

**Deutsche Börse Group response
to the
IOSCO Consultation Report
on
Regulatory Considerations and Good Practices on the Evolution
of Market Liquidity During the Trading Day**

Frankfurt, 14 August 2026

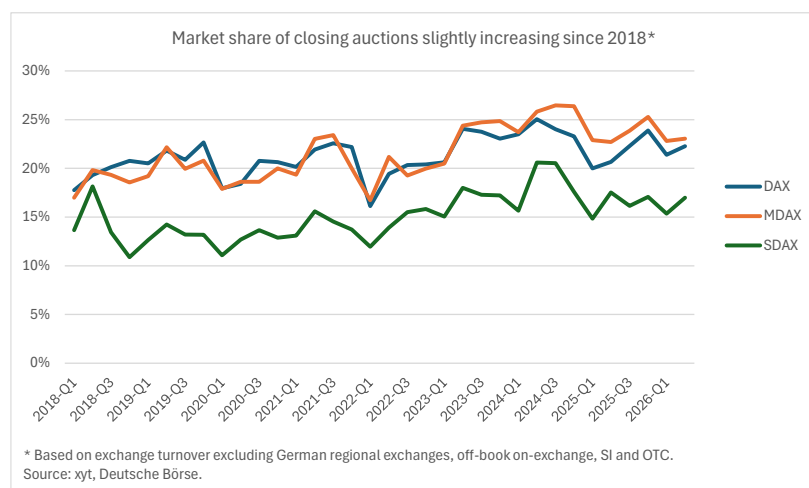
1. Introductory Remarks

n/a

2. Detailed comments to the consultation report

Question 1: Do you agree with the observed trends outlined in the Chapter 2?

DBG can only comment on the trends observed in Germany and more broadly in the EU. Historically, closing auctions have always concentrated a significant share of the turnover on trading venues in Europe but we do concur with the observation that closing auction volumes have increased in Germany over the past years. Looking specifically at German instruments, since 2018, the market share of closing auctions in German instruments (CDAX), when compared to all other execution venue types (excluding German regional exchanges due to limitations in historical data availability), grew slightly from 19% to 22% YTD May 2026. Participation in closing auctions is higher for large- and mid-caps. In DAX instruments, closing auctions account for 19% of turnover in 2018 and 22% in 2025. Similarly, closing auction participation in MDAX instruments increased from 19% to 24% over the same period. By contrast, closing auction shares for less liquid SDAX instruments were consistently lower, accounting for 14% in 2018 and 16% in 2025 (and only 12% when German regional exchanges are included).



We would also mention that the growth is not linear and subject to cyclical events with the most pronounced one being the index rebalancing affecting market participants with portfolios trades associated with those episodic index rebalances. Recently, the semi-annual rebalancing of MSCI indices effective after close on 29 May 2026 brought the Deutsche Boerse Xetra auction volume shares in Europe (of total trading venues' volume) to 53% for DAX stocks and 44% for MDAX stocks. Earlier, the latest semi-annual rebalancing effective after 24 November 2025 close brought the same market shares to 46% and 55%, respectively. But if the way portfolios are designed can be constrained by the "index balancing effect", other effects exist and might not reflect on closing auctions. As an example, we observe a hedging effect with derivative contracts during intraday auctions on Deutsche Boerse Xetra every third Friday of the month on the so called Double Witching Day, but more pronounced every third Friday of the last month in the quarter (March, June etc.) when derivative contracts on indices expire, so called Triple Witching Day. Because the strike price for Deutsche Boerse Xetra underlyings is mostly defined as the price of the intraday auction, market activity surges during the said auction due to program trading associated with index futures arbitrage and the order imbalances resulting from the unwinding of cash positions when options or futures expire (at 13:00 CET on settlement days). Equity futures and options also expire on the same days and derivatives trading is authorized until the closing auction on spot market. But the increase in trading before closing does not seem much higher than on usual Fridays.

The economic conditions also influence participation in closing auctions. This is valid not only for closing auctions; it is in general one of the arguments why market participants might prefer to trade in lit continuous trading than using auctions or dark venues. The Covid-19 crisis and the announcement of U.S. trade tariffs in that sense are a good example: in times of uncertainty and higher volatility, market participants express a need for immediacy since prices move quickly and immediate access to liquidity is preferable to waiting for the end of the trading session or even the few minutes the auction will last; the same way market participants turned away from SIs and dark venues in the EU during this period of high volatility. The need for immediacy is also reflected in the drop in the share of closing auctions compared to continuous trading. When the closing auction usually shows a market share of 20-25%, it was down to 9% on 7 April 2025 for example for DAX instruments (announcement of U.S. trade tariffs).

In derivatives markets, such as Eurex, the situation may slightly differ — beyond edge cases such as the Covid-19. For Eurex futures, the daily closing auction takes place at 22:00, so that benchmark Eurex futures can absorb and reflect price fluctuations in the underlying markets during the equity closing auctions through continuous trading around 17:30. We do not observe a comparable concentration of trading volume around the futures closing process. As a result, the specific liquidity concentration risks described in the report for equity market closing auctions are not necessarily evident in the same way within the derivatives markets environment.

While the report focuses on the evolving closing auction concentration between 2020 and 2025, DBG believes a broader, longer-term observation is essential. In particular, ETF creation/redemption mechanisms and associated NAV-based trading activity are likely key drivers of this increasing concentration across several markets and asset classes. Consequently, the trend of liquidity concentrating at market closure should be evaluated within the context of a wider, long-term market structure.

Furthermore, this growing concentration increases the significance of the closing price as a critical benchmark for equity index derivatives valuation, hedging, and settlement. Given the deep and growing interconnectedness between cash and derivatives markets, monitoring potential cross-market effects around the close is increasingly vital.

Question 2: Do you think that there are additional aspects or trends regarding end-of-day auction mechanisms and post-close sessions, that have not been captured? If so, please explain.

DBG would like to insist on the pivotal role of closing auctions in the functioning of equity markets. Closing auctions indeed benefit the market by concentrating liquidity, reducing cost and safeguarding the price formation process. The popularity of closing auctions shows that there is a significant demand from investors for this highly transparent and non-discriminatory mechanism which is in the best interest of investors, public companies and the market as a whole.

Closing auctions, as their name indicates, determine the closing price that is in line with the stock's intraday performance, in the best interest of public companies and investors. They are relevant to set the reference price for a high number of financial instruments (ETFs, traditional funds etc.) and allow market participants to replicate exactly the price at which index rebalances are done. In addition, it is the official closing price that is used for calculations for corporate actions and other transactions, and indeed is the generally accepted reference price for many other purposes, such as tax matters or for the determination of settlement prices by CCPs.

We would also add to the points listed in the IOSCO report that closing auctions contribute to making companies listed in the EU visible and tradeable at large quantities with a certain degree of execution probability and reliable price (as EU closing auctions take place when US markets are open). The global reference for each relevant stock is guaranteed by the robust price formation process carried out by primary exchanges, based on high quality matching algorithms that determine the closing price that maximizes the turnover. These auctions have a fixed schedule defined by trading venues and processes

are transparent as the theoretical auction price is continuously published. They do not substitute continuous trading which facilitates all orders as rapidly as possible during regular trading hours so that the trades are executed on a continuous basis at the prevailing market price but instead serve different purposes.

Furthermore, closing auction prices play a critical role in equity index derivatives markets, as they are widely used as reference inputs for the valuation, settlement, and risk management of index-linked products. A robust and liquid closing auction therefore supports market integrity by reducing valuation uncertainty, limiting the potential for price distortions at the end of the trading day, and ensuring consistency between cash and derivatives markets.

An additional trend is the growing dependence of cash-equity closing prices by related derivatives and benchmark products. The concentration of liquidity at the close may increase incentives for strategies targeting the cash market benchmark where derivatives exposures are significant, warranting ongoing assessment of cross-market interactions.

Question 3: Have you observed any positive effects arising from liquidity variation throughout the trading day? If so, please elaborate on these.

In general, liquidity varies throughout the trading day for equity instruments; those variations are structural and known by market participants. Typically, in Europe, the beginning of the day would see more activity and increased volatility due to the incorporation of overnight information into prices. Where activity would slow down midday, the opening of US markets would bring more activity end afternoon, to slow down again before the closing auction. The same way we do not consider that liquidity variation does not have negative effects, we would not either identify positive effects of liquidity variation across the trading day. Market participants will adjust their strategies depending on their needs and prefer trading at the close with increased liquidity and high price efficiency or earlier in the day based on information.

Question 4: Have you observed any impact on competition arising from liquidity variation throughout the trading day? If so, please provide further information on this.

As the IOSCO report underlines, we have been observing an uptick in mechanisms by which investors are guaranteed execution at the closing price, without routing trades through a trading venue's closing auction. As explained in our response to Q6, alternative venues do not make investments in the full range of activities necessary to contribute to the core price formation process, but rather use the data provided by exchanges to run their own commercial business models competing with the data sources for the same order flow at lower cost.

Question 5: Where a closing price cannot be determined in the closing auction, what fallback options exist in your jurisdiction, and how frequently have they been applied?

In the EU, stock exchanges can design their market models following a number of rules in particular in terms of transparency, pre and post trade, according to the legislative framework of Markets in Financial Instruments Directive (MiFID) and Markets in Financial Instruments Regulation (MiFIR). Closing auctions in particular are, like opening or intraday auctions, part of the trading models "periodic auctions", defined as per Commission Delegated Regulation (EU) 2025/1246 of 18 June 2025 amending the regulatory technical standards laid down in Delegated Regulations (EU) 2017/583 and 2017/587. A periodic auction system is defined as 'a system that matches orders on the basis of a periodic auction and a trading algorithm operated without human intervention' and information to be made public is the price at which the auction trading system would best satisfy its trading algorithm in respect of shares, depositary receipts, ETFs, certificates and other similar financial instruments traded on the trading system and the volume that would potentially be executable at that price by participants in that system. Regarding the price determination – the algorithm in place - and the status of the auction price, the EU regulation does not include specific requirements. In the case of the Xetra T7 platform, we for instance

do not publish an official closing price, which could be closing auction price. As such, we would consider only the last traded price for the relevant instrument on the platform and we would not recommend a fallback option other than referring to the last transaction price. In the case of an outage, we would follow the same principle which is compliant with ESMA's recommendation that in case of an outage, the market is provided with a closing price for the trading day, without mandating trading venues to nominate an alternative venue to run the closing auctions. For our platform Xetra T7, in case of an incident affecting the closing auction, we would postpone the closing auction and if needed, run it on a recovery system (see our Emergency Playbook, Incident Handling Standards and Best Practices Defined by Eurex and Frankfurter Wertpapierbörse available here: <https://www.cashmarket.deutsche-boerse.com/cash-en/Data-Tech/Information-Channels/emergency-procedures>, as well as the FESE standard outage protocols: <https://www.fese.eu/publications/trading-venue-outages-a-framework-for-industry-wide-standard-protocols-in-equity-markets/>).

Question 6: Have you observed an increase in the prevalence of mechanisms by which investors are guaranteed execution at the closing price, without routing trades through a trading venue's closing auction? If so, please provide details on this and, any impact on: (i) market efficiency; (ii) price discovery, (iii) liquidity, (iv) investor protection and (v) market resilience.

DBG considers that closing mechanisms and internalisation practices by SIs and brokers using the closing price set on primary markets as a reference price risk undermining the price formation process within closing auctions. While price formation occurs across a range of venues, such alternative venues do not make investments in the full range of activities necessary to contribute to the core price formation process, but rather use the data provided by exchanges to run their own commercial business models competing with the data sources for the same order flow at lower cost. As evidence, when system outages occur on primary exchanges in Europe – be it for central limit order books, opening or closing auctions – MTFs (both lit and dark), SIs and OTC markets usually halt their trading. The same outcome is observed during volatility interruptions on primary venues.

We would like to address here a more generic concern regarding price-reference venues. Indeed, as shown by research conducted by researchers from University St Gallen and reported by SIX Swiss Exchange, a removal of liquidity from the closing auction results in a shift in the closing auction price: A removal of 10% of the bid or ask liquidity dislocates the closing price between 8 and 12 bps across Blue Chips stocks. Furthermore, trading participants are reactive to incoming liquidity in the call phase; fragmentation of closing auction liquidity would result in a dilution of closing order interaction and a subsequent weakening of price discovery (Frauendorfer, K. & Müller, L., 2020, Liquidity-related Price Sensitivities of Closing Auctions in Equity Markets, Institute for Operations Research and Computational Finance, University of St. Gallen). In that sense Deutsche Boerse Group would call for a stronger monitoring of referencing systems, especially at the close and with systems which are less transparent than periodic auctions. We have been calling for instance for the introduction of the CLSE flag, as introduced by the UK FCA, which would identify all transactions done at the closing auction price.

Given the importance of closing prices for derivatives valuation, hedging and settlement, regulators should assess whether increasing execution fragmentation could weaken the liquidity concentration and price-discovery process underpinning these benchmarks.

Question 7: Does increased concentration of equity trading in the end-of-day auction pose additional risks that have not been identified in this Consultation Report? If so, please provide details on these risks and how you mitigate these.

DBG has not identified risks due to the increased concentration of equity trading at the close, besides those raised earlier due to the fragmentation of liquidity and the subsequent risks to efficient price formation. As explained in our response to Q6 and to Q20, our main concern is about all mechanisms which divert flows away from the primary exchanges running the closing auctions and the impact on price formation.

Regarding operational risks, we will address those points in our response to Q8 and Q9, but would like to already mention that accounting for changes in liquidity be it intraday, structural or due to liquidity shocks, is the core of stock exchanges' function; we do ensure that resources are efficiently distributed in the economy through orderly market conditions, at any time.

Question 8: Do trading venues' cybersecurity programs consider possible increased cyber risk implications related to changes in liquidity profile, such as concentrated liquidity periods? Are trading venues considering their operational resilience frameworks, BCP and recovery plans, in light of changes in liquidity profiles and concentrated trading periods? Do you have any additional element relevant to enhance the operational resilience during periods of increased concentration of liquidity?

The European Union already has wide range of regulations and/or legislative initiatives to tackle with cyber-attacks and operational resilience. As an example, the Digital Operational Resilience Act (DORA) is particularly designed to promote cyber resilience in the financial services ecosystem and help financial institutions, the financial sector and financial systems to prevent, to respond to, and to recover from cybersecurity incidents. As much as we understand that increased market activity might potentially bring increased attention from cyber-attackers, we are considering all threats within a determined framework widely defined under DORA which is adequately scaled.

Similarly, besides specific aspects covered under the Article 48 of the Markets in Financial Instruments Directive (MiFID II), operational resilience BCPs and recovery plans are covered under the DORA acts as the overarching, harmonized standard for digital and ICT-specific resilience and part of the trading venues' ICT Risk Management Framework. As for cyber-attacks, processes in place have a more generic approach which would cover market activity excess as our infrastructures are to be calibrated to support high number of messages, across the day but also in case of exceptional events impacting market activity. As a day-to-day management of liquidity across our platforms, Deutsche Boerse AG continuously invests in its trading system and is holding up transparency while providing a low latency trading venue. We have continued to add functionality while at the same time tuning our system further; as an example, the technical upgrade of the T7 core trading system in Q3/Q4 2024 significantly improved throughput and latency. The positive effects could be observed in the median latency values as well as in higher percentiles.

Question 9: Are there additional measures that mitigate risks stemming from operational risks due to peak volumes or due to changes in liquidity profiles and concentrated trading periods that IOSCO should take into account?

In terms of operational resilience, as explained in our response to Q8, trading venues in the European Union are regulated under the Market in Financial Instruments Directive and Regulation (MiFID/MiFIR) which include requirements to ensure orderly market conditions. The safeguards pre-existed the regulation and the directive provides a more or less prescriptive framework on the methodologies and parameters and requires regular review (at least annual). First, trading venues have to ensure that the most vital components of our systems are not harmed by a malfunctioning client: transaction limits mean a maximum number of messages which can be entered by the client, those limits are defined per session type and cap the entries/modification and deletion of orders/quotes. Second, pre-trade controls give each member a maximum order value and a maximum order quantity. The maximum order value for each instrument is calculated based on the volatility profile of the relevant instrument - instruments are clustered based on their liquidity profile - and the value is provided into our Instrument Reference Data file. Similarly, the maximum volume is obtained based on the maximum value divided by the price on the reference date and adjusted on a weekly basis. Third, a price validation functionality is implemented based on our circuit breaker parameters (see below) to which a certain coefficient is applied.

As noticed by the IOSCO report and part of MiFID, trading venues must also have circuit breakers in place (volatility interruptions). The design of the volatility interruptions is based on a number of

parameters which have been recently confirmed and made mandatory following the review of MiFID (Directive (EU) 2024/790 of the European Parliament and of the Council of 28 February 2024). On Xetra, for our listed shares, when the matching of two orders would take place at a price which goes beyond a pre-defined static or dynamic price range, trading in the relevant instrument goes into a 2-min auction to give market participants the possibility to amend their orders; if at the end of the auction the price still violates redefined ranges then we go on an extended volatility interruption which is handled by our Market Operations team. The static range is based on the last auction price whereas the dynamic range is based on the last traded price. The parameters are defined based on the past volatility of the instrument, its nature and liquidity.

It is essential that trading venues retain the flexibility to customize and calibrate their safeguards as they have the best knowledge and experience of their systems and listed products and they are, eventually, responsible for orderly market conditions; this includes adjustments to changes in liquidity conditions. As an example, Deutsche Boerse adopted the ACE (Automated Corridor Expansion) Model for ETFs in 2021, accounting for the specific nature of ETPs and their intrinsic higher volatility. Following the high volatility levels in 2020 and the frequent trigger of VIs on ETFs, it was decided to 1. Switch automatically expanding price ranges not requiring manual handling and 2. Publish the thresholds and parameters for more visibility. Under the ACE Model, each instrument is assigned to one of the initial ACE parameter classes, with each parameter class including parameters for the maximum number of ACE price corridors, the dynamic and static price ranges and the individual ACE price corridors. For ACE volatility interruptions during auctions, the duration of each ACE price corridor is 5 minutes plus a random end. For ACE volatility interruptions during Continuous Trading, the duration of the 1st ACE price corridor is 2 minutes plus a random end, and for each subsequent price corridor 5 minutes plus a random end.

The description of our mechanisms is available publicly at: https://www.cashmarket.deutsche-boerse.com/resource/blob/4942824/7f80f5406aab402eb2e5e2436ce0821a/data/T7_Release_14.1_-_Market_Model%20_Xetra.pdf

Question 10: What operational challenges arise when integrating liquidity-based parameters into surveillance and compliance systems?

Integrating liquidity-based parameters into surveillance and compliance systems presents several operational challenges. Liquidity can vary significantly throughout the trading day for a given financial instrument, making it difficult to define and maintain meaningful liquidity classifications, as liquidity bands may only broadly reflect actual market conditions at a specific point in time. In addition, measuring liquidity at a single trading venue can be misleading, since market makers often source and import liquidity from multiple venues. Finally, back testing liquidity-based alerts is more complex, as it requires consideration of different time periods and liquidity conditions to enable a comprehensive and robust assessment of alert effectiveness.

Question 11: How can trading venues and regulators effectively leverage on technological developments and data-driven frameworks and tools while maintaining transparency and accountability in surveillance processes?

Trading venues and regulators can effectively leverage technological developments and data-driven surveillance tools by adopting AI, where appropriate, to reduce false-positive alerts and enable greater focus on high-risk and complex anomalies. The standardization of data inputs and reporting formats can further enhance the accuracy of cross-market surveillance and analysis. In addition, AI-powered real-time surveillance capabilities can help detect sophisticated forms of market abuse, particularly those associated with high-frequency and algorithmic trading strategies. To promote a level playing field and ensure alignment across the sector, regulators should also adapt to technological advancements and make active use of AI models and advanced analytical tools in their supervisory activities. At the same time, transparency and accountability must remain central to the surveillance process. Where AI-

generated alerts are used, firms should ensure appropriate explainability, for example through Shapley value-based explanations or similar methods that help users understand the key drivers of an alert. In all cases, AI-generated outputs should be subject to review and validation by a human analyst before any conclusions or actions are taken.

Question 12: What protocols could strengthen cooperation between trading venues to detect and prevent cross-market manipulation?

The exchange of data between different trading venues is often challenged by differing supervisory and regulatory regimes across jurisdictions i.e., in Europe, trading venues cannot freely share confidential trading data with another for surveillance purposes due to legal, regulatory and confidentiality requirements (both on state and federal level). Also, the technical standard for data storage and the software used differs from trading venue to trading venue. Hence, the cooperation between trading venues can be strengthened as follows:

- Establishment of an exchange of information between trading venues and regulators regarding emerging market abuse trends.
- Setup of a (internationally harmonized) legal framework allowing the exchange of confidential exchange data between trading venues and regulatory authorities for surveillance purposes (which should also include the legal basis for an exchange of personal data that is subject to further data sharing limitations following from e.g. the European General Data Protection Regulation).
- Setup of communication channels and common protocols for information sharing between trading venues, allowing a timely exchange of information.
- (International) Standardization of data exchange formats to allow a combined analysis across data sets of different exchanges and that can be digested by the major trading surveillance software systems.

Question 13: Are there additional measures that could help mitigate risks of market manipulation in the context of increasingly complex microstructural features of trading venues?

Additional measures could help mitigate the risks of market manipulation arising from increasingly complex trading venue structures and market microstructures. The design and implementation of new trading venue features should incorporate preventive safeguards against market manipulation. For example, mechanisms such as randomized auction end times can reduce opportunities for participants to influence auction outcomes by submitting orders immediately before the auction closes. In addition, advanced analytical tools, including AI where appropriate, can be used to identify sophisticated manipulation patterns across different order books, market models and matching systems for the same financial instrument, as well as across related assets and markets such as equities, ETFs, futures and options. Finally, improved transparency and identification around transactions executed at, or referencing, the official closing price across trading venues could enhance market oversight and facilitate the detection and investigation of potentially manipulative trading activity.

Question 14: Do you agree that the changing liquidity dynamics and the existence of differentiated trading phases could be considered in the calibration and review of volatility control mechanisms (VCMs)? Please elaborate on whether the growing complexity of secondary markets' microstructural features shall be considered in the context of VCMs' review.

Deutsche Börse constantly innovates the trading models that are made available to market participants. The meaningful integration of new trading functionalities into the set of safeguards (including VCMs) is a core element of all model enhancements. In turn, safeguard mechanisms themselves are subject to ongoing assessment and improvement, factoring in changes in the market environment.

Question 15: Should other principles and/or metrics play a role in informing VCM design and recalibration?

The current regulatory framework in the European Union (MiFID II Article 48(5) and the recently revised RTS 7a) provides comprehensive guidance on aspects to be factored into the design and parameterization of VCMs. DBG maintains a methodology that governs VCMs deployed in the different trading mechanisms, taking into account statistical evidence of historical volatility, properties of the respective trading mechanisms, alternative reference prices and liquidity features of the respective financial instruments. While DBG is continuously monitoring the functioning and effectiveness of the VCMs in place and is open for constant innovation in this field, we consider the current regulatory framework adequate.

Question 16: Are VCMs applied differently during auction phases and continuous trading sessions? If yes, please provide details on the risks and considerations taken into account.

At Deutsche Börse, the fundamental mechanics of VCMs are the same for both, continuous trading and auctions: a potential execution price is checked against the prevailing trigger thresholds and trading changes to a volatility interruption, which, in case of an auction, effectively results in an extension of the auction call phase, potentially followed by an “extended volatility interruption” (see also our answer to Q9).

Recently, Deutsche Börse has introduced the “implied reference price” for selected instruments as an alternative reference price for the last traded price (from continuous trading) that is used to calculate the dynamic volatility range used in the closing auction. The introduction was accompanied by a review and adjustment of volatility ranges, resulting in overall tighter ranges for the respective instruments. This helps to ensure that a recent and appropriate reference price is used during the closing auction. The measure is targeted at situations where liquidity is thin prior to the closing auction and then increases significantly during the closing auction itself.

Question 17: How do you define a ‘stressed market condition’ and how do you deal with VCMs during stressed market conditions?

A “stressed market condition” is identified in accordance with the relevant provisions in RTS 8. Trading venues shall set out parameters to identify stressed market conditions in terms of significant short-term changes in price and volume. The resumption of trading after volatility interruptions shall be considered as stressed market conditions.

At Deutsche Börse, stressed market conditions are determined per liquid instrument when

- 1) an extended volatility interruption is triggered and
- 2) a quantity condition is met.

The quantity condition compares the volatility auction traded quantity against a threshold quantity. The threshold quantity is defined by the adjusted average daily traded quantity (AADTQ) for the instrument concerned. It is the average daily traded volume of the previous three calendar months, and it can be adjusted (but practically it is not because the adjustment factor is set to 1). The minimum as well as the default value (i.e. for newly listed instruments) for the AADTQ is 10,000. The quantity condition is met if the traded quantity in the extended volatility auction exceeds the AADTQ.

The duration of the Automated Stressed Market Condition is configurable and currently set to 60 minutes. It is automatically prolonged when conditions for a stressed market are detected again. Start and end of Automated Stressed Market Conditions are communicated to the market via the market data interface.

Question 18: Do you believe that the concentration of trading activity during closing auctions may raise risks for price formation and benchmark integrity, and if so, how could these risks be monitored or addressed?

DBG would refer to our response to Q1 and Q6 and reiterate that considering the drivers of the growth of volumes during closing auctions, we cannot see a concern. Fundamentally, DBG believes that one of the reasons for the growth of closing auctions in the EU can be associated with MiFID II itself. Relevant factors in this context relate to the increased fragmentation since the introduction of the framework harming liquidity sourcing and transparent price formation with the emergence of systematic internalisers and alternative trading systems like frequent batch auctions and the increase in the number of venues under pre trade transparency waivers. By proposing a short period of time where liquidity is concentrated and a variety of market participants is represented, closing auctions are an efficient trading model which ensures deep liquidity, low toxicity and fulfils best execution conditions.

We would also repeat that the participation into the closing auction is subject to cyclical events with the most pronounced one being the index rebalancing affecting market participants with portfolios trades associated with those episodic index rebalances. The way portfolios are designed can be constrained by the “index balancing effect” although other effects exist and might not reflect on closing auctions. As an example, we observe a hedging effect with derivative contracts during intraday auctions on Xetra every third Friday of the month on the so-called Double Witching Day, but more pronounced every third Friday of the last month in the quarter (March, June etc.) when derivative contracts on indices expire, so called Triple Witching Day. Because the strike price for underlying instruments traded on Xetra is mostly defined as the price of the intraday auction, market activity surges during the intraday auction due to program trading associated with index futures arbitrage and the order imbalances resulting from the unwinding of cash positions when options or futures expire (at 1pm on settlement days). Equity futures and options also expire on the same days, derivatives trading authorized until closing auction on spot market. But the increase in trading before closing does not. These seem much higher than on usual Fridays.

Economic conditions also influence participation in closing auctions. This is valid not only for closing auctions; it is in general one of the arguments why market participants might prefer to trade in lit continuous trading rather than using auctions or dark venues. The Covid-19 crisis in that sense is a good example: In times of uncertainty and higher volatility, market participants express a need for immediacy since prices move quickly and immediate access liquidity is preferable to waiting for the end of the trading session or even the few minutes the auction will last. The same way market participants turned away from SIs and dark venues in the EU during this period of high volatility. The need for immediacy is also reflected in the drop in the share of closing auctions compared to continuous trading. When the closing auction was then usually showing a market share of 20-25%, it was down to 14% on 13 March 2020 for example for DAX instruments.

While benchmark-related closing auctions and settlement windows may attract concentrated trading activity, existing controls provide robust safeguards through the monitoring of final settlement price determination processes. For example, benchmark price formation around standard index expiries is already subject to surveillance through final settlement price determination processes, including intraday VWAP-based settlement calculations for Euro Stoxx indices and auction-based reference prices for the DAX family. In addition, daily settlement and margining processes, together with surveillance/monitoring mechanisms by index providers and market operators, are designed to identify unusual price behaviour across relevant underlyings, although attributing specific short-term price movements to particular drivers may not always be feasible given the large number of instruments and jurisdictions involved.

Question 19: Do you agree that growing concentration of trading activity in closing auctions may increase liquidity or settlement risks for CCPs and participants, and that these risks warrant closer monitoring?

Deutsche Boerse Group would note that liquidity risk may arise from activity during non-core trading hours and/or information asymmetry that results in price volatility and unintended executions (stop-loss orders). When closing actions happen, information asymmetry with respect to market moving information is least likely to occur. The auction format is a suitable format for price discovery and

poorly traded securities usually follow only an auction-based trading model. Hence, we see no liquidity risk from the observed higher relative share of trading volume in closing actions.

Similarly, we do not see any link between the execution time of orders during core trading hours (which include the closing auction) and settlements. To the contrary, unintended executions triggered by price volatility (stop loss orders) are least likely to occur in auctions and this might even result in a positive impact on settlement efficiency.

We hence do not agree that the observed growing concentration of trading activity in closing auctions increases liquidity or settlement risks for CCPs and Participants.

Question 20: Have you observed any other risk stemming from changes in liquidity patterns? In addition to the closing auctions, have you noted a rise of other alternative trading protocols? If so, have you noted that these new trading protocols may have an impact on market liquidity?

Closing auctions run by stock exchanges are not monopolies in Europe; the level of competition is high between trading venues but also with bilateral systems and internalization from banks. By construct closing auctions aim to set the price that maximizes the traded volume. Market participants do benefit from a highly efficient price and do not pay the spread; those aspects are highly valued by market participants and a number of competing offerings have developed in the past years. A number of alternative solutions are available to market participants which allow them to execute their transactions without participating to the closing auction on the primary market. Those products would usually run in parallel with the closing auction on the primary market; they would either match orders at the official closing price once it is fixed or offer competitive offerings in parallel of existing closing auctions on primary markets with price formation. Moreover, some investment banks provide market at close products that match orders internally to avoid paying the exchange auction fee; this includes principal liquidity guaranteed at the close via their SI.

As explained, in our response to Q6, we see the risk of alternative trading protocols, away from primary exchanges and which solely price reference the closing auction price, on price formation, and are concerned that the efficiency of the price formation process is deteriorated, should those protocols grow in volumes. We believe that transparency in particular for bilateral models is essential, in particular to prevent the non-compliant back-to-back transactions on the systematic internaliser models which are supposed to trade on risk only and not act similarly to multilateral venues as per the EU legislation.

Question 21: Do you agree with the supervisory and regulatory approaches identified and/or do you think there are additional aspects that have not been captured?

DBG agrees broadly with the supervisory and regulatory approaches identified. However, we would underline the fact that multilateral venues are not the only systems dealing with equity instruments. In the European Union, Systematic Internalisers are execution venues, albeit bilateral venues, but shall as well have in place adequate safeguards and recovery plans, in case they face technical issues due to an increase in activity in their systems.

Question 22: How does your supervisory framework incorporate intra-day liquidity analytics into a risk-based supervisory engagement with trading venues?

n/a

Question 23: Do you agree with the good practices that IOSCO suggests for trading venues and regulators to consider? If not, please explain why and provide further information.

DBG does broadly agree with the good practices proposed by IOSCO. We would however caution against measures which would target increased market activity at the close when an existing regulatory framework is already in place and accounts for similar risks; typically DORA in the EU under a *lex*

specialis approach translated in some requirements to be taken out of the MiFID text as requirements would have applied twice and potentially differently between the two regulations. It is essential that regulators do not adopt inadequate or diverging requirements to deal with, in fine, similar events, namely an increase in activity in their systems. Testing and adjusting our systems for their capacity and robustness is currently done continuously by EU trading venues and we would urge IOSCO to add a provision in their good practices, referring to any broader existing requirements in each jurisdiction before additional potentially detrimental measures are adopted.

Question 24: Are there any other good practices that could be considered?

n/a