M., Panz, S., Jentsch, P., (2016) *Circuit Breakers – A Survey Among International Trading Venues*, Commissioned by WFE

²² For example the extreme volatility in the Canadian equity market on August 24, 2015 showed that prices for leveraged ETFs needed to move in wider increments; hence, IIROC increased the single-stock circuit breaker trigger thresholds to accommodate for the increased potential volatility of these types of securities. Bursa Malaysia Derivatives made changes to the dynamic price limits (DPL) on structured warrants due to frequent requests by its participants to widen the thresholds as the limits were impeding trading opportunities.

²³ see Annex A

3. Discussion of Volatility Control Mechanisms

Volatility control mechanisms seek to minimize market disruption caused by trigger events such as:

- (i) *Clearly erroneous orders* being submitted at incorrect prices or volumes resulting from manual order entry errors or malfunctioning market participant algorithms or automated order entry systems.
- (ii) *Large aggressive orders* that create imbalances between liquidity providers and liquidity takers and which may remove all or a significant number of resting orders or trigger a cascade of stop market orders.
- (iii) *Positive feedback loops* that may occur where large price movements initiate further buying or selling in the same direction, potentially exacerbated by a cascade of stop market orders.

This section of the Consultation Report describes the rationale behind the use of volatility control mechanisms and different approaches taken by trading venues.

i. The Importance of Volatility Control Mechanisms

Extreme volatility events may undermine the operation of fair and orderly markets and investor confidence. Inadequate, absent or inappropriate measures can impact market stability, integrity and efficiency. Recent experiences and actions undertaken by regulatory authorities and trading venues illustrate a recognition of the importance of volatility control mechanisms. Accordingly, many regulatory authorities and trading venues have been reviewing their approaches toward managing extreme volatility by, for example, introducing mechanisms to temporarily halt or constrain trading.

Trading halts are typically triggered by large price movements taking place within a short time period, and hence represent *ex-post* reactions to excessive price volatility in the market. More recently, trading venues have adopted mechanisms to automatically reject orders that work on an *ex-ante* basis (e.g., preventing the entry of orders outside of certain pre-determined thresholds). Such mechanisms allow trading to continue but executions may only occur within the prescribed thresholds.

The predominant rationales for the adoption of volatility control mechanism(s) by trading venues are to:

- (i) address significant or abnormal price volatility;
- (ii) preserve and/or ensure orderly trading;
- (iii) promote efficient price discovery; and
- (iv) protect investors and preserve market integrity and confidence in the market.²⁴

²⁴ In some jurisdictions, where individual investors constitute a sizable proportion of market activity, volatility control mechanisms may also be designed to dissuade excessive speculation and/or extreme price swings with a view to enhancing investor protection.

While trade intervention may help maintain fair and orderly markets, too much intervention can undermine market efficiency. Therefore, volatility control mechanisms should be just one component of an overall market resiliency framework that operates alongside other requirements such as proper testing of trading systems controls to check orders prior to entry and stress tests for increased order flows.

As recent events illustrate, extreme volatility events can have a negative impact on market stability, integrity and efficiency and on investor confidence. IOSCO believes that market volatility control mechanisms can be an effective way for trading venues to help mitigate these effects and preserve orderly trading.

RECOMMENDATION 1- TRADING VENUES SHOULD HAVE APPROPRIATE VOLATILITY CONTROL MECHANISMS

Trading venues should establish and maintain appropriate volatility control mechanisms during trading hours in order to manage extreme volatility and preserve orderly trading in a financial instrument on the market.

ii. Volatility Control Mechanisms

(a) Understanding the Applicable Market Structure

When examining volatility control mechanisms, it is important to understand the market structure in which they operate.

Differences in the approaches to managing excessive volatility reflect differences in market structure and the flexibility needed by regulatory authorities and trading venues. Therefore, a one-size-fits-all model across all asset classes and jurisdictions is not necessarily ideal. Differences in liquidity or product types may also necessitate a tailored approach when it comes to the design and functionality of mechanisms to protect the price discovery process and to avoid significant disruptions to orderly trading. For example, the approach taken for securities of large-cap issuers may differ from the approach applied to the securities of small-cap issuers as the volatility profile of each group may be significantly different.

Some have advocated that the use of automated volatility control mechanisms is preferred to the use of mechanisms that involve human intervention. This preference is based on the view that automated volatility control mechanisms provide a more transparent and fair response to disorderly markets and anomalous trades than controls that rely on the exercise of human discretion. While automated volatility control mechanisms are employed more often in automated markets, manual intervention may still be appropriate in some instances, such as trading venues that are small in size or operate in a manner other than a continuous order book (e.g. call market) where the benefits of automation may be absent. Trading venues should consider the specific condition and structure of their markets to devise an appropriate mix of volatility control mechanisms.

In addition, while most trading venues use some form of volatility control mechanism, the use of such mechanisms may not be appropriate for venues with low trading volume. In such cases, volatility events may be addressed through other solutions, including, for example, reliance on

specialists or market makers who can moderate price fluctuations prior to order entry or execution.

As well, most trading venues benefit from a high degree of automation in the design of volatility control mechanisms, especially those that are fully electronic and offer continuous trading. However, in other circumstances, market structures may not lend themselves to such a high degree of automation. For example, a trading venue that operates a periodic call auction market may not benefit from a highly automated solution and may instead consider an approach that focuses on the accuracy of calculated call prices.

In all cases, it is important that the design of volatility control mechanisms takes into account factors such as the size and structure of the particular trading venue as well as the types of financial instruments traded.

(b) Types of Volatility Control Mechanisms used by Trading Venues

Trading venues that have adopted volatility control mechanisms generally use either one or both of the following approaches:

- *Price banding*: Executions or order entries may only be made within prescribed price bands. Trading venues in some jurisdictions set wide price bands to address all potential extreme volatility events, while others set narrower price bands that may need to be more closely monitored to see if they need to be widened in certain situations. In certain jurisdictions, if no orders are received within the price bands after a certain period of time, the bands may be adjusted either automatically or pursuant to a rule. Once adjusted, trading and order entry may resume within the newly adjusted price bands. In other jurisdictions, if orders are not received within the price bands, a trading halt or trading pause is triggered.
- *Trading halts*: In the case of single-stock circuit breakers, trading of a particular financial instrument is halted for a period of time, which may be up to several minutes once an order is received or a trade occurs at a price that exceeds the pre-determined thresholds. During these trading halts, order books are generally open for order entry, modification and cancellation. Should an initial trading halt not achieve the desired result, that trading venue may decide either to extend it or to initiate further trading halts. Market-wide circuit breakers reference the general movement of the market (normally by reference to an index) rather than the price movement of a single financial instrument. When the index moves beyond a predetermined threshold, trading of all securities on the trading venue or within a jurisdiction is halted. The length of the halt is predetermined and usually depends on the time when the halt occurs and whether there is sufficient time left in the trading day or session to reopen the market without the risk of it undermining market integrity, fairness and efficiency.

Volatility control mechanisms are usually active during continuous trading sessions. However many jurisdictions also apply such mechanisms to auction sessions: in such cases, the auction is delayed when the indicated auction price falls outside of the pre-defined thresholds.

Most volatility control mechanisms rely on reference prices that may be static, dynamic or a combination of both:

- *Static Reference Prices* – Static reference prices remain constant for an extended period, usually a trading day. They are generally set by the closing or opening price of a particular financial instrument or index. Static reference prices are generally wider than dynamic reference prices and are designed to address volatility events that occur over a longer period of time compared to dynamic measures.
- *Dynamic Reference Prices* - Dynamic reference prices are generally calculated on a continuous basis. The calculation method varies and can be as simple as referencing the current quote or last trade in a particular security or index, or more complex by taking into consideration the activity that occurred during the preceding period. Dynamic reference prices are usually set tighter than static reference prices so as to address volatility events that occur over a short period of time, such as those that could be triggered by extreme and rapid liquidity demands.

(c) Calibration of Mechanisms

When developing a volatility control mechanism, the calibration of the reference prices or thresholds is important. Various factors may be considered including the:

- the nature of the financial instrument or underlying asset;
- the liquidity and volatility profile of the specific instruments and asset classes/sub-classes; and
- the price of the financial instrument.

Few jurisdictions apply a “one size fits all” approach when calibrating volatility control mechanisms. These factors help ensure that mechanisms are not applied too broadly and do not react to the normal volatility of a particular financial instrument.

With respect to liquidity, in some cases, volatility control mechanisms are only applied to financial instruments that are deemed “liquid”. In other cases, all financial instruments may be covered by the mechanism and liquidity is considered when establishing the specific thresholds. Less liquid financial instruments are generally subject to wider thresholds.

When setting thresholds for volatility control mechanisms, the value or price of a financial instrument is usually taken into account, either in absolute or percentage terms. For example, some trading venues “bucket” financial instruments based on value and apply different thresholds to each bucket.²⁵

It is also important to consider that the minimum price movement, in absolute terms, will be more dramatic for lower-priced financial instruments than higher-priced ones. Alternatively, when threshold price movement is expressed by a percentage increase or decrease from the reference price, lower-priced financial instruments generally require a higher percentage price movement to trigger a volatility control mechanism.

²⁵ For example, ASIC requires certain securities markets (e.g. the Australian Securities Exchange and Chi-X Australia) to apply an Automated Order Threshold to reject aggressive orders that are a certain distance from a reference price. The price band varies based on the value of the security. Similarly, IIROC requires all Canadian marketplaces to employ marketplace thresholds that reject any order that upon execution exceeds the calculated reference price by a certain percentage. The percentage varies from 10% - 300% and is based on the trading price of the security.

Trading venues that trade derivatives in many cases establish thresholds for volatility control mechanisms differently. In some cases, models are used to establish appropriate thresholds. In such cases, the model price may consider the trading price of the underlying product. Order entry and execution is permitted to occur so long as the modeled or calculated price of the derivative aligns with the value of the underlying product. Any interruption to trading would only occur when the price of the derivative does not align with the theoretical price or price of the underlying product.

Because the effectiveness of volatility control mechanisms is heavily dependent on the thresholds used, IOSCO believes that it is vital these thresholds are appropriately calibrated by trading venues using relevant factors to ensure that the mechanisms are applied when necessary and do not interfere during times of normal volatility of a financial instrument.

RECOMMENDATION 2 – CALIBRATION OF VOLATILITY CONTROL MECHANISMS

Trading venues should ensure that volatility control mechanisms are appropriately calibrated. To do so, trading venues may consider the following non-exhaustive list of elements:

- (a) the nature of the financial instrument or underlying asset e.g. a security, ETF or derivative.
- (b) the liquidity or trading profile of the financial instrument.
- (c) the volatility profile of the financial instrument or underlying product.
- (d) the volatility control mechanisms in place for related financial instruments and/or markets.
- (e) the price of the financial instrument.

(d) Management of Volatility Control Mechanisms

Volatility control mechanisms require regular monitoring to ensure they continue to work as designed and remain effective.

(i.) Initial Testing of Mechanisms

It is standard practice for volatility control mechanisms to be tested prior to implementation to ensure that the mechanisms work as intended (i.e. function testing to test for consistency with the functional requirements). Trading venues may also conduct testing with other market participants prior to implementation to ensure the mechanisms interact appropriately with the marketplace.

(ii.) Monitoring of Mechanisms

IOSCO believes that regular monitoring of volatility control mechanisms is an important element to make sure that volatility control mechanisms continue working as designed and remain effective and that trading venues:

- conduct regular reviews of the mechanisms;
- ensure that the mechanisms are adapted to market changes; and
- adjust mechanisms where warranted.

Some trading venues review the mechanisms on a periodic basis (such as quarterly, bi-annually or annually), while others do not set specific timeframes but conduct reviews continuously or on an ad-hoc basis when necessary (for example, if requested by market users).

Reviews typically take into account information such as the number of order rejections recorded with existing thresholds, previous trade cancellation requests, the number and nature of trigger events, feedback from market participants and changes made by other market operators for the same or underlying products. Product-specific factors may also be considered, including corporate actions and changes to the liquidity profile.

Some trading venues have designed volatility control mechanism with wide price bands or thresholds intended to address all potential extreme volatility situations. In such cases, there is no discretion to modify or suspend a volatility control mechanism in response to a specific volatility event and the price bands or thresholds are consistently applied at all times. These jurisdictions believe that a consistent and reliable approach increases investor participation in the market during volatility events by providing certainty on how orders will be handled.

Other trading venues have implemented narrower price bands or thresholds but have the discretion to, temporarily adjust or suspend a volatility control mechanism in accordance with their rules, policies or requirements. The circumstances and factors that determine whether a modification is appropriate are reviewed on a case-by-case basis, and consider whether the automatic trigger or thresholds are appropriate to maintain the integrity of the market and preserve orderly trading in specific situations.²⁶ These circumstances and factors may include, for example, reopening trading after an extended period of market closure, and geopolitical events.²⁷

Regardless of the approach taken, IOSCO believes that it is essential that volatility control mechanisms are regularly monitored and that the mechanisms, including applicable thresholds (if authorized by law or in accordance with a trading venue's rulebook), are adjusted as necessary to ensure that they work as intended and do not unnecessarily interfere with the normal price discovery process.

RECOMMENDATION 3 – MONITORING OF VOLATILITY CONTROL MECHANISMS

Trading venues should regularly monitor volatility control mechanisms to make sure they are working as designed and to identify circumstances that would require the mechanisms to be re-calibrated.

²⁶ For example, in Canada IIROC may, with notice, temporarily widen the price thresholds of a particular security in response to an extraordinary event where increased volatility may be considered “normal” trading activity.

²⁷ On November 8, 2016, in advance of the U.S. presidential election, IIROC widened the price thresholds applicable to its single-stock circuit breaker program to accommodate the potential for increased volatility (IIROC Notice 16-0256 – November 8, 2016).

4. REGULATORY OVERSIGHT OF VOLATILITY CONTROL MECHANISMS AND INFORMATION TO REGULATORS

In C2 member jurisdictions, there are three main approaches to regulatory oversight of volatility control mechanisms. Under the first approach, regulatory authorities in some jurisdictions impose a general requirement that trading venues must operate fair and orderly markets,²⁸ but do not specifically require trading venues to employ volatility control mechanisms. To satisfy their obligation to operate fair and orderly markets, trading venues in these jurisdictions have in practice established, to varying degrees, rules or mechanisms for managing extreme volatility.²⁹ Consequently, trading venues may have provisions in their rules setting out, for example, the thresholds for triggers, the duration of a trading halt, or the means for determining opening prices following an interruption.³⁰

Under the second approach, trading venues in certain jurisdictions are specifically required to use volatility control mechanisms, but are given discretion in determining the precise methodology³¹ to use with varying degrees of specificity on how these mechanisms must operate. In the E.U., for example, the MiFID II regime contains detailed provisions and guidelines,³² while other jurisdictions provide more flexibility to trading venues in determining the appropriate volatility control mechanisms.³³

Under the third approach, regulatory authorities in other jurisdictions take a more direct approach to volatility control mechanisms and provide detailed requirements on how these mechanisms must operate.³⁴ For example, the rules of the Investment Industry Regulatory Organization of Canada (IIROC) provide price thresholds within which executions may occur on a trading venue, as well as other controls on volatility, such as the duration of a trading halt caused by the breach of a price threshold. The Australian Securities and Investments Commission (ASIC) similarly provides an “extreme trade range threshold” and sets the duration of a volatility interruption.

With respect to implementing these three approaches to volatility control mechanisms, in a few member jurisdictions, the regulatory authority has direct statutory authority to set certain mechanisms and thresholds.³⁵ In others, the trading venue sets thresholds with some manner of regulatory oversight (such as the requirement to notify the regulatory authority of the thresholds, set the thresholds through consultation with or oversight by the regulatory authority,

²⁸ The precise language varies among the jurisdictions.

²⁹ see Annex A

³⁰ see Annex A

³¹ see Annex A

³² see Annex A

³³ For example, Japan’s Financial Services Agency allows trading venues to design their volatility control mechanisms, which are then subject to regulatory approval.

³⁴ These jurisdictions include: Canada, Australia, Russia, and India.

³⁵ see Annex A

or through direct approval by the regulatory authority).³⁶ In the majority of jurisdictions, trading venues set thresholds with regulatory approval.³⁷

Regulatory authorities generally require trading venues to keep books and records. Trading venues commonly maintain records of their rules, policies and procedures and records relating to the operation, triggering and monitoring of the volatility control mechanisms. IOSCO believes that maintaining relevant records is important both from a governance and supervisory perspective, to facilitate the effective oversight, use and management of these mechanisms by relevant regulatory authorities and trading venues.

RECOMMENDATION 4 – INFORMATION NECESSARY FOR REGULATORY AUTHORITIES TO MONITOR THE VOLATILITY CONTROL MECHANISM FRAMEWORKS

Regulatory authorities should consider what information they require to effectively monitor the overall volatility control mechanism framework in their jurisdiction, and make sure that trading venues maintain relevant records.

Nearly all regulatory authorities have some access to information regarding the specific triggering of a volatility control mechanism and may obtain this information in one or more of the following ways:

- (i) *Information through internal, third-party, or public information channels.* Many regulatory authorities have real-time access to information about the triggering of automatic volatility control mechanisms through internal, public, or third-party information channels.³⁸
- (ii) *Through direct notification by the trading venue in certain circumstances.* Other regulatory authorities can receive information through trade reports from regulated trading venues, whether tied to the triggering of a volatility control mechanism or pursuant to a periodic reporting obligation.³⁹ Reporting obligations may be based on the underlying product(s) or volatility conditions, and/or the exercise of discretion or emergency action by the trading venue.⁴⁰
- (iii) *Upon request by the regulatory authority.* Some regulatory authorities may request information from trading venues and other relevant stakeholders (such as the issuer or SROs) when a volatility control mechanism is triggered, whether in real-time or after the fact.⁴¹

To ensure regulatory authorities can fulfill their responsibilities to monitor the overall effectiveness of the volatility control mechanisms framework in their jurisdictions, IOSCO

³⁶ see Annex A

³⁷ These jurisdictions include: Australia, Brazil, Canada, China, Dubai, Hong Kong, Japan (both METI and JFSA), Korea, Malaysia, Mexico, Saudi Arabia, and the U.S. (both CFTC and SEC).

³⁸ see Annex A

³⁹ see Annex A

⁴⁰ see Annex A

⁴¹ see Annex A

believes that trading venues should make available to regulators information regarding the volatility control mechanisms they use.

RECOMMENDATION 5 – INFORMATION REGARDING TRIGGERING OF VOLATILITY CONTROL MECHANISMS TO REGULATORY AUTHORITIES

Trading venues should make available upon request by their regulatory authority information about the execution of any volatility control mechanism.

5. DISSEMINATION OF INFORMATION TO MARKET PARTICIPANTS AND THE PUBLIC

IOSCO believes that market participants and the public should have information regarding the types of volatility control mechanisms in place on a particular trading venue, and how a mechanism may be triggered.

For market participants, the following information about trading halts can be very important:

- how a trading halt is triggered;
- the type of trading halt;
- the trading phase in which it was triggered; and
- any applicable extensions of the halt and the end of the halt.

Although trading venues usually report specific thresholds to the regulatory authority and disclose the general policies and arrangements to manage its volatility control mechanisms, the specific thresholds that trigger volatility control mechanisms might not be publicly disclosed in order to prevent potential misuse. However, even in this case, it can be useful for trading venues to publicly provide general descriptions of what thresholds may trigger a volatility control mechanism and how they are calibrated.

Trading venues generally make some degree of information available about their rules, policies and procedures regarding volatility control mechanisms, whether to regulatory authorities, market participants, and/or the market as a whole. In most cases, trading venues also disseminate various kinds of information when a volatility control mechanism is triggered, including, for example, the type of trading halt, the trading phase in which it was triggered, any extensions to the halt, and when regular trading resumes.

Information about volatility control mechanisms and thresholds

The majority of regulatory authorities require trading venues to publicly disseminate information about the volatility control mechanisms they employ, although the degree of prescriptiveness of these requirements and the discretion that is afforded to trading venues varies across jurisdictions.

Many regulatory authorities specifically require the publication of a trading venue's rules regarding volatility control mechanisms pursuant to a specific legal requirement.⁴² Others have general requirements that trading venues ensure an orderly, informed and fair market, and therefore trading venues are expected to disseminate important information to the market, which includes information about volatility control mechanisms.⁴³

In practice, a significant number of trading venues have rules, policies and procedures related to volatility control mechanisms described in their rulebooks which are typically approved or reviewed by the regulatory authority. These rules, policies and procedures, and any changes to them, are usually available on the website of the trading venue.

⁴² see Annex A

⁴³ CNBV (Mexico), Capital Market Authority (Saudi Arabia), MAS (Singapore)

When changes are made to the volatility control mechanisms, market participants are often notified, either prior to or at the time of implementation so that trading venue members can make themselves familiar with the new or modified characteristics of the mechanisms.⁴⁴

So, in most circumstances, the model of the volatility control mechanism used is disclosed both to the regulatory authority and the public. However, with respect to the specific reference prices or thresholds used, some trading venues disclose the specific thresholds at which volatility control mechanisms are triggered,⁴⁵ while others do not.⁴⁶ Some trading venues are reluctant to disclose the specific thresholds to market participants and/or the public so as to prevent the potential misuse and gaming of the mechanism (for example, intentionally triggering a stock halt).

IOSCO is of the view that it is important for market participants and, if appropriate, the public to be informed about the volatility control mechanisms that are used by a trading venue. This disclosure of information is important to facilitate the maintenance of fair and orderly markets.

RECOMMENDATION 6 – COMMUNICATION OF INFORMATION ABOUT VOLATILITY CONTROL MECHANISMS TO MARKET PARTICIPANTS AND THE PUBLIC

Trading venues should communicate sufficient information to market participants and, if appropriate, the public to understand the nature and operation of the volatility control mechanisms used.

Some trading venues are required to inform market participants and the public when a volatility control mechanism is triggered and also provide specific additional information such as the type of trading halt, the trading phase in which it was triggered, the extension of the halt and the end of the halt.⁴⁷

Trading venues that inform market participants when a volatility control mechanism is triggered typically do so by way of real-time, automated alerts or messages through platform-based messaging systems or market data feeds.⁴⁸ Trading venues tend to inform participants both when the mechanism is triggered, as well as upon the resumption of regular trading. Some

⁴⁴ E.g., Sibex (Romania) and Euronext (NE). (Sibex noted that it publishes any changes on its webpage at least 24 hours before taking effect.)

⁴⁵ A trading venue in Canada, TSX (Canada), reported that the MWCB threshold mechanism and threshold limits are described in detail and posted on its website; however, it reported that threshold limits for certain other instrument types (which were not specified) are not publicly disclosed. The trading venues in the United States reported that MWCB and LULD thresholds are publicly disclosed.

⁴⁶ For example, a trading venue in the Middle East (Tadawul (Saudi Arabia)) reported that it only discloses the fluctuation limits of its volatility control mechanisms; a trading venue in Asia (CLTX (Singapore)) reported that only the policies relating to the mechanisms to manage volatility are publicly disclosed; a trading venue in North America (TSX (Canada)) likewise reported that the specific thresholds underlying how VCMs are triggered are not publicly disclosed.

⁴⁷ U.S. (SEC), EU jurisdictions under MiFID II and ESMA Guidelines; SC (Malaysia); FSC-FSS (South Korea). Under ESMA's final guidelines on trading halts under MiFID II, trading venues in EU member jurisdictions will be required to immediately make public through the means regularly used to make available pre- and post-trade information the activation of a trading halt, the type of trading halt, the trading phase in which it was triggered, the extension of the halt and the end of the halt. In the U.S., the information about trading halts is communicated in real-time to the public over the U.S. consolidated tapes.

⁴⁸ E.g., LSE (United Kingdom), CME (U.S.); BME (Spain)

trading venues also notify individual participants immediately if any of their orders are rejected as a result of an active volatility control mechanism.⁴⁹

Trading venues may provide different information to affected participants and to the public. Most trading venues indicated that they inform market participants directly when a volatility control mechanism is triggered but many indicated that they also notify the public. Several noted that they inform the public when a market-wide volatility control mechanism is triggered, but not necessarily when other types of halts, such as a single-stock circuit breaker, are triggered.⁵⁰ Some trading venues reported that they only inform the public when a market-wide circuit breaker is triggered, and information is posted immediately on their website.⁵¹ Other trading venues responded that they notify the public some period of time after market participants are notified (which is usually automatic and in real-time).⁵²

During an extreme volatility event, IOSCO believes that market participants and, if appropriate, the public should have sufficient information about the triggering of a volatility control mechanism. Specifically, market participants should be aware of the event and be provided the opportunity to add or remove liquidity and adjust booked orders as this should assist the return to a fair and efficient market.

RECOMMENDATION 7 – COMMUNICATION TO MARKET PARTICIPANTS AND THE PUBLIC WHEN A MECHANISM IS TRIGGERED

Trading venues should make available to market participants and, if appropriate, the public information regarding the triggering of a volatility control mechanism. Information to market participants should be provided promptly.

⁴⁹ E.g., ISE (Ireland); NXCL (Canada)

⁵⁰ For example, a trading venue in Canada reported that it publishes information on its website in the event of a market-wide halt, but informs market participants “who are connected or receive information directly from [the venue] or through a third party” about a broader number of events, namely whenever a volatility auction, single stock or market-wide halt occurs.

⁵¹ KRX (South Korea)

⁵² For example, a trading venue in South Africa (4X (South Africa)) noted that all data is automatically disseminated to authorized users of the platform when a VCM is triggered, and such data is then made available (with a 15 minute lag) on the venue’s public information portal “for anyone to access.”

6. COMMUNICATION BETWEEN TRADING VENUES

When a volatility control mechanism is triggered, communication between trading venues is important. Communication is particularly relevant where the same instruments are traded across multiple trading venues in the same jurisdiction, which is the case for many jurisdictions.⁵³ However, the trading of financial instruments in some jurisdictions is concentrated on a single trading venue⁵⁴ and communication is less relevant. Communication is also important where related instruments trade on separate trading venues. For example, most derivatives trade on separate trading venues from those of the underlying instrument.

Many jurisdictions have either implemented various communication options as regulatory requirements or have addressed these at the trading venue level. In examining the various approaches, it is worth noting that:

- if a jurisdiction has more than one trading venue trading the same or related instruments, requirements for communication between trading venues and/or a common set of rules or requirements are relevant. If trading in a financial instrument is halted on one trading venue, several jurisdictions will halt all trading in that financial instrument,⁵⁵ while others allow trading to continue on other trading venues or OTC;⁵⁶
- if regulatory authorities establish detailed requirements regarding volatility control mechanisms (i.e. describe the procedure for determining the threshold values that warrant suspension of trading or determine the duration of the trading suspension) the issue of consistency of application across venues should be considered;⁵⁷
- in jurisdictions with more general requirements for volatility control mechanisms, trading venues are usually required to cooperate when establishing a volatility control mechanism, or to enter into information sharing agreements/MOUs/other understandings or agreements with relevant foreign or domestic trading venues that trade the same or related instruments (including related derivatives), for purposes of coordinating their respective volatility control mechanisms.

Even where there are no regulatory requirements for communication, some trading venues have established communication with other foreign venues trading in the same or related instruments. This communication could be established through a formal bilateral agreement⁵⁸ or more informally; for example, the trading venue may draw up a list of relevant contacts at

⁵³ In many cases the number of venues is significant such as in the UK, which is comprised of over 70 MTFs and 7 regulated markets providing a variety of execution options. In the U.S., trading is dispersed among many highly automated trading centers including registered exchanges, ATs and broker-dealers. In Canada, securities are traded on several registered exchanges and ATs.

⁵⁴ In Hong Kong, for example, all securities are traded on a single venue and all futures and options contracts are traded on a single venue. Similarly in Korea, the Korea Exchange (KRX) is the only designated trading venue.

⁵⁵ These jurisdictions include: U.S. – SEC, Australia, Malaysia, Mexico, Canada.

⁵⁶ These jurisdictions include: U.S. – CFTC, MiFID jurisdictions, Hong Kong, Korea, Japan – FSA, Dubai, Russia.

⁵⁷ More detailed requirements are established, for example, in Australia, Canada, Russia, Saudi Arabia, U.S.

⁵⁸ For example, Brazil and CME Group (Chicago Mercantile Exchange) hold an agreement denominated Cross Listing in the Derivatives Segment, which requires immediate communication by one exchange to the other in the case of a standstill scenario with one of the cross-listed instruments. The duly informed exchange shall decide upon the procedures to be adopted, with this not being a mandatory obligation.

cross border venues that trade the same or related instruments. Organizations such as the World Federation of Exchanges may also facilitate this type of informal communication through contact lists that its members can use. Groups such as the Intermarket Surveillance Group may also be useful forums to facilitate the exchange of information on the operation of volatility control mechanisms and the discussion of such issues as repeated patterns of triggering of volatility control mechanisms through the operation of particular algorithms. The type of communication may be passive – such as where a trading venue receives real-time data feeds from relevant jurisdictions or active- such as where the trading venue communicates directly with other trading venues.

One of the main considerations for the need and method of communication is whether the volatility event could affect trading venues in other jurisdictions.⁵⁹ In addition, the need for communication may depend on the nature of the volatility event, for example, whether it related to a single stock or is a market wide halt. Market wide halts, in particular, if triggered in large markets, may affect trading venues in other jurisdictions. Another consideration is whether the other jurisdictions' venues trade the same or related instruments, such as futures or ETFs. In addition, information that is communicated could be useful for other venues to analyze their own market behavior.

Finally, sharing of historical information, such as data on the triggering of volatility control mechanisms may facilitate the analysis of market events or specific trading activity that may have contributed to a volatility event. This information may assist reviews of the impact and effectiveness of a volatility control mechanism.

IOSCO believes that communication by trading venues both within their own jurisdiction and outside their jurisdiction can be an essential component in effectively responding to extreme volatility events or assessing their effectiveness ex-post and should be considered when appropriate.

RECOMMENDATION 8 – COMMUNICATION BETWEEN TRADING VENUES

Where the same or related instruments are traded on multiple trading venues in the same jurisdiction, trading venues should communicate as appropriate when volatility control mechanisms are triggered. Where the same or related instruments are traded in different jurisdictions and the mechanism is triggered, communication may be appropriate.

⁵⁹ See introduction for examples of such events.

7. CONCLUSION

As discussed in this Consultation Report, the importance of the establishment of volatility control mechanisms is recognized by trading venues and regulatory authorities globally. IOSCO believes that these mechanisms support the goal of ensuring that markets are “fair, efficient and transparent”. As a result, IOSCO sets out the following 8 recommendations.

- Trading venues should establish and maintain appropriate volatility control mechanisms during trading hours in order to manage extreme volatility and preserve orderly trading in a financial instrument on the market.
- Trading venues should ensure that volatility control mechanisms are appropriately calibrated. To do so, trading venues may consider the following non-exhaustive list of elements:
 - a) the nature of the financial instrument or underlying asset e.g. a security, ETF or derivative;
 - b) the liquidity or trading profile of the financial instrument;
 - c) the volatility profile of the financial instrument or underlying product;
 - d) the volatility control mechanisms in place for related financial instruments and/or markets;
 - e) the price of the financial instrument.
- Trading venues should regularly monitor volatility control mechanism to make sure they are working as designed and to identify circumstances that would require the mechanisms to be re-calibrated.
- Regulatory authorities should consider what information they require to effectively monitor the overall volatility mechanism framework in their jurisdiction, and make sure that trading venues maintain relevant records.
- Trading venues should make available upon request by their regulatory authorities information about the execution of any volatility control mechanism.
- Trading venues should communicate sufficient information to market participants and, if appropriate, the public to understand the nature and operation of the volatility control mechanisms used.
- Trading venues should make available to market participants and, if appropriate, the public information regarding the triggering of a volatility control mechanism. Information to market participants should be provided promptly.
- Where the same or related instruments are traded on multiple trading venues in the same jurisdiction, trading venues should communicate as appropriate when volatility mechanisms are triggered. Where the same or related instruments are traded in different jurisdictions and the mechanism is triggered, communication may be appropriate.

Appendix A

Footnote 23	Examples of significant events that were simulated in reviews and which resulted in changes	• The U.S. SEC implemented several measures in response to the Flash Crash. For example, the SEC approved the LULD Plan and updated its MWCB. In addition, the SEC approved amendments to the clearly erroneous execution rules and eliminated stub quotes. The U.S. SEC monitors and evaluates extreme volatility events and the mechanisms in place to address them; • The “flash crash” of May 2010 resulted in South Korea’s KRX reviewing its circuit breaker mechanisms and the introduction of a new dynamic volatility intervention mechanism in 2014, supplemented by both a static threshold in 2015 and followed by a kill switch mechanism in 2016; • Euronext has made adjustments to tighten its static threshold levels following an incident in 2016. • On June 24, 2016, because Brexit led to a high number of single instrument trading halts, the market operator of the regulated market (Bolsa de Madrid) broadened the static range of all stocks to 25% and notified the regulator of this change. Spain also has conducted several studies which evidence the effectiveness of circuit breakers to address volatility.
Footnote 29	Jurisdictions that impose a general requirement that trading venues must operate fair and orderly markets, but do not specifically require trading venues to employ volatility control mechanisms	Hong Kong, Malaysia, Turkey, Mexico, U.S., Japan, Dubai, China and Saudi Arabia. For example, Hong Kong’s Securities and Futures Ordinance (SFO) provides high-level regulatory requirements for its trading venues, including statutory duties to ensure a fair, informed and orderly market. Trading venues are required to ensure that risks associated with their business and operations are managed prudently, however, there is no provision in the SFO that specifically requires the exchanges to apply mechanisms to manage market volatility. Mexico’s Security Market Law requires trading venues in its jurisdiction to issue internal regulation that sets surveillance activities to preserve orderly

		securities trading and the correct price formation, and have mechanisms to ensure market integrity.
Footnote 30	Trading venues that have provisions in their rules setting out the thresholds for triggers, the duration of a trading halt, or the means for determining opening prices following an interruption	For example, in the U.S., the U.S. self-regulatory organizations (SROs), including US exchanges and FINRA have developed and operate a National Market System Plan to Address Extraordinary Market Volatility (also known as the Limit-Up Limit-Down Plan or LULD Plan). The LULD Plan contains specific provisions related to, for example, how reference prices and price bands are calculated for individual stocks, how trading pauses are declared, the length of trading pauses, the information about trading pauses that is disseminated to the public, and how trading resumes after a pause
Footnote 31	Trading venues in certain jurisdictions are specifically required to use volatility control mechanisms, but are given discretion in determining the precise methodology	Italy, Romania, Ireland, Netherlands, Germany, Spain, France, UK (collectively Markets in Financial Instruments Directive or “MiFID jurisdictions”), South Africa, Korea and Brazil. For example, South Africa’s laws require trading venues to have a mechanism to manage volatility and preserve orderly trading in the markets, but are not specific to the extent of prescribing the specific mechanism that trading venues must employ, nor do they specify the scope of instruments to be covered. MiFID II requires trading venues to be able to temporarily halt or constrain trading if there is a significant price movement in a financial instrument on that market or a related market during a short period.
Footnote 32	MiFID II guidelines	The MiFID II guidelines require trading venues to calibrate their volatility thresholds according to a methodology that takes into account the nature of the financial instrument, its liquidity and volatility profile, as well as the trading mode and rules of the trading venue. These guidelines also require that trading venues have systems in place to ensure they notify competent authorities so that the authorities are able to coordinate a market-wide response and determine whether it is appropriate to halt trading on other venues on which the financial instrument is traded. These guidelines also provide that a trading venue’s circuit breakers should use static and dynamic reference prices unless the trading venue can demonstrate to its regulator that volatility can be adequately measured with only static or dynamic reference prices. These new guidelines went into effect on January 3, 2018.

Footnote 35	In a few member jurisdictions, the regulatory authority has direct statutory authority to set certain mechanisms and thresholds	These jurisdictions include: Australia (ASIC determines extreme trade range thresholds in its Market Integrity Rules (MIRs) but is required to consult before making or amending MIRs), Canada (IIROC sets the thresholds for market-wide circuit breakers, single-stock circuit breakers and marketplace thresholds following a public consultation process), India (SEBI prescribes the thresholds for market-wide circuit breakers), and Russia (regulations set out detailed requirements for circuit breakers). However, in none of these four jurisdictions does the regulator have sole authority over all volatility mechanisms and thresholds: in Australia, market operators may set anomalous order thresholds with notice to and oversight by ASIC; in Canada, trading venues may set more restrictive thresholds than those set by the regulator, upon approval from the applicable securities commission; in India, there are weekly surveillance meetings between trading venues and the regulator to discuss market safety and integrity issues; and in Russia, exchanges may create other mechanisms or set stricter limits and thresholds, with regulatory approval.
Footnote 36	Examples of trading venue that set thresholds with some manner of regulatory oversight	Jurisdictions include: India, MiFID II jurisdictions (France, Germany, Ireland, Italy, Netherlands, Romania, Spain, and UK), South Africa, and Turkey. In the EU, MiFID II (beginning in January 2018) will require venues to report the thresholds for halting trading and any material changes to those thresholds to the competent authority in a consistent and comparable manner, and the competent authority shall in turn report them to ESMA. ESMA has established a common reporting template for the relevant national authorities and the trading venues under its jurisdiction to describe details of the mechanisms in place.
Footnote 38	Regulators that have real-time access to information about the triggering of automatic volatility control mechanisms through internal, public, or third-party information channels	Some regulators reported that they have access in real time to the relevant information through market data feeds [The U.S. Securities and Exchange Commission (SEC), the Securities Commission (SC) (Malaysia), the Monetary Authority of Singapore (MAS), Securities and Futures Commission (SFC) (Hong Kong) and the Financial Services Agency (FSA) (Japan)]. One regulator has access to general trade data from designated contract markets (i.e., traditional

		futures exchanges, or DCMs) in real time through subscription-based market data feeds [U.S. Commodity Futures Trading Commission (CFTC)]. Others reported that they can access real-time trading data through market data feeds and/or internal market surveillance efforts [The Comisión Nacional Bancaria y de Valores (CNBV) (Mexico), the Australian Securities and Investments Commission (ASIC), and the Investment Industry Regulatory Organization of Canada (IIROC)]
Footnote 39	Regulators that can receive information through trade reports from regulated trading venues, whether tied to the triggering of a volatility control mechanism or pursuant to a periodic reporting obligation	The CFTC requires DCMs and other reporting markets to submit daily trade and supporting data reports that may, if requested, include information regarding the use of a specific volatility control mechanisms, as well as related trade data in the period before and after the mechanism is triggered. For futures trading, ASIC also receives daily files for surveillance and supervision data on a T+1 basis. MAS additionally requires trading venues to submit a report within 14 days when an index circuit breaker is triggered, describing the remedial actions taken at the time of the occurrence, and the subsequent follow-up actions that the venue has taken or intends to take.
Footnote 40		In the EU, MiFID II imposes the requirement that where a trading venue which is material in terms of liquidity in that financial instrument halts trading, that trading venue has the necessary systems and procedures in place to ensure that it will notify competent authorities in order for them to coordinate a market-wide response and determine whether it is appropriate to halt trading on other venues on which the financial instrument is traded until trading resumes on the original market. Accordingly, under MiFID II trading venues need to notify the relevant authority whenever the venue halts trading in a regulated market that is material in terms of liquidity. The Securities Commission Malaysia (SC) (Malaysia) imposes a notification requirement when an index circuit breaker is triggered. Other authorities such as the Dubai Financial Services Authority (DFSA) and the Monetary Authority of Singapore (MAS) impose a notification requirement if a venue exercises discretion to halt trading. Others such as the CFTC require notification if a DCM takes any

		emergency action, which can include the suspension or curtailment of all trading in a contract.
Footnote 41	Regulatory authorities that request information from trading venues and other relevant stakeholders (such as the issuer or SROs), when a volatility control mechanism is triggered, whether in real-time or after the fact	For example, the SEC reported that in the case of market-wide events, it maintains communication with self-regulatory organizations (SROs), and that depending on the circumstances, it will request additional information from the relevant SRO after a volatility event. The Financial Services Commission (FSC) and Financial Supervisory Service (FSS, and together, FSC-FSS) (South Korea), and South African Financial Services Board (FSB), for example, each also noted that they can access information about the triggering of volatility interruptions on all of its regulated trading venues upon request. MAS reported that it expects to be notified as soon as practicable, and that such communications often take the form of call updates, so that the MAS obtains as close to real time information as possible. The Autorité des marchés financiers (AMF) (France) noted that trading venues have formalized procedures to contact the regulator in specific instances, such as the occurrence of large price movements on blue chip securities or other atypical situations on other liquid equity securities. In such cases, the trading venue contacts the AMF by phone and then by email to inform the regulator when the mechanism is triggered. The AMF may also contact the issuer of the relevant instrument for the purpose of verifying the information that led to trigger of the volatility control mechanisms.
Footnote 42	Regulators that specifically require the publication of a trading venue's rules regarding volatility control mechanisms pursuant to a specific legal requirement	In the U.S. equity markets, volatility control mechanisms are published (i.e., the "Limit Up-Limit Down Plan" and MWCB rules), and any amendments thereto, are published on the SRO websites and any amendments thereto would be subject to public notice and comment and approval by the SEC. Further, rules related to trading halts are published on the SROs' websites and any amendments thereto would be subject to notice and comment. The AMF Quebec, IIROC and OSC similarly reported that detailed information about volatility control mechanisms is first published for public comment and subsequently published as final guidance on IIROC's website. IIROC guidance additionally sets out that each trading venue

		must publicly disclose a detailed description of the mechanism it uses to implement marketplace thresholds, including specific examples of how an order that triggers a marketplace threshold will be handled by that trading venue. ASIC also imposes relatively detailed requirements: the relevant requirements are published on ASIC's website, and trading venues must publish their operating rules, policies and procedures on their individual websites. Trading venues are further required to make information about anomalous order thresholds publicly available prior to their adoption, including each time the thresholds change, and must have transparent cancellation policies. Under the CFTC's principles-based framework, DCMs disclose information about volatility control mechanisms pursuant to the requirement that they make publicly available accurate information about such things as "the rules, regulations and mechanisms for executing transactions [...] and the rules and specifications describing the operation of the contract market's electronic matching platform or trade execution facility," as well as the principle that DCMs must "ensure that authorities, market participants, and the public have available all material information pertaining to [...] trading and product rules, or other changes to information previously disclosed by the DCM."
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