



European Securities and
Markets Authority

Consultation Paper

MiFID II/MiFIR review report on Algorithmic Trading



Responding to this paper

ESMA invites comments on all matters in this paper and in particular on the specific questions summarised in Annex 1. Comments are most helpful if they:

- respond to the question stated;
- indicate the specific question to which the comment relates;
- contain a clear rationale; and
- describe any alternatives ESMA should consider.

ESMA will consider all comments received by **12 March 2021**.

All contributions should be submitted online at www.esma.europa.eu under the heading 'Your input - Consultations'.

Publication of responses

All contributions received will be published following the close of the consultation, unless you request otherwise. Please clearly and prominently indicate in your submission any part you do not wish to be publicly disclosed. A standard confidentiality statement in an email message will not be treated as a request for non-disclosure. A confidential response may be requested from us in accordance with ESMA's rules on access to documents. We may consult you if we receive such a request. Any decision we make not to disclose the response is reviewable by ESMA's Board of Appeal and the European Ombudsman.

Data protection

Information on data protection can be found at www.esma.europa.eu under the heading [Legal Notice](#).

Who should read this paper?

All interested stakeholders are invited to respond to this consultation paper. In particular, responses are sought from trading venues and from investment firms engaged in algorithmic and high-frequency trading activities.

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Acronyms and definitions used

ADNT	Average Daily Number of Transactions
AMF	Autorité des Marchés Financiers
CDR (EU) 2017/565	Commission Delegated Regulation (EU) 2017/565 of 25 April 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council as regards organisational requirements and operating conditions for investment firms and defined terms for the purposes of that Directive
CDR (EU) 2019/442	Commission Delegated Regulation (EU) 2019/442 of 12 December 2018 amending and correcting Delegated Regulation (EU) 2017/587 to specify the requirement for prices to reflect prevailing market conditions and to update and correct certain provisions
CFTC	Commodity Futures Trading Commission
CP	Consultation Paper
Danish FSA	Danish Financial Supervisory Authority
DEA	Direct Electronic Access
EC	European Commission
ETC	Exchange Traded Commodity
ETF	Exchange Traded Fund
ETN	Exchange Traded Note
EU	European Union
ESMA	European Securities and Markets Authority
FBA	Frequent Batch Auction
FITRS	Financial Instruments Transparency System
HFT	High Frequency Trading
IFR	Investment Firm Review
LME	London Metal Exchange
MAR	Market Abuse Regulation – Regulation (EU) 596/2014 of the European Parliament and of the Council
MiFID II	Markets in Financial Instruments Directive (recast) - Directive 2014/65 of the European Parliament and of the Council

MiFIR	Markets in Financial Instruments Regulation – Regulation 600/2014 of the European Parliament and of the Council
MRMTL	Most Relevant Market in terms of Liquidity
MTF	Multilateral Trading Facility
NCA	National Competent Authority
OTC	Over-the-counter
OTF	Organised Trading Facility
OTR	Order to Transaction Ratio
POP	Passive Order Protection
Q&A	Question and answer
RCB	Reasonable Commercial Basis
RTS	Regulatory Technical Standard
RTS 1	Commission Delegated Regulation (EU) 2017/587 of 14 July on transparency requirements for trading venues and investment firms in respect of shares, depositary receipts, exchange-traded funds, certificates and other similar financial instruments and on transaction execution obligations in respect of certain shares on a trading venue or by a systematic internaliser
RTS 6	Commission Delegated Regulation (EU) 2017/589 of 19 July 2016 on the organisational requirements of investment firms engaged in algorithmic trading
RTS 7	Commission Delegated Regulation (EU) 2017/584 of 14 July 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council with regard to regulatory technical standards specifying organisational requirements of trading venues
RTS 8	Commission Delegated Regulation (EU) 2017/578 of 13 June 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council on markets in financial instruments with regard to regulatory technical standards specifying the requirements on market making agreements and schemes
RTS 9	Commission Delegated Regulation (EU) 2017/566 of 18 May 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council on markets in financial instruments with regard to regulatory technical standards for the ratio of unexecuted orders to transactions in order to prevent disorderly trading conditions

RTS 10	Commission Delegated Regulation (EU) 2017/573 of 6 June 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council on markets in financial instruments with regard to regulatory technical standards on requirements to ensure fair and non-discriminatory co-location services and fee structures
RTS 11	Commission Delegated Regulation (EU) 2017/588 of 14 July 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council with regard to regulatory technical standards on the tick size regime for shares, depositary receipts and exchange-traded funds
SEC	US Securities and Exchange Commission
SI	Systematic Internaliser
TRV Report	Trends, Risks and Vulnerabilities Report
TV	Trading venue

1 Executive Summary

Reasons for publication

Directive 2014/65/EU¹ (MiFID II) and Regulation (EU) No 600/2014² (MiFIR) provide for a number of review reports requiring the European Commission (EC), after consulting ESMA, to present reports to the European Parliament and the Council on various provisions. This consultation paper (CP) covers the review provision on the impact of requirements regarding algorithmic trading including high-frequency algorithmic trading set out under Article 90(1)(c) of MiFID II.

Contents

Many provisions and requirements of MiFID II relate either directly or indirectly (e.g. direct electronic access or tick sizes) to algorithmic trading. This consultation paper therefore adopts a holistic approach to algorithmic trading and reviews all related provisions together with the aim of having the current framework operating more efficiently.

Section 2 provides an introduction to the report. Section 3 presents an overall approach towards algorithmic trading and high frequency trading and in particular the authorisation regime attached to these types of market participants, together with some quantitative analysis. Section 4 discusses the organisational requirements for investment firms that engage in algorithmic trading, including high-frequency traders. Section 5 focusses on the organisational requirements for trading venues that enable algorithmic trading on their systems.

Finally, Section 6 addresses the other provisions that aim at better framing the activity of algorithmic and high-frequency traders such as tick sizes and market making, while also discussing new issues which have recently emerged on EU markets and are very closely linked to algorithmic trading, such as the deployment of mechanisms called speedbumps and the sequence of trade confirmation to individual participants by trading venues versus the public disclosure of such transactions.

Next Steps

ESMA will consider the feedback it receives to this consultation and expects to publish a final report and submit it to the European Commission by July 2021.

2 Introduction

Article 90 (1)(c) of MiFID II:

Before 3 March 2020 the Commission shall, after consulting ESMA, present a report to the European Parliament and the Council on:

[...]

(c) the impact of requirements regarding algorithmic trading including high-frequency algorithmic trading;

[...]

1. MiFID II/MiFIR require the European Commission (EC) to present reports to the European Parliament and the Council, after consulting ESMA, on a number of provisions. Article 90(1)(c) of MiFID II provides in particular for the submission of a report on “the impact of requirements regarding algorithmic trading, including high-frequency algorithmic trading”.
2. The MiFID II mandate is therefore not specific regarding which provisions should be reviewed in the concerned report. The concept of algorithmic trading is however broad, and many provisions and requirements of MiFID II are related either explicit to this type of trading (e.g. Article 17 of MiFID II) or indirectly (e.g. Direct Electronic Access or tick sizes).
3. In this consultation paper, ESMA has considered that it was necessary to adopt a holistic approach and to review all relevant provisions together. The consultation paper therefore covers (i) the overall approach towards algorithmic trading and high frequency trading and in particular the authorisation regime attached to these types of market participants, (ii) the provisions applicable to algorithmic and high-frequency traders, (iii) the provisions applicable to trading venues allowing or enabling these market participants and (iv) other provisions that aim at better framing the activity of algorithmic and high-frequency traders (e.g. tick size and market making).
4. ESMA has also considered it necessary to include sections on new issues which have recently emerged in EU markets and that are very closely linked to algorithmic trading,

¹ Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU (OJ L 173, 12.6.2014, p. 349–496).

² Regulation (EU) No 600/2014 of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012 (OJ L 173, 12.6.2014, p. 84).

i.e. the recent deployment of mechanisms called speedbumps and the issue about the sequence of publication between (i) the order/trade confirmations sent to individual participants and (ii) the public disclosure of orders and transactions.

5. Article 90(1)(c) of MiFID II requires the Commission to present its report by 3 March 2020. However, a series of unexpected events have forced ESMA and the Commission to reconsider this deadline. In particular, Brexit and the covid-19 crisis have not only shifted the order of priorities for EU regulators, but this has also forced EU27 markets to adjust quickly to this new reality making the analysis of the impact of MiFID II more challenging to undertake in practice.
6. Based on the responses received to this consultation, ESMA will prepare the final review report for submission to the European Commission. Respondents to the consultation are encouraged to provide relevant information, including quantitative data, to support their arguments or proposals. ESMA will endeavour to submit its review report to the Commission by June 2021.

3 Overall approach

7. This section provides an overall approach to algorithmic trading, including high-frequency trading (HFT), under MiFID II. It first sets out the legal framework governing this activity in Level 1. The section then provides an overview of firms conducting algorithmic trading including High Frequency Trading (HFT) in the EU. It further discusses two issues that have arisen regarding the scope of application of MiFID II algorithmic trading and HFT rules in relation to Direct Electronic Access (DEA) and third-country firms. A summary of rules applicable to HFT in some third-country jurisdictions is provided in Annex III-C.

3.1 Legal framework

8. As part of its objective of having more efficient and resilient markets, MiFID II seeks to keep pace with technological developments. Whilst recognising the benefit of new trading technologies, MiFID II also aims at addressing the potential risks from increased use of technology, including algorithmic trading, HFT or DEA. As explained in Recital (63) of MiFID II, “Those potential risks from increased use of technology are best mitigated by a combination of measures and specific risk controls directed at firms that engage in algorithmic trading or high-frequency algorithmic trading techniques, those that provide direct electronic access, and other measures directed at operators of trading venues that are accessed by such firms”.

3.1.1 Algorithmic trading

9. Under Article 4(1)(39) of MiFID II, algorithmic trading is defined as “trading in financial instruments where a computer algorithm automatically determines individual parameters of orders such as whether to initiate the order, the timing, price or quantity of the order or how to manage the order after its submission, with limited or no human intervention, and does not include any system that is only used for the purpose of routing orders to one or more trading venues or for the processing of orders involving no determination of any trading parameters or for the confirmation of orders or the post-trade processing of executed transactions”.
10. The definition is further specified in Article 18 of Commission Delegated Regulation (EU) 2017/565³ which sets out that “[...] a system shall be considered as having no or limited human intervention where, for any order or quote generation process or any process to optimise order-execution, an automated system makes decisions at any of the stages of initiating, generating, routing or executing orders or quotes according to pre-determined parameters”.
11. In response to questions from stakeholders, ESMA also issued Q&As⁴ to clarify the scope of the computer algorithms captured by the MiFID II definition, notably that the use of algorithms which only serve to inform a trader of a particular investment opportunity is not considered as algorithmic trading, provided that the execution is not algorithmic.
12. An investment firm⁵ that uses algorithmic trading is required to comply with specific requirements to identify and mitigate the risks associated with this type of trading. Those requirements include in particular:
 - Notification to the NCA of the Home Member State and to the NCAs of the trading venues where it deploys its algorithmic trading strategies;
 - Provision of information upon request about its trading algorithms, systems and controls to its Home Member State NCA. The Home Member State NCA may share this information with the NCAs of the trading venues where the investment firm deploys its strategies; and
 - Compliance with organisational requirements, as discussed in section 4.

³ Commission Delegated Regulation (EU) 2017/565 of 25 April 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council as regards organisational requirements and operating conditions for investment firms and defined terms for the purposes of that Directive (OJ L 87, 31.3.2017, p. 1–83).

⁴ See for instance questions 1 to 3 of section 3 of the MiFID II/MiFIR Q&As on market structure topics (https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-38_qas_market_structures_issues.pdf).

⁵ Those requirements also apply to members or participants of regulated markets and MTFs who are not required to be authorised under MiFID II pursuant to points (a), (e), (i) and (j) of Article 2(1).

13. Likewise, a trading venue that allows algorithmic trading through its system must comply with specific obligations that are set out in section 5.
14. However, and in contrast to HFT, the mere use of algorithmic trading techniques other than HFT does not trigger the requirement for that person to be authorised as an investment firm.

3.1.2 High-frequency trading

15. High-frequency trading is a sub-set of algorithmic trading. Article 4(1)(40) of MiFID II defines high frequency algorithmic trading technique as “an algorithmic trading technique characterised by:
 - (a) infrastructure intended to minimise network and other types of latencies, including at least one of the following facilities for algorithmic order entry: co-location, proximity hosting or high-speed direct electronic access;
 - (b) system-determination of order initiation, generation, routing or execution without human intervention for individual trades or orders; and
 - (c) high message intraday rates which constitute orders, quotes or cancellations.”
16. Article 19 of Commission Delegated Regulation (EU) 2017/565 further defines a “high message intraday rate” as the submission on average of any of the following:
 - “(a) at least 2 messages per second with respect to any single financial instrument traded on a trading venue;
 - (b) at least 4 messages per second with respect to all financial instruments traded on a trading venue”;where only messages concerning financial instruments for which there is a liquid market are to be included in the calculation.
17. Where a firm is using a high-frequency algorithmic trading technique, the exemption from authorisation as an investment firm when only dealing on own account under Article 2(1)(d) of MiFID II is no longer available. Nor are the exemptions under Article 2(1)(e) of MiFID II for operators dealing on own account in emission allowances and Article 2(1)(j) of MiFID II for commodity firms. The required authorisation aims at ensuring that those firms are subject to organisational requirements under MiFID II and that they are properly supervised. Firms that are exempted from MiFID II under points (a), (e), (i) and (j) of Article 2(1) of MiFID II and that use algorithmic trading techniques are not required to be

authorised as investment firm but are subject to the measures and controls aiming to tackle the specific risks arising from algorithmic trading.

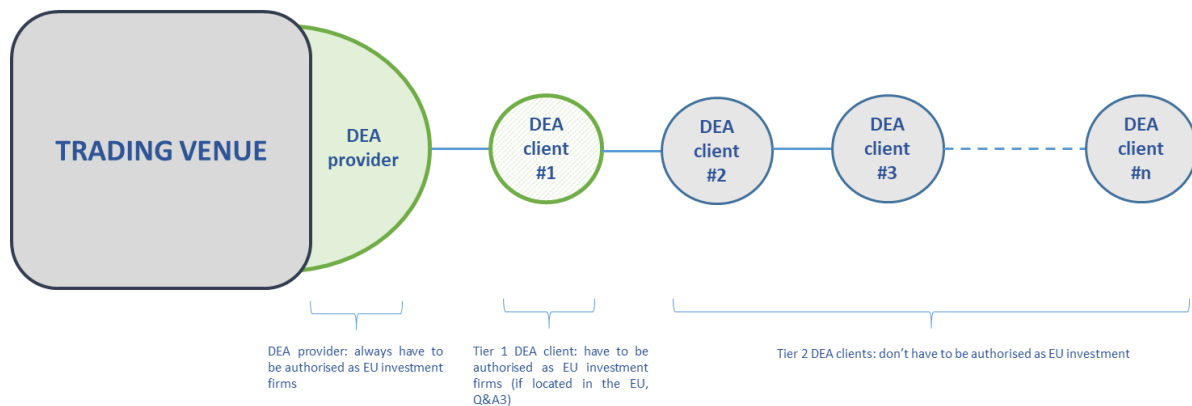
18. In addition to the requirements applicable to firms engaged in algorithmic trading, firms using high-frequency algorithmic trading techniques are subject to specific record keeping requirements that are discussed in section 4.

3.1.3 Direct Electronic Access (DEA)

19. A further concept important to note in the context of trading technology is Direct Electronic Access (DEA). Under Article 1(41) of MiFID II, DEA refers to “an arrangement where a member or participant or client of a trading venue permits a person to use its trading code so the person can electronically transmit orders relating to a financial instrument directly to the trading venue and includes arrangements which involve the use by a person of the infrastructure of the member or person or client or any connecting system provided by the member or participant or client, to transmit the orders (direct market access or DMA) and arrangements where such an infrastructure is not used by a person (sponsored access)”.
20. Article 21(4) of Commission Delegated Regulation (EU) 2017/589⁶ (RTS 6) further introduces the concept of sub-delegation by referring to: “A DEA provider allowing a DEA client to provide its DEA access to its own clients ('sub-delegation') [...]”.
21. When a person accesses a trading venue using DEA, the exemption from authorisation as investment firm for persons only dealing on own account under Article 2(d) of MiFID II is no longer available to that person.
22. DEA providers must be authorised as investment firms or credit institutions under Article 48(7) of MiFID II and cannot operate under the equivalence regime for third-country firms. Furthermore, DEA providers must comply with additional organisational requirements.

FIGURE 1: AUTHORISATION REQUIREMENTS FOR DEA USERS

⁶ Commission Delegated Regulation (EU) 2017/589 of 19 July 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council with regard to regulatory technical standards specifying the organisational requirements of investment firms engaged in algorithmic trading (OJ L 77, 20.3.2019, p. 417-448).



Source: ESMA.

3.2 Analysis

23. Financial markets have significantly evolved over the past decade as a consequence of new technologies. Many market participants now make use of algorithmic trading where a computer algorithm automatically determines aspects of an order with minimal or no human intervention and algorithmic trading continues to expand across asset classes from the more mature equity and interest rate markets to commodity markets. This has led to significant changes in market structures and microstructures and has required to adapt EU legislation to this new paradigm.

24. The impact of algorithms used for routing and executing trades in financial instruments has been one of the most discussed topics in the financial industry for some time. As set out in Recital (62) of MiFID II, “trading technology has provided benefits to the market and to market participants generally such as wider participation in markets, increased liquidity, narrower spreads, reduced short term volatility and the means to obtain better execution for clients”. However, Recital (62) of MiFID II notes that trading technology also gives rise to a number of potential risks such as an increased risk of the overloading of the systems of trading venues due to large volumes of orders, risks of algorithmic trading generating duplicative or erroneous orders or otherwise malfunctioning in a way that may create a disorderly market, risk of overreaction to market events exacerbating volatility and risk of market abuse behaviours. Through Level 1 and Level 2, MiFID II aims at mitigating the risks identified arising from algorithmic trading or high-frequency algorithmic trading techniques.

Q1: What is your overall assessment of the MiFID II framework for algorithmic trading, HFT and DEA?

Q2: In your views, are there risks other than the one mentioned in MiFID II or impacts on market structure developments due to market electronication/ algorithmic trading that would deserve further regulatory attention? Please elaborate.

3.2.1 State of play of algorithmic trading, HFT and DEA

25. ESMA conducted a fact-finding exercise with NCAs and trading venues to try to assess the prevalence of algorithmic trading, HFT and DEA. This section first considers the notifications received by NCAs for such activities and then analyses recent trends in the development of algorithmic trading and HFT.

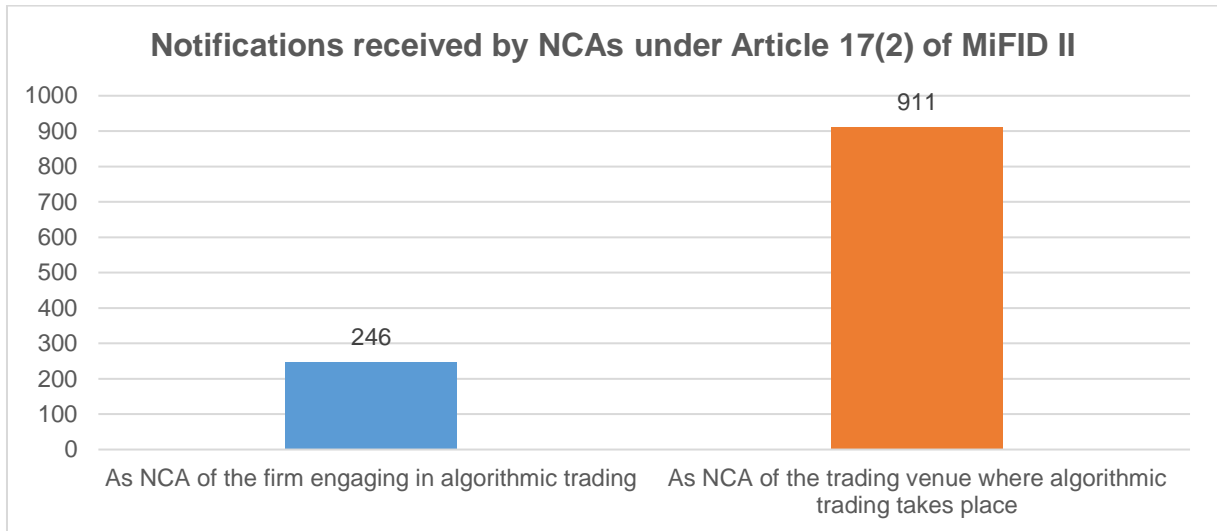
3.2.1.1 Authorisations and notifications

26. Based on the responses received from NCAs, no person has been authorised as an investment firm solely for applying an HFT technique when dealing on own account and therefore, not being eligible to the exemptions under Articles 2(1)(d)(iii), 2(1)(e) and 2(1)(j) of MiFID II. This does not come as a surprise as a person applying an HFT technique can reasonably be expected to be either a direct member or participant of a trading venue or have DEA to a trading venue to reduce latency and preserve the confidentiality of the algorithms used. That person would therefore be authorised as an investment firm under Article 5(1) of MiFID II in the first place. Although some firms using HFT techniques also execute client orders, in which case they would need to seek authorisation on that sole basis, it is here again unlikely that membership, participation or DEA access to a trading venue does not come as an intrinsic part of their business model.

Notifications of algorithmic trading under Article 17(2) of MiFID II

27. The graphs and tables below provide the number of notifications received by NCAs in 18 Member States from firms that engage in algorithmic trading either as NCA of the firm or as NCA of the trading venue where the firm engages in algorithmic trading. Figure 2 gives the number of notifications (246) received directly from firms nationally engaging in algorithmic trading and the number of notifications (911) received from firms engaging in algorithmic trading on different venues (meaning that the average firm is active on roughly four different venues). Where a firm engages in algorithmic trading on a domestic trading venue, that firm is counted in each of the two notifications. The number of notifications received may not however fully reflect the number of firms engaged in algorithmic trading or providing DEA. As a reminder, only members or participants of trading venues are required to provide such notifications, as opposed to DEA users.

FIGURE 2: NOTIFICATIONS RECEIVED BY NCAs FROM FIRMS THAT ENGAGE IN ALGORITHMIC TRADING



Source: Data collection from NCAs in the EU Member States

FIGURE 3: NOTIFICATIONS RECEIVED BY NCAs FROM FIRMS THAT ENGAGE IN ALGORITHMIC TRADING PER MEMBER STATE

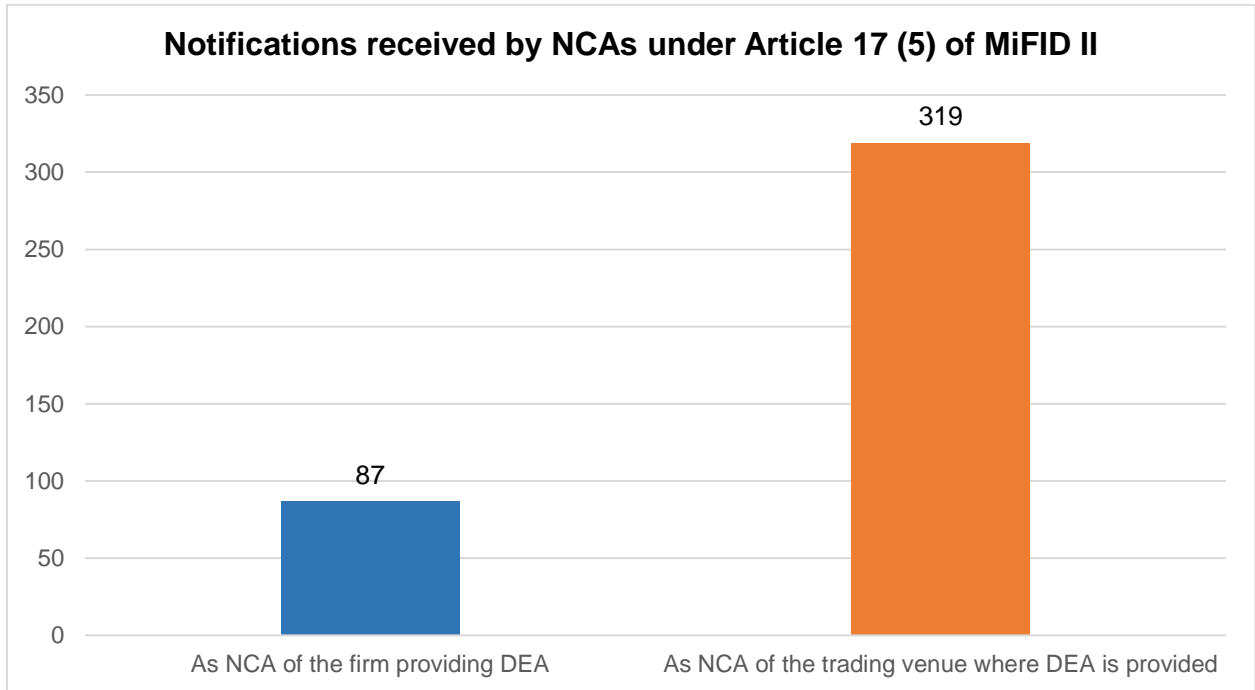
Notifications received per Member State under Article 17(2) of MiFID II		
Member State	As NCA of the firm engaging in algorithmic trading	As NCA of the trading venue where algorithmic trading takes place
Austria	3	2
Belgium	2	58
Czech Republic	7	11
Estonia	1	1
Finland	2	43
France	20	79
Germany	81	327

Greece	12	19
Hungary	3	3
Ireland	6	15
Italy	21	57
Malta	3	0
Netherlands	25	60
Norway	2	37
Poland	14	40
Portugal	2	42
Spain	31	74
Sweden	11	43

Source: Data collection from NCAs in the EU Member States.

28. Very few non-investment firms (i.e. members or participants of regulated markets or MTFs who are not required to be authorised under MiFID II pursuant to points (a), (e), (i) and (j) of Article 2(1) of MiFID II) have notified that they engage in algorithmic trading in accordance with Article 1(5) of MiFID II. Some NCAs received notifications from third-country firms that engage in algorithmic trading on EU trading venues even if such notifications are not foreseen in MiFID II.
29. The percentage of members or participants of trading venues that have notified the NCA of the trading venue at which they engage in algorithmic trading varies significantly across EU jurisdictions. There appear to be no simple correlation between the size of the trading venue and the percentage of firms using algorithmic trading techniques. On the largest trading venues, the percentage typically ranges between 42% and 60%. However, the percentage can also be close to, or exceed 50% on some smaller venues, including in the Nordic countries, whilst remaining below 10% on some regional exchanges.
30. The graphs and tables below provide the number of notifications received by NCAs from investment firms providing DEA to a trading venue, either as NCA of the investment firm or as NCA of the trading venue where the investment firm is providing DEA. Where an investment firm provides DEA to a domestic trading venue, that investment firm is counted in each of the two notifications.

FIGURE 4: NOTIFICATIONS RECEIVED BY NCAs FROM DEA PROVIDERS



Source: Data collection from NCAs in the EU Member States.

FIGURE 5: NOTIFICATIONS RECEIVED BY NCAs FROM DEA PROVIDERS

Notifications received per Member State under Article 17(5) of MiFID II		
Member State	As NCA of the firm providing DEA	As NCA of the trading venue where DEA is provided
Austria	4	3
Belgium	0	21
Czech Republic	2	2
Estonia	1	0
Finland	1	17
France	11	30

Germany	24	92
Greece	6	7
Hungary	3	0
Ireland	1	5
Italy	3	21
Malta	0	0
Netherlands	1	25
Norway	1	20
Poland	5	12
Portugal	2	21
Spain	20	35
Sweden	2	11

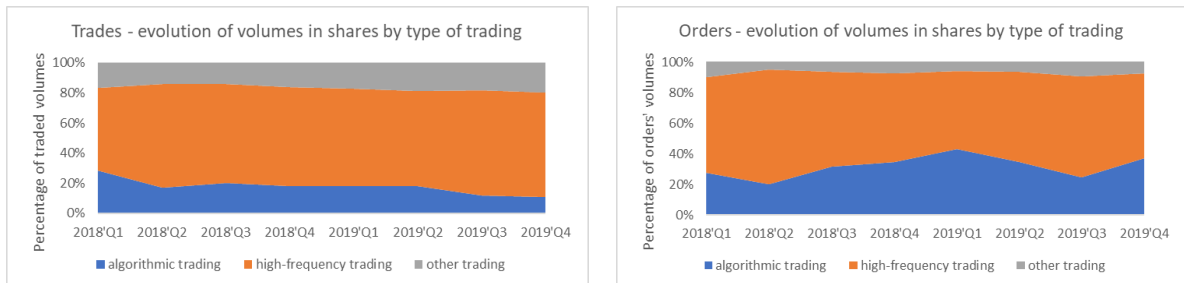
Source: Data collection from NCAs in the EU Member States.

31. There is no legal requirement for a DEA provider to provide the NCA with the number of its DEA clients or whether DEA provision allows for sub-delegation. Although some NCAs are collecting information on a domestic basis, this is not common practice across EU Member States.

3.2.1.2 Evolution of algorithmic and HFT trading

32. In order to analyse the evolution of algorithmic trading, including high-frequency trading, ESMA has collected the data from the RMs and MTFs in the EU. Overall, 52 trading venues from 24 EU countries have provided aggregated quarterly figures for the years 2018 and 2019. The analysis below is focused on the three main asset classes, i.e. shares, bonds and derivatives.
33. As shown in Figure 6 below, the split of trading in shares across the three categories of trading identified, i.e. algorithmic trading other than HFT, HTF and non-algorithmic trading, has remained rather stable in Q2 2018 and 2019, with the largest share of around 60% of the high-frequency trading. As a reminder, the definition of HFT only applies to liquid instruments. The analysis of the volumes of orders provides a very similar, and somewhat less stable picture. Over the period considered, orders originating from high-frequency trading accounted for about 50 to 70% of the overall quoted volumes.

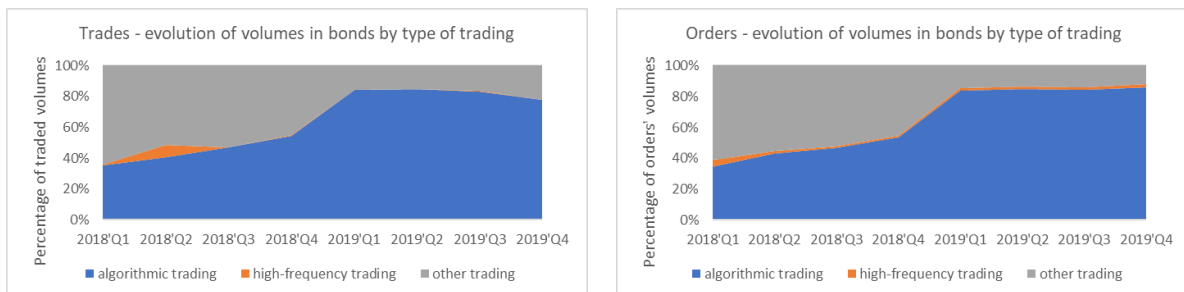
FIGURE 6: ALGORITHMIC TRADING IN SHARES



Source: Data collection from RMs and MTFs in the EU Member States

34. Trading in bonds, presented in Figure 7, shows a totally different pattern. After being almost fully non-algorithmic until mid-2019, bond trading then saw a significant increase in algorithmic trading in Q2 2019, with a peak in Q3 2019 where algorithmic trading other than HFT accounted for around 80% of trading. When looking at orders, the increasing share of algorithmic trading can be seen earlier on, starting early 2019. Contrary to the other asset classes, there is only marginal high-frequency trading in bonds, which could be explained by the less liquid nature of those instruments.

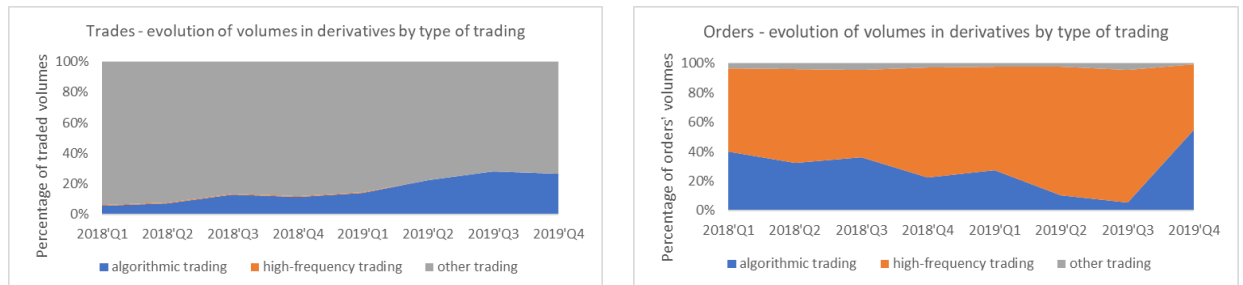
FIGURE 7: ALGORITHMIC TRADING IN BONDS



Source: Data collection from RMs and MTFs in the EU Member States

35. In case of derivatives, the split of trading between algorithmic and non-algorithmic trading has remained stable until Q2 2019 where algorithmic trading other than HFT started to increase. In Q4 2019, non-algorithmic trading accounted for around 70% of derivatives trades. However, based on the data provided by trading venues, the majority of orders was entered by firms that engage in algorithmic trading, and more specifically by HFT. This could be explained by constant quotes being provided by the market makers in those instruments, the majority of which does not result in a transaction.

FIGURE 8: ALGORITHMIC TRADING IN DERIVATIVES



Source: Data collection from RMs and MTFs in the EU Member States

3.2.2 Scope of Algorithmic trading

Algorithmic trading and OTC trading

36. Ahead of MiFID II application, ESMA received questions from stakeholders on the scope of the algorithmic trading requirements set out in Article 17 of MiFID II, including as to whether those requirements applied to electronic OTC trading. ESMA considered that the provisions of Article 17, and notably the multiple references in this Article to investment firms engaging in algorithmic trading “on trading venues” were self-explanatory. ESMA also noted at the time that the risks arising from algorithmic trading such as an increased risk of the overloading of trading systems, the risk of generating duplicative or erroneous orders and overreaction to market events, are likely to create more detrimental consequences to orderly markets when trading takes place on multilateral systems than with bilateral trading. This analysis was reflected in a Q&A on Market Structures Issues.⁷

Q3: Do you consider that the potential risks attached to algorithmic trading should also be given consideration in other trading areas? Please elaborate.

Algorithmic trading and DEA users

37. ESMA notes that some uncertainty has emerged as to whether the definition of algorithmic trading in Article 4(1)(39) of MiFID II only applies to members, participants or clients of trading venues or includes DEA clients as well. In ESMA’s view, the definition of algorithmic trading refers to a trading technology used to send orders to a trading venue. Since DEA is a way of accessing trading venues that is recognised and regulated by MiFID II, where a DEA client would be using algorithmic trading as defined in MiFID II, that DEA client would fall under the MiFID II algorithmic trading framework. The same applies with respect to HFT.

⁷ https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-38_gas_markets_structures_issues.pdf, page 18.

Q4: Do you agree with this analysis? If not, please explain why.

3.2.3 High Frequency Trading

38. In addition to the reference to infrastructure intended to minimise latency and system-determination of order initiation, generation, routing or execution without human intervention, the definition of HFT in Article 4(1)(40) of MiFID II includes “high message intraday rates”. CDR 2017/565 defines such high message intraday rates by a static number of messages sent per second with respect to any single liquid financial instrument or with respect to all the liquid financial instruments traded on a trading venue. As explained above, and in contrast to other algorithmic trading entities, a person established in the Union that engages in HFT is always required to be authorised as an investment firms and must meet additional order record keeping requirements.

39. As long as those specific requirements for HFT firms continue to apply, ESMA appreciates the need for a definition of HFT allowing for a uniform application of the authorization requirement for persons that engage in high frequency algorithmic trading technique across EU jurisdictions. However, as ever-increasing speed of execution is available to market participants willing and able to make the necessary investments to that end, the question may arise as to whether static daily message rates remain a relevant criterion or whether other approaches should be considered.

Q5: Did you encounter any specific issue with the definition of HFT? Do you consider that the definition should be amended? Do you have any suggestion to replace the high message intraday rates with other criteria or amend the thresholds currently set in Level 2? Please elaborate and provide data supporting your response where available.

3.2.4 Direct Electronic Access (DEA)

Direct Electronic Access and sub-delegation

40. As the way in which trading venues operate has evolved, notably through the development of electronic trading, so has the means of access to these trading venues. Due to continuous technological evolution, DEA has facilitated access to trading venues across continents, offering new trading opportunities to market participants and providing new sources of liquidity.

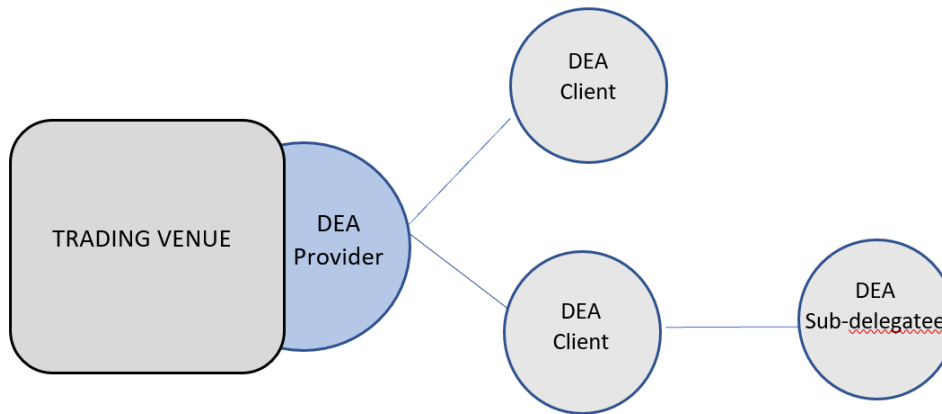
41. Although not formally considered as a member or participant of a trading venue, persons accessing trading venues via DEA have the capacity to enter orders directly into a trading system in a way similar to a member or participant, with greater control over their trading decisions and reduced latency of execution. When trading under the DEA provider’s

trading code, the DEA user or client is a potential source of market risk or credit risk magnified using sophisticated technology. In light of those risks, and as provided for in Article 2(1)(d)(ii) of MiFID II, a person that only deals on own account and would otherwise be eligible to a MiFID II exemption, has to be authorised as an investment firm when having DEA to a regulated market, an MTF or an OTF. Such authorisation aims in particular to ensure that those firms are subject to organisational requirements under MiFID II and that they are properly supervised. Authorisation of DEA users comes as an additional risk mitigation measure on top of the obligations to be met by the DEA provider which ultimately retains responsibility for all trades entered into the venue's trading system under its trading code.

42. As further discussed in the subsection on third-country firms, MiFID II does not apply to third-country firms that do not operate through a branch in the EU. The requirements applicable to third-country firms having DEA to EU trading venues is therefore left to national discretion. The situation is different for DEA providers as EU trading venues can only permit investment firms or credit institutions to provide DEA under Article 48(7) of MiFID II. ESMA has further recalled this licensing obligation in its Q&A on MiFID II Market structure issues (Question 25, Section 3 on Direct Electronic Access (DEA) and algorithmic trading)⁸.
43. Some additional complexity was added to the DEA framework with the introduction of the concept of sub-delegation in Article 21(4) of RTS 6, which provides that: "A DEA provider allowing a DEA client to provide its DEA access to its own clients ('sub-delegation') shall be able to identify the different order flows from the beneficiaries of such sub-delegation without being required to know the identity of the beneficiaries of such arrangement".
44. The diagram below describes the basic sub-delegation of DEA where a DEA client sub-delegates its DEA access to a third party. Although Article 21(4) of RTS 6 generally refers to DEA sub-delegation, ESMA understands that such sub-delegation only occurs in the context of Direct Market Access (DMA) and that no firm is sub-delegating sponsored access.

⁸ https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-38_gas_markets_structures_issues.pdf

FIGURE 9: DEA SUB-DELEGATION



Source: ESMA

Q6: Based on your experience, is sub-delegation of DMA access a frequent practice? In which circumstances? Which benefits does it provide to the DEA user and to the sub-delegates? Are you aware of sub delegation arrangements in the context of Sponsored access? If so, please elaborate.

45. A key issue arising from the concept of sub-delegation of DEA relates to the application of the exemption in Article 2(1)(d) to those firms accessing a trading venue via DEA sub-delegation. Looking at Figure 9, the question arises as to which firms should be considered as having DEA to a trading venue for the purpose of Article 2(1)(d)(ii) and be therefore required to seek authorisation as an investment firm under MiFID II.
46. In a Q&A⁹ published in November 2017 (Question 24, Section 3 on Direct Electronic Access (DEA) and algorithmic trading), ESMA considered that the definition of DEA, which refers to “an arrangement where a member or participant or client of a trading venue permits a person to use its trading code so the person can electronically transmit orders relating to a financial instrument directly to the trading venue [...]” infers a direct contractual arrangement between the DEA provider and the DEA client. A person who directly interacts with the member to obtain the use of its trading code, and who is explicitly authorised by the member to use it, should therefore be understood to have DEA to a trading venue for the purpose of Article 2(1)(d).

⁹ https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-38_gas_markets_structures_issues.pdf

47. Where the DEA client sub-delegates the DEA access, and in contrast to the circumstances described above, ESMA understands that the person benefitting from the DEA sub-delegation (Tier 2 DEA clients) would, in most cases, not technically be in possession of the trading code of the DEA provider. The trading code is not passed down to the ultimate users of DEA, but only appended to the order message by the DEA provider before being submitted to the trading venue. Therefore, ESMA does not consider such Tier 2 DEA clients as having DEA for the purpose of Article 2(1)(d) of MiFID II.

Q7: (for DEA Tier 1 clients) Do you sub-delegate direct electronic access? If so, are your Tier 2 clients typically regulated entities/investment firms? Are they EU-based or third-country based?

Direct Electronic Access and On-line Brokerage

48. As trading technology continues to evolve, questions have been raised as to whether on-line brokerage should be considered as providing retail investors with DEA, and in particular DMA to trading venues and the potential consequences thereof, including the on-line broker being qualified as DEA provider and having to meet applicable requirements under RTS 6.

49. Article 20 of CDR (EU) 2017/565 further clarifies that a person is not considered to have DEA when that person “cannot exercise discretion regarding the exact fraction of a second of order entry and the lifetime of the order within that time frame”. Clients of online brokers do not have control over the exact fraction of a second when their orders enter the trading venue’s systems and therefore cannot be considered as having DEA access.

50. In addition, under Article 4(1) of MiFID II, the Directive only applies to persons “whose regular occupation or business is the provision of one or more investment services to third parties and/or the performance of one or more investment activities on a professional basis”. Unless exceptional circumstances, retail clients are not considered to perform investment activities on a professional basis and are therefore not required to seek authorisation as investment firms.

Q8: Do you agree with this analysis? If not, please explain why. Do you consider that further clarification is needed in this area? If so, what would you suggest?

3.2.5 Third-country firms

51. Under Article 1(1) on the scope of MiFID II, the Directive “shall apply to investment firms, market operators, data reporting services providers and third-country firms providing

investment services or providing investment activities through the establishment of a branch in the Union”.

52. Member States may require a third-country firm to establish an EU branch to provide investment services to retail clients. When they do not have established a branch in the Union, third-country firms may provide investment services and activities to eligible and professional clients in the EU subject to an equivalence decision made by the Commission for that third country in accordance with Articles 46 to 49 of MiFIR. Pending an equivalence decision by the Commission, Member States’ national regimes apply to the provision of investment services and activities by third-country firms.
53. In relation more specifically to Article 2(1)(d) of MiFID II and persons dealing on own account and using HFT techniques or being a member or participant of a trading venue or having DEA access, ESMA conducted a stocktaking exercise with NCAs to understand how national regimes apply. The result of this stocktaking exercise is provided in Annex III-B and shows the heterogeneity of applicable requirements.
54. The lack of a harmonised EU regime for third-country firms creates an unlevel playing field between EU and non-EU firms, with a competitive advantage provided to the latter. While an EU HFT firm would have to be authorised as an investment firm in the EU notably when having DEA to a trading venue (Tier 1 user) or applying HFT techniques and be subject to the stringent MiFID II/MiFIR regulatory framework (e.g. capital requirements, Article 17 of MiFID II and RTS 6), non-EU firms would only be subject to the applicable national regime, if any.
55. The difference of treatment appears even less justified in practice considering that, from a risk perspective, there is no major difference between the activities of EU or non-EU HFT firms or DEA users. Those risks are related to the trading technology used rather than the location from where the activity is undertaken. It is therefore questionable whether the MiFID II regime, delivers on its objective to address the risks arising from trading technology developments and to prevent disorderly trading conditions on EU markets by failing to include third-country firms.
56. The lack of harmonised EU regime for third-country firms also creates an unlevel playing field across EU trading venues as third-country firms using HFT techniques and/or seeking DEA access are more attracted to trade on trading venues where national rules do not require them to be authorised as investment firm.
57. ESMA notes that a similar unlevel playing field issue does not arise with respect to DEA provision as trading venues may only permit members or participants to provide DEA where they are authorised under MiFID II or under Directive 2013/36/EU.

3.3 Conclusions and proposals

58. Overall, ESMA considers that the concepts and definitions introduced by MiFID II in Level 1 have generally provided a sound basis for addressing the risks arising from increased speed and sophistication in trading. However, ESMA considers that some clarifications or amendments to Level 1 may contribute to making the regime clearer and more efficient to the benefit of market participants and NCAs and help to address some unlevel playing field issues.

3.3.1 Scope of Algorithmic trading

59. For the reasons set out above in paragraph 18, ESMA continues to consider that the potential risks attached to algorithmic trading and potential damaging consequences to orderly markets are more salient with respect to multilateral trading where multiple buying and selling orders may interact within a nano second.

60. However, considering market developments, including the increasing role played by systematic internalisers (SI) as execution venues and the use of more and more sophisticated technology by market participants, ESMA is of the view that there could be merit in extending the definition of algorithmic trading to trading in financial instruments OTC by those key market players and in selectively applying some of the requirements currently set out in Level 2. This would ensure that the quotes displayed, streamed, or sent to counterparties or clients by SIs are not a source of risks for the SI itself and a source of confusion, disruption and potential chain reactions in the market. Key requirements at SI level for OTC algorithmic trading would include (i) governance arrangements for trading systems and trading algorithms, (ii) controlled deployment of algorithms (iii) kill functionality and other risks controls). ESMA does not consider that it would be proportionate to extend those requirements to all investment firms trading OTC.

61. This would require amending Level 1 to revise the definition of algorithmic trading and mandate ESMA to further specify applicable requirements to SIs in Level 2. Level 1 would also be amended to introduce a notification of the use of algorithmic trading by SI to the NCA and access by the NCA to the algorithms used.

Q9: Do you agree with ESMA's proposal? If so, do you consider that the requirements considered above relevant? Should there be additional ones? If you disagree with ESMA's proposal, please explain why.

3.3.2 DEA

62. Based on the feedback received from NCAs, ESMA understands that assessing whether a person has DEA access to a trading venue for the purpose of Article 2(1)(d) has proved

challenging, especially when it comes to DEA sub-delegation. ESMA is therefore proposing to clarify the existing framework without undermining its efficiency.

63. ESMA also notes that where a DEA user only dealing on own account established in the EU currently needs to be authorised as an investment firm, such requirement does not apply to third-country HFT firms trading on EU trading venues or having DEA access to such venues. Potential requirements are left to national discretion, although the risks of disorderly markets or the risks for the DEA provider created by those third-country firms are similar to the ones that the authorisation requirement seeks to address in the EU.
64. The current framework is, and will be, a source of additional level playing field concerns for EU firms, considering in particular the end of the Brexit transition period where significant third-country firms currently active on EU trading venues will no longer be bound by EU rules. ESMA also appreciates that some Member States may be unwilling to impose national requirements on third-country firms where such requirements would not evenly apply across the EU, thereby putting their trading venues at a competitive disadvantage. The proposal set out below with respect to DEA users also aims at addressing this level field playing issue.
65. ESMA is of the view that the costs of requiring full authorisation of a person dealing on own account as investment firms for the sole purpose of having DEA access, including as a Tier 1 client, outweigh the benefits expected from such authorisation. ESMA therefore proposes to delete the exception to the exemption from authorisation as investment firm set out in Article 2(1)(d)(ii) of MiFID II for persons having DEA to a trading venue. Persons having DEA access to only deal on own account would no longer to be authorised as investment firms, except where they qualify as HFT firms. ESMA considers that the obligations and responsibilities relating to the DEA provider, including under Article 17(5) of MiFID II and Articles 22(3) and Article 23(2) of RTS 6, provide an appropriate and sufficient framework for addressing the risks of disorderly trading arising from DEA access to only deal on own account.
66. As a reminder, under Article 17(5) of MiFID II, an investment firm that provides DEA to a trading venue must have in place effective systems and controls which notably ensure that trading by clients using the service is properly monitored and that appropriate risk controls prevent trading that may create risks to the investment firm itself or that could create or contribute to a disorderly market. Furthermore, Article 22(3) of RTS 6 provides that a DEA provider allowing sub-delegation must ensure that a prospective DEA client which intends to sub-delegate its DEA has a due diligence framework in place that is at least equivalent to a DEA provider due diligence framework before sub-delegating such access. Under Article 23(2) of RTS 6, a DEA provider is also required to carry out an annual risk-based reassessment of the adequacy of its clients' systems and controls, in particular taking into account whether a DEA client has expressed an intention to sub-delegate the access it receives from the DEA provider.

67. To address the uncertainty that has arisen in relation to DEA sub-delegation and Tier 2 clients and in line with the rationale set out above, ESMA also proposes to amend the definition of DEA in Article 4(1)(39) to include DEA sub-delegation. This would allow to clarify that Tier 2 clients should be considered DEA users for the purposes of MiFID II obligations relating to DEA.
68. ESMA also considers that there would be value for the NCAs to have a better understanding of the magnitude of DEA access, both as the NCA of a trading venue where DEA is provided and as the NCA of a DEA provider. ESMA therefore suggests that Article 17(5) of MiFID II is amended to include the number and names of entities to which DEA access is provided, with an annual update.
69. With respect to DEA providers, and to further ensure harmonised implementation across the EU, ESMA is of the view that more prominence should be given to the requirement for DEA providers to be authorised as investment firms or credit institutions. ESMA therefore considers that such requirement should be spelled out in Article 1 of MiFID II and not only be indirectly provided for through an obligation on trading venues under Article 48 of MiFID II.
70. The proposal to remove the obligation for DEA clients to be authorised as investment firms would also ensure an equal treatment of EU and non-EU firms. ESMA suggests addressing the remaining unlevel playing field between EU and third-country HFT firms by introducing a requirement for third-country firms to be authorised as an investment firm when they qualify as an HFT firm on an EU trading venue. This would require a Level 1 change.
71. ESMA notes that the issues raised by the treatment of third-country firms under MiFID II/MiFIR are not limited to third-country firms having DEA to EU trading venues or applying HFT techniques and also extends to members and participants of EU trading venues. ESMA has however focussed on those two areas in the context of this report.

Q10: Do you agree with ESMA's proposals above? Please elaborate.

4 Organisational requirements for investment firms

72. This section of the CP discusses organisational requirements for investment firms, as stipulated in Article 17 of MiFID II and further specified in the relevant Level 2 regulations such as RTS 6.
73. In respect to Level 1 requirements, this section addresses the national practices for the notifications to NCAs by investment firms engaged in algorithmic trading and explores the merit of harmonising the notification process (e.g. harmonisation of the timing of the notification, content of the notification with a template).

74. The section also analyses the information gathered by NCAs, either as part of the notification referred to above or on an ad-hoc basis to monitor the compliance of investment firms with the requirements of Article 17(1) of MiFID II. This includes the frequency of the requests of information and the type of information requested.
75. Moreover, the CP discusses the co-operation between NCAs in the context of requests of information under Article 17(2) and (5) of MiFID II and the merits of a formal process for the exchange of information (e.g. timeline, template for the requests).
76. Finally, because a substantial part of the legal framework on organisational requirements for investment firms is set out in Level 2 Regulations, in particular RTS 6, the CP also analyses the application by investment firms of the provisions laid down in RTS 6.
77. It should be mentioned that some of the proposals put forward by the Commission in relation to digital operational resilience (also referred to as DORA)¹⁰ currently foresee an amended scope of RTS 6 to ensure there is no overlap with the new cross-sectoral requirements. ESMA is aware of these developments and is actively engaged in discussions on current and future DORA related legislative proposals. Considering the long-term horizon of these developments, ESMA however considers it might merit making some targeted amendments to RTS 6 and 7 already prior to any review associated with the DORA proposals.

4.1 Notifications to NCAs, exchange of information and on-going supervision

4.1.1 Legal framework

78. According to Article 17(2) of MiFID II, an investment firm that engages in algorithmic trading shall notify the NCA of its home Member State and of the trading venue at which the investment firm engages in algorithmic trading as a member or participant of the trading venue.
79. The NCA of the investment firm may require the investment firm to provide, on a regular or ad-hoc basis, a description of the nature of its algorithmic trading strategies, details of the trading parameters or limits to which the system is subject, the key compliance and risk controls that it has in place to ensure the conditions laid down in Article 17(1) of MiFID II are satisfied and details of the testing of its systems. Furthermore, the NCA of the

¹⁰Proposal for a Directive of the European Parliament and of the Council amending Directives 2006/43/EC, 2009/65/EC, 2009/138/EU, 2011/61/EU, EU/2013/36, 2014/65/EU, (EU) 2015/2366 and EU/2016/2341, COM(2020)596 and Proposal for a Regulation of the European Parliament and of the Council for operational resilience on the financial sector and amending Regulations (EC) No 1060/2009, (EU) No 648/2012, (EU) No 600/2014 and (EU) No 909/2014, COM(2020)595.

investment firm may request further information about the firm's algorithmic trading and the systems used for that trading.

80. Moreover, the NCA of the investment firm is required, on the request of the competent authority of a trading venue at which the investment firm is engaged in algorithmic trading, to communicate the information referred to above without undue delay.
81. Furthermore, according to Article 17(5) of MiFID II, an investment firm that provides DEA to a trading venue shall notify the NCAs of its home Member State and of the trading venue at which it provides DEA accordingly. The competent authority of the investment firm may request, on a regular or ad-hoc basis, a description of the systems and controls and evidence that those have been applied.
82. The NCA of the investment firm is required, on the request of a competent authority of a trading venue in relation to which the investment firm provides DEA, to communicate without undue delay the information referred to above.

4.1.2 Assessment and proposals

83. Based on a questionnaire sent to NCAs, ESMA analysed national practices for notifications to NCAs by investment firms under Articles 17(2) and 17(5) of MiFID II. In particular, ESMA asked NCAs whether they had national rules regarding the timing of notifications and what information they required to communicate as part of the notifications.
84. The questionnaire showed that only a few NCAs have formal rules for notifications under Articles 17(2) and 17(5) MiFID II. A couple of NCAs provide guidance to investment firms on the information they have to provide as part of the notification. This information includes:
 - Date of the notification;
 - LEI code;
 - Company name and address;
 - Key contact person within the investment firm;
 - First declaration or update;
 - Date of launch of the activity;
 - Identification of the trading venue(s);
 - Financial instruments;
 - Investment services;
 - Types of algorithmic strategies;
 - Number of trading algorithms used;
 - Short description of trading algorithms;

- Interdependency between trading algorithms.

85. Based on the results of the questionnaire, ESMA sees merit in developing notification templates within RTS 6 that investment firms would use, for the purpose of Articles 17(2) and 17(5) of MiFID II, to notify the NCAs of their home Member State and the NCAs of the trading venue at which they engage in algorithmic trading.

86. At the moment there are no legal provisions as to the timelines of the notification process. Few NCAs have however set up national rules in this regard. An amendment to the Level 1 text in this respect in will be helpful for both investment firms and NCAs from a practical point of view. ESMA would hence see merit in clarifying that investment firms should submit the notifications according to Articles 17(2) and 17(5) 'without undue delay'.

87. The above proposals would concern Level 1 and 2 amendments.

Q12: Do you see merit in ESMA developing a template for notifications to NCAs under Articles 17(2) and 17(5) of MiFID II? If not, please justify your position.

Q13: Do you agree that it would be useful to clarify that notifications should be done 'without undue delay'?

88. With respect to the exchange of information between the NCAs of the home Member State of the investment firm and the NCAs of the trading venues at which the investment firm engages in algorithmic trading, the responses to questionnaire did not reveal any problem with the exchange of information. There seems however to be only very little interaction between NCAs in practice.

89. Against this backdrop, ESMA believes that there is no need to develop any template for the exchange of information between NCAs. However, ESMA stands ready to make a proposal to facilitate the exchange of information, should there be a need in the future. In any case, the abovementioned template could also serve as a basis for sharing information with other NCAs in the case of cross-border requests of information.

Q14: Do you agree with ESMA's approach for the exchange of information between NCAs? If not, please justify your position.

90. Under Articles 17(2) and 17(5) of MiFID II, NCAs may request on a regular or ad-hoc basis, information from investment firms in order to demonstrate their compliance with the legislation. Feedback from NCAs showed that only a limited number of NCAs request this information and, most of the time this is during periodic inspections of investment firms. Only a handful number of NCAs require this information on a regular basis and outside periodic inspections.

91. It is important to qualify the above analysis by the fact that the number of investment firms engaged in algorithmic trading is concentrated in some member states.

4.2 Application of RTS 6

4.2.1 Legal framework

92. RTS 6 specifies the details of the organisational requirements for investment firms engaged in algorithmic trading laid down in paragraphs 1 to 6 of Article 17 of MiFID II. Article 17(1) of MiFID II requires an investment firm that engages in algorithmic trading to have in place effective systems and risk controls suitable to the business it operates to ensure that its trading systems are resilient and have sufficient capacity, are subject to appropriate trading thresholds and limits and prevent the sending of erroneous orders or the systems otherwise functioning in a way that may create or contribute to a disorderly market.
93. According to Article 17(1) as well, such a firm should have in place effective systems and risk controls to ensure the trading systems cannot be used for any purpose that is contrary to Regulation (EU) No 596/2014 (Market Abuse Regulation)¹¹ or to the rules of a trading venue to which it is connected. Finally, the investment firm should have in place effective business continuity arrangements to deal with any failure of its trading systems and should ensure its systems are fully tested and properly monitored to ensure that they meet the requirements laid down in this paragraph.
94. RTS 6 further specifies the above organisational requirements and includes provisions on, inter alia, (i) the testing and deployment of trading systems and strategies and on (ii) the annual self-assessment. RTS 6 also further specifies the DEA provisions from Article 17(5) of MiFID II.
95. The following section reviews in particular provisions relating to the characterisation of algorithms, the testing of algorithms, and the annual self-assessment. The relevant legal references for the latter two are elaborated on below. For the legal framework on the definition of algorithmic trading, we refer to section 3.
96. First, Article 5 of RTS 6 specifies that prior to the deployment or substantial update of an algorithmic trading system, trading algorithm or algorithmic trading strategy, an investment firm should establish clearly delineated methodologies to develop and test such systems, algorithms or strategies.

¹¹ Regulation (EU) No 596/2014 of the European Parliament and of the Council of 16 April 2014 on market abuse (market abuse regulation) and repealing Directive 2003/6/EC of the European Parliament and of the Council and Commission Directives 2003/124/EC, 2003/125/EC and 2004/72/EC (OJ L 173, 12.6.2014, p. 1–61).

97. In particular, these methodologies should ensure that the algorithmic trading system, trading algorithm or algorithmic trading strategy: (a) does not behave in an unintended manner, (b) complies with the investment firm's obligations under this Regulation, (c) complies with the rules and systems of the trading venues accessed by the investment firm, (d) does not contribute to disorderly trading conditions, continues to work effectively in stressed market conditions and, where necessary under those conditions, allows for the switching off of the algorithmic trading system or trading algorithm.
98. Article 5 also requires an investment firm to adapt its testing methodologies to the trading venues and markets where the trading algorithm will be deployed and specifies when the investment firm is required to undertake further testing.
99. On a related note, Article 7 of RTS 6 requires an investment firm to ensure that testing of compliance with the criteria laid down in Article 5(4)(a), (b) and (d) is undertaken in an environment that is separated from its production environment and that is used specifically for the testing and development of algorithmic trading systems and trading algorithms. To do so, the investment firm may use its own testing environment, or a testing environment provided by a trading venue, a DEA provider or a vendor. An investment firm should however retain full responsibility for the testing of its algorithmic trading systems, trading algorithms or algorithmic trading strategies and for making any required changes to them.
100. Moreover, according to Article 6 of RTS 6, an investment firm should test the conformance of its algorithmic trading systems and trading algorithms with the system of the trading venue and with the system of the direct market access provider in a number of cases. Such conformance testing should verify whether the basic elements of the algorithmic trading system or the trading algorithm operate correctly and in accordance with the requirements of the trading venue or the direct market access provider. It is further specified what the testing should verify for this purpose.
101. Lastly, on testing, Article 10 of RTS 6 requires that an investment firm, as part of its annual self-assessment, tests that its algorithmic trading systems and its procedures and controls can withstand increased order flows or market stress. The investment firm should design such tests, having regard to the nature of its trading activity and its trading systems. The investment firm should ensure that the tests are carried out in such a way that they do not affect the production environment. Article 9 further notes that those tests should comprise messaging volume and trade volume tests.
102. Provisions on the annual self-assessment are set out in Article 9 of RTS 6. An investment firm should annually perform a self-assessment and validation process and, on the basis of that process, issue a validation report. In the course of that process the firm should review, evaluate and validate: (a) its algorithmic trading systems, trading algorithms and algorithmic trading strategies; (b) its governance, accountability and approval framework;

(c) its business continuity arrangement; and (d) its overall compliance with Article 17 of MiFID II, having regard to the nature, scale and complexity of its business. The self-assessment should also include at least an analysis of compliance with the criteria set out in Annex I of RTS 6.

4.2.2 Assessment and proposals

103. ESMA sought feedback from NCAs on the framework for algorithmic trading, and in particular on the application of RTS 6 by investment firms. Most of the provisions on organisational requirements for investment firms engaged in algorithmic trading are indeed set out in RTS 6. ESMA asked NCAs whether any provisions in RTS 6 proved challenging or ill-suited and should therefore be amended or removed in the context of the revision of MiFID II/MiFIR.
104. According to the feedback received from NCAs, the current provisions in RTS 6 generally work well. NCAs noted that the RTS is valuable and covers all relevant areas of algorithmic trading. There were no urgent key issues identified regarding the current legal framework. Nonetheless, it was suggested that some targeted amendments and clarifications could be done.
105. These amendments cover the characterisation of algorithms, the testing of algorithms, and the annual self-assessment. Furthermore, it should be noted that any amendments in light of extending algorithmic requirements to SIs (please see section 3) will also affect RTS 6 provisions.
106. As some of the requirements in RTS 6 for investment firms are the mirror image of requirements in Commission Delegated Regulation (EU) 2017/584 (RTS 7)¹² for trading venues, some of the amendments that are suggested below are relevant for both, and hence will also be shortly reiterated upon in section 5.

Definition of algorithmic trading

107. Considering some of the comments received from NCAs, ESMA is reflecting on whether there is a need to clarify better the definition of algorithmic trading, as provided for in Article 18 of the Commission Delegated Regulation (EU) 2017/565. ESMA has provided guidance through Q&As on this definition clarifying for instance that the use of algorithms which only serve to inform a trader of a particular investment opportunity is not considered as algorithmic trading, provided that the execution is not algorithmic.¹³ ESMA wonders

¹² Commission Delegated Regulation (EU) 2017/584 of 14 July 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council with regard to regulatory technical standards specifying organisational requirements of trading venues (OJ L 77, 20.3.2019, p. 350-367).

¹³ https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-38_qas_markets_structures_issues.pdf

whether the guidance provided is sufficient or whether more clarifications should be given.

108. In the same context, ESMA is contemplating whether it would be of use to explicitly exclude certain types of algorithms from the scope of the provisions governing algorithmic trading. Currently, Recital 6 of RTS 6 notes that the testing of trading algorithms should be based on the potential impact that those algorithms may have on the overall fair and orderly functioning of the market, and that pure investment decision algorithms should be excluded from the testing requirements. Furthermore, Article 5 of RTS 6 explicitly notes that the methodologies for testing in paragraphs 2 to 5 in that Article only apply to trading algorithms leading to order execution.

109. ESMA would note though that while it may be considered to select other requirements on algorithmic trading that should not apply in cases where algorithms have a limited impact on the overall fair and orderly functioning of the market, it may be difficult to verify such limited impact.

110. Any amendments to the legislative framework in relation to the above would likely concern Level 2 amendments.

Q15: What is your view on clarifying the definition of algorithmic trading? If you deem it beneficial to refine the definition and account for further types of algorithms or algorithmic trading strategies, please provide your suggestion as well as underlying rationale.

Q16: Do you think there should be specific requirements for different type of algorithms or algorithmic trading strategies in RTS 6? Please explain.

Testing and testing environment

111. As regards the testing requirements in RTS 6, a distinction can be made between stress testing (Article 10), conformance testing (Article 6) and general methodology and testing (Article 5 and 7). Broadly speaking, stress testing concerns testing by an investment firm on whether its algorithmic trading systems and the procedures and controls can withstand increased order flows or market stresses and include high messaging volume tests as well as high trade volume tests. Conformance testing covers the ability of an algorithm or an algorithmic system to interact properly with a trading venue's system and matching logic. Last but not least, as a part of the general methodology, it should be ensured that the algorithm or the algorithmic system does not behave in an unintended manner, does not contribute to disorderly trading conditions, continues to work effectively in stressed market conditions and, where necessary under those conditions, allows for the switching off of the algorithmic trading system or trading algorithm (hereafter referred to as 'behavioural testing' of algorithms).

112. For neither stress testing nor conformance testing ESMA sees a need for amending any provisions. *Vis-à-vis* behavioural testing, ESMA would consider some clarifications beneficial.
113. As a way forward to improve testing and testing environments for behavioural testing, ESMA would in particular consider it beneficial to clarify what it means to test on “disorderly trading conditions”. There currently seems to be no convergence in how the testing of disorderly trading conditions is done.
114. ESMA believes that a clear definition of “disorderly trading conditions” could in part contribute to a more accurate and improved testing. ESMA considers that disorderly trading conditions should refer to a market where the maintenance of a fair, orderly and transparent execution of trades is compromised.
115. Considering the various Level 2 regulations (including RTS 6, RTS 7, RTS 8) for which the definition of disorderly trading conditions would be used, ESMA would deem a Level 1 amendment most fitting. ESMA would also note that the definitions of “disorderly trading conditions” were deleted from the draft RTS 6 and 7. While at the time this was done to avoid unnecessary confusion, ESMA observes that the lack of a definition has introduced ambiguity. Hence ESMA would advocate for a harmonisation of the definition in Level 1 text.
116. Furthermore, due to the variety in testing environments offered and used, ESMA considers that it would be useful to produce additional guidance covering the expectations concerning the checks and testing to be done for behavioural testing. This could concern, *inter alia*, the variety of conditions or scenarios that should be tested. Such clarifications could also indicate that this type of behavioural testing should focus on the interaction between the tested algorithm and the market, and that it should in particular detect whether the tested algorithm contributes to amplification of market movements that are unrelated to real economic value. There could be further attention as to specific elements that should be taken into account or general scenarios that should be included, in order to recreate the abovementioned dynamics in the testing environment. Considering the level of detail required for such guidance, ESMA would consider developing this in Level 2 (RTS 6). ESMA would seek to engage with stakeholders to establish the appropriate elements or scenarios.
117. Finally, ESMA would also consider it beneficial to require investment firms to report in the annual self-assessment under Article 9 of RTS 6 the specific testing environments used and for which algorithms. In order to develop a full view on the usage of testing environments, and to ensure that proper testing is performed in accordance with RTS 6, including information in the self-assessment may be of help to NCAs (see also paragraphs below).

118. The above proposals would concern both Level 1 and Level 2 amendments.

Q17: What is your experience with testing environments? Are they used frequently? If not, why? Do you see a need for any improvements?

Q18: Do you agree that the definition of “disorderly trading conditions” should be clarified in accordance with the proposed definition? If no, how would you define such trading conditions?

Q19: Do you agree that ESMA should provide additional guidance on the expectations concerning the checks and testing to be done, in particular for testing on disorderly trading conditions?

Annual self-assessment

119. Pursuant to Article 9 of RTS 6, investment firms are required to assess their compliance (and record their self-assessment) with Article 17 of MiFID II at least once a year.

120. A minority of NCAs currently requests this self-assessment for review. NCAs who do so, believe that it is a good tool but note that the lack of clear guidance and the free format of the self-assessment create very different outcomes in the level of detail of the submitted self-assessments. This renders it difficult for the NCA to compare outcomes. Hence, it could be useful to have a specific format - harmonized at EU level - in order to improve consistency and comparability.

121. ESMA would also propose a couple of other adjustments. As a remark, these proposals align with the RTS 7 proposals below, and any changes made to the RTS 6 provisions should be done in a harmonised fashion with those of RTS 7.

122. Firstly, ESMA would deem such exercise to be a proper due diligence assessment, and notes that it should be more ambitious than a statement of compliance. Secondly, in order to increase the quality of such assessments, ESMA would see merit in asking investment firms to submit their self-assessment to their NCA for review. Moreover, since ESMA considers that investment firms should diligently perform the self-assessment, and expects an increased burden for the investment firm, the frequency could be amended to every two years. Nonetheless, this should not apply to the stress testing done in accordance with Article 10, for which the frequency would continue to be on an annual basis. It should also be noted that NCAs should retain the possibility to request the self-assessment to be performed more frequently should the NCA deem this necessary.

123. Lastly, as mentioned above, ESMA would also propose to require investment firms to report in the annual self-assessment under Article 9 of RTS 6 more information on testing environments. Such information would include, inter alia, the testing environment used to

test compliance with the criteria in Article 5(4) of RTS 6 and for which algorithms this holds. This potential requirement will allow NCAs to verify that proper testing is performed in accordance with RTS 6 as well as provide a full view on the usage of testing environments.

124. The above proposals would concern Level 2 amendments.

Q20: Would you agree that it could be beneficial if ESMA develops a prescribed format for the self-assessment foreseen in Article 9 of RTS 6?

Q21: Do you agree with the changes proposed to the self-assessment of Article 9 of RTS 6?

Q22: Would you propose any other targeted legislative amendments to RTS 6? Please include a detailed explanation of the proposed amendment and of the underlying issue that this amendment would aim to tackle.

5 Organisational requirements for trading venues

125. Article 48 of MiFID II describes the requirements regarding systems resilience, circuit breakers and electronic trading. The objective of those requirements is to ensure that the algorithmic trading and high-frequency trading do not create a disorderly market and cannot be used for abusive purposes. Trading venues should therefore ensure that their systems are resilient and properly tested to deal with increased order flows or stress market conditions and that circuit breakers are in place to temporarily halt trading or constrain it in case of sudden, unexpected price movements.

126. RTS 7 further specifies the organisational requirements for trading venues, limiting the scope of application to those trading venues which “allow or enable algorithmic trading”. Those are further defined under Article 1 of RTS 7 as trading venues “where order submission and order matching is facilitated by electronic means”. The rationale is explained in Recital 3 which clarifies that “risks arising from algorithmic trading can be present in any type of trading system that is supported by electronic means”.

127. Recital 3 of RTS 7 further clarifies that “specific organisational requirements should be laid down in respect of regulated markets, multilateral trading facilities and organised trading facilities allowing for or enabling algorithmic trading through their systems. Such trading systems are those where algorithmic trading may take place as opposed to trading systems in which algorithmic trading is not permitted, including trading systems where transactions are arranged through voice negotiation.”

128. ESMA is of the view that RTS 7 applies to all trading venues except those that operate a voice trading system. The scope of RTS 7 therefore includes (i) trading venues without

auto matching, (ii) trading venues explicitly prohibiting algorithmic trading as well as (iii) electronic platforms where orders can be submitted through voice.

129. It should be noted that RTS 7 provides some flexibility for trading venues and their NCAs to apply the provisions in a proportionate manner. In other words, the requirements set out in RTS 7 “should be considered according to the nature, scale and complexity of the algorithmic trading activity undertaken” (Recital 5 of RTS 7).
130. Furthermore, those trading systems which are excluded from the scope of application of RTS 7 remain nevertheless bound by the provisions contained in Article 48 of MiFID II. In fact, MiFID II provisions have a broader scope applying to all trading systems and regardless whether order submission and order matching is facilitated by electronic means.
131. More specifically, ESMA considers that voice trading systems remain bound by Article 48(1) of MiFID II and are expected “to have in place effective systems, procedures and arrangements to ensure its trading systems are resilient, have sufficient capacity to deal with peak order and message volumes, are able to ensure orderly trading under conditions of severe market stress, are fully tested to ensure such conditions are met and are subject to effective business continuity arrangements to ensure continuity of its services if there is any failure of its trading systems”. ESMA has recently clarified the scope of application of RTS 7 in a Q&A¹⁴ which encompasses the above considerations.

5.1 Capacity and Resilience of Trading Venues

5.1.1 Legal framework

132. Trading venues are required to have in place all necessary systems, procedures and arrangements to comply with MiFID II requirements in terms of system resilience, circuit breakers and electronic trading. Article 48 of MiFID II sets out those requirements.
133. In particular, Article 48(1), requires trading venues to ensure its systems are resilient, have sufficient capacity and are able to ensure orderly trading under conditions of market stress. Furthermore, those systems need to be fully tested and subject to business continuity arrangements.
134. RTS 7 further specifies the requirements to ensure trading venues’ systems are resilient and have adequate capacity. Trading venues should assess their compliance at least once a year, taking into account the nature, scale and complexity of their business. RTS

¹⁴ See Question 31 on the Direct Electronic Access (DEA) and algorithmic trading section of ESMA’s Questions and Answers on MiFID II and MiFIR market structures topics (https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-38_gas_markets_structures_issues.pdf).

7 further specifies a non-exhaustive list of elements that should be taken into account when undertaking the self-assessment. The self-assessment should only be sent to their NCA when requested.

135. Furthermore, in accordance with RTS 7 trading venues should also have clearly defined development and testing methodologies to ensure that (a) the trading system does not behave in an unintended manner; (b) the compliance and risk management controls embedded in the systems work as intended, including the automatic generation of error reports; and, (c) the trading system can continue to work effectively in case of a significant increase of the number of messages managed by the system. Trading venues should also take all necessary steps to avoid that their trading systems contribute to disorderly trading conditions.

5.1.2 Assessment and proposals

136. ESMA has assessed the appropriateness of the self-assessment in the perspective of both NCAs and trading venues in order to understand whether the exercise is useful and whether some changes should be introduced.

137. Trading venues provided feedback to ESMA as to whether the self-assessment of compliance with Article 48 raised any issues or brought about any changes to their systems. Whilst this was not a common outcome, a handful of venues stated they were able to improve their processes or identified deficiencies following the self-assessment. In particular those venues reported:

- improvements to their paper processes and control documentations;
- identification of deficiencies in terms of system functionality and governance;
- identification of low-level risks which were subsequently fixed;
- improvements in governance, business continuity arrangements and cyber security; and,
- development of a new trading system to comply with requirements under Article 48 MiFID II.

138. In addition to the feedback provided by trading venues, ESMA has also collected views from NCAs on the appropriateness of the self-assessment and invited them to share the main conclusions drawn from analysing TV's assessments.

139. Most NCAs requesting the self-assessment, noted it lacked a clear structure and could give a certain leeway for different interpretations on how the assessment itself should be performed. Despite the guidance provided in the Annex to RTS 7, NCAs believe that a harmonised approach could be developed on how the self-assessment should be conducted by trading venues. Furthermore, NCAs suggested that it was also unclear how the self-assessment should be drafted, including the type of analysis requested.

140. In light of previous considerations, NCAs provided informal guidance to venues on the expected content of the documents and the criteria to be followed in the drafting. However, rather than providing guidance to their supervised entities individually, NCAs would welcome ESMA's guidance on the structure and the level of detail in the answers.
141. Furthermore, some room for improvements was identified in some areas, for instance in the process of due diligence of members, the testing environments for algorithms and the pre- and post-trade controls. More importantly, the assessments analysed by NCAs seem to be more a statement of compliance rather than a proper due diligence on the systems and controls implemented by trading venues.
142. As observed from the issues and solutions identified by trading venues, ESMA is of the view that the self-assessment has overall achieved its purpose and remains appropriate to be undertaken by trading venues. Nevertheless, taking into consideration the feedback provided by both NCAs and trading venues, there is certainly room for improvement in the way the self-assessment is performed. ESMA is therefore proposing some targeted changes in this respect.
143. Firstly, in order to foster convergence amongst jurisdictions, ESMA proposes to create a harmonised approach for the self-assessment. In particular, ESMA proposes to create a clear format¹⁵ trading venues should follow when undertaking their assessment, with the aim of improving the appropriateness and comparability of the exercise amongst trading venues and NCAs.
144. The proposed harmonization will also ensure that trading venues undertake proper due diligence on their systems and controls based on a structured approach, enabling a coherent identification of the main aspects of focus. At the same time, such approach will ensure that trading venues not only assess their compliance with article 48 MiFID II, but also with all requirements of RTS 7.
145. Secondly, ESMA believes that the self-assessment should include a proper due diligence from trading venues on their systems and controls. Such due diligence might increase trading venues burden in performing such assessment. Hence ESMA proposes that the self-assessment is performed every two years instead of annually. However, it should be noted that NCAs should retain the possibility to request the self-assessment to be performed more frequently should it deem necessary.
146. Furthermore, ESMA believes that RTS 7 should specify that the self-assessment should be submitted to the NCA.

¹⁵ Please see similar proposal in the context of the annual self-assessment to be performed in the context of RTS 6 in section 4.2.2.

147. The proposals described above would require an amendment to RTS 7.

Q23: Do you agree with ESMA's proposal to harmonise and create a clear structure for the performance of the self-assessment?

Q24: Do you agree with limiting the self-assessment to every two years and to require trading venues to share it with their relevant NCA?

5.2 Testing of algorithms

5.2.1 Legal framework

148. The increased importance of algorithmic trading strategies, including high frequency trading strategies, in today's financial markets, requires appropriate regulatory initiatives to be set forth in order to prevent these strategies to adversely impact EU market structures. In addition, appropriate testing of algorithms so as to ensure that these strategies cannot create or contribute to disorderly trading conditions should be paramount.

149. As previously mentioned, as per Article 48(1) of MiFID II, "[...] Member States shall require a regulated market to have in place effective systems, procedures and arrangements to ensure its trading systems [...] are fully tested" to guarantee they are resilient, have capacity to deal with peak order and message volumes, and overall to ensure continuity of its services in case of any failure.

150. Additionally, Article 48(6) of MiFID II requires trading venues to ensure that algorithmic trading cannot create or contribute to disorderly trading conditions. To do so, the trading venues should have in place systems and arrangements requiring members or participants to carry out appropriate testing and provide environments to facilitate such testing. Furthermore, trading venues should have in place the necessary tools to manage any disorderly trading conditions which may arise from algorithmic trading systems. RTS 7 further specifies the above requirements and includes provisions on the testing of trading systems, conformance testing and testing of members' algorithms to avoid disorderly trading conditions.

151. According to Article 9 of RTS 7, trading venues should make use of clearly defined development and testing methodologies, before deploying or amending a trading system.

152. Articles 9(1) and (2) of RTS 7 further stipulate that trading venues should require their members to certify that the algorithms they deploy have been appropriately tested, through a conformance test. To that end, and according to Article 9(4), trading venues are required to provide a conformance testing environment to their actual and prospective members.

153. The conformance testing should ensure that the basic functioning of the member's trading system, algorithms and strategies complies with the trading venue's conditions or with the conditions of the direct market access provider. For this purpose, the testing shall verify if that the algorithmic trading system or trading algorithm:

- a. interacts with the trading venue's matching logic as intended; and,
- b. adequately processes the data flows downloaded from the trading venue.

154. Finally, Article 10(2) of RTS 7 further specifies the characteristics of the testing environment that have to be provided by trading venues.

5.2.2 Assessment and proposals

155. The testing of algorithms is paramount to the efficiency of markets. The purpose of testing is to avoid disorderly trading conditions through by recreating real market conditions to ensure the well-functioning of algorithms under changing circumstances. To that effect, ESMA is of the view that the requirements to perform algorithm testing under Article 48(6) of MiFID II and further specified in RTS 7 remain appropriate and thus do not require any significant changes at this stage.

156. Nonetheless, ESMA's questionnaire highlighted a potential overlap between the obligations for investment firms and trading venues on aspects related to testing included in RTS 6 and RTS 7. In particular, ESMA noted an overlap relating to conformance testing and testing of algorithms for disorderly trading conditions, correspondent to Articles 9 and 10 of RTS 7, respectively. The identified overlapping points concern Article 5(1) and (4) and Article 7(1) of RTS 6 with Article 9(1) and (2) and Article 10(1) of RTS 7.

157. As per ESMA's analysis, Article 5(1) of RTS 6 specifies that an investment firm, prior to the deployment or substantial update of an algorithmic trading system, trading algorithm or algorithmic trading strategy, should establish clearly delineated methodologies to develop and test such systems, algorithms or strategies.

158. Such methodologies, as per Article 5(4) of RTS 6, should ensure that the algorithmic trading system, trading algorithm or algorithmic trading strategy: (a) does not behave in an unintended manner; (b) complies with the investment firm's obligations under this Regulation; (c) complies with the rules and systems of the trading venues accessed by the investment firm; (d) does not contribute to disorderly trading conditions, continues to work effectively in stressed market conditions and, where necessary under those conditions, allows for the switching off of the algorithmic trading system or trading algorithm.

159. Article 7 of RTS 6 further requires an investment firm to ensure that testing of compliance with the criteria laid down in Article 5(4)(a), (b) and (d) is undertaken in an environment that is separated from its production environment and that is used specifically for the testing and development of algorithmic trading systems and trading algorithms. In order to do so, the investment firm may use its own testing environment, or a testing environment provided by a trading venue, a DEA provider or a vendor. In any case, an investment firm should retain full responsibility for the testing of its algorithmic trading systems and for making any required changes.
160. ESMA notes that these provisions are overlapping with Article 9 and 10 of RTS 7. The first part of Article 9 states that a trading venue should, before deploying or updating a trading system, be responsible to make use of clearly defined development and testing methodologies which ensure that: (a) the trading system does not behave in an unintended manner; (b) the compliance and risk management controls embedded in the systems work as intended, including the automatic generation of error reports; (c) the trading system can continue to work effectively in case of a significant increase of the number of messages managed by the system. The second part of Article 9 states that trading venues should be able to demonstrate at all times that they have taken all reasonable steps to avoid that their trading systems might contribute to disorderly trading conditions.
161. Furthermore, Article 10(1) of RTS 7 also states that trading venues should require their members to certify that the algorithms they deploy have been tested to avoid contributing to (or creating) disorderly trading conditions prior to the deployment or substantial update of a trading algorithm or trading strategy and explain the means used for that testing.
162. ESMA intends to look further into the responsibilities attributed to trading venues and investment firms, in order to provide market participants with further clarity if necessary. Should this be the case, ESMA could propose targeted amendments to those provisions in order to clarify which are the responsibilities of trading venues (provide a testing environment and require members to undertake the conformance testing) and which are those of investment firms (follow a clear testing structure). This would require a Level 2 amendment.

Q25: Do you agree with ESMA's analysis about the overlapping requirements between RTS 6 and 7? Are those overlaps considered beneficial, should they be removed or are there any gaps? Are there any further points that should be clarified?

163. The conditions for the conformance testing and the testing of algorithms put an emphasis on investment firms and trading venues to have controls in place to manage volatility and prevent disorderly trading conditions. ESMA is reflecting on the need to provide for a more robust set of trading scenarios in order to ensure that trading venues' systems can

cope with the algorithms deployed by their members or prospective members. ESMA would welcome market participants' views on this proposal.

164. Furthermore, for algorithms to be appropriately tested, investment firms should be able to have access to robust testing and simulation environments. ESMA would also welcome market participants' views on the appropriateness of testing environments currently available.

Q26: What is your view with regards to the testing of algorithms requirements? Do you agree that more robust testing scenarios should be set?

Q27: Are the testing environments available for the testing of algorithms appropriate for this purpose?

165. Finally, in line with the considerations underlined in the previous section¹⁶ and the feedback received on its questionnaire, ESMA believes that a clear definition of “disorderly trading conditions” would be beneficial to improve testing and testing environments. ESMA notes that the lack of a definition has introduced ambiguity and a Level 1 amendments would be most fitting. ESMA welcomes comments on this proposal on Question 18.

5.3 Circuit Breakers

5.3.1 Legal framework

166. Paragraph 5 of Article 48 of MiFID II sets out the requirements relating to circuit breakers. In particular, where there is a significant price movement during a short time interval, trading venues should be able to halt trading and, in exceptional circumstances to cancel, vary or correct a transaction. The parameters for halting trading should be appropriately calibrated taking into account a number of items:

- the liquidity of the different asset classes and sub-classes;
- the nature of the market model and types of users; and,
- are sufficient to prevent significant disruptions to the orderliness of trading.

167. In addition, a trading venue that is material in terms of liquidity in a financial instruments halts trading, should ensure it notifies competent authorities to coordinate a market-wide response and determine whether it is appropriate to halt trading on other trading venues until trading resumes on the original market.

¹⁶ See paragraphs 113-115.

168. Article 19 of RTS 7 further specifies the mechanisms to manage volatility to be used by trading venues. In particular, trading venues need to have mechanisms to halt or constrain trading at all times during trading hours. Furthermore, Article 19(2) of RTS 7 requires trading venues to ensure that (a) mechanisms to halt or constrain trading are tested before implementation and periodically thereafter when the capacity and performance of trading systems is reviewed; (b) IT and human resources are allocated to deal with the design, maintenance and monitoring of the mechanisms implemented to halt or constrain trading; (c) mechanisms to manage market volatility are continuously monitored. Finally, Article 19(3) and (4) respectively require trading venues to maintain records of the rules and parameters set for such mechanisms and to ensure that they can be manually overridden if needed to ensure orderly trading.

169. Furthermore, ESMA has issued guidelines on the calibration of circuit breakers and publication of trading halts under MiFID II¹⁷ to ensure a consistent application of the provisions under Article 48(5) of MiFID II across the EU.

170. The guidelines set out a non-exhaustive list of elements that should be taken into account by trading venues when calibrating their circuit breakers. The calibration should be performed according to a pre-defined, statistically supported methodology. The elements contained in the guidelines which should be taken into account are:

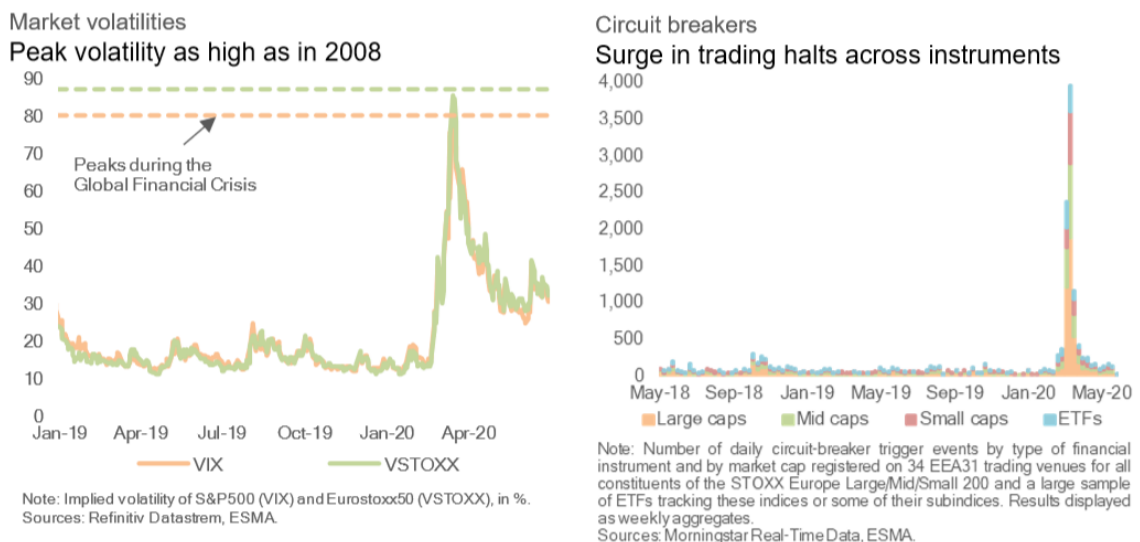
- the nature of the financial instrument;
- the liquidity profile and quotation level of the financial instrument;
- the volatility profile of the financial instrument;
- the order imbalance;
- trading venue mode and rules;
- internal and external references;
- duration of the halts;
- newly issued instruments.

5.3.2 Assessment and proposals

171. Circuit breakers are employed by trading venues as a way of protecting markets against episodes of extreme volatility affecting particular instruments or the whole market. Circuit breakers play an important role in today's financial markets. The role of circuit breakers has been very prominent in a variety of circumstances such as periods of extreme volatility which materialised, for example, during the 2008 financial crisis.

¹⁷ https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-63_mifid_ii_guidelines_on_trading_halts.pdf

FIGURE 10: MARKET VOLATILITIES AND CIRCUIT BREAKERS



172. In order to understand whether the calibration and deployment of circuit breakers have been effective in the EU, ESMA has analysed trading data during the beginning of the Covid-19 pandemic in 2020. The period between the end of February 2020 and March 2020 was characterised by a significant sell-off and high volumes traded. EU trading venues faced periods of very high volatility which are comparable to those of the 2008 financial crisis – see Figure 10.

173. In its Report on Trends, Risks and Vulnerabilities (TRV Report)¹⁸, ESMA noted that “trading venues proved to be broadly resilient, despite the surge in trading activity, message traffic and market movements. Circuit breakers were widely and efficiently used,

¹⁸ See TRV – ESMA Report on Trends, Risks and Vulnerabilities https://www.esma.europa.eu/sites/default/files/library/esma_50-165-1287_report_on_trends_risks_and_vulnerabilities_no.2_2020.pdf

and trading capacity was tested by volumes reaching all-time highs, with few operational issues.”

174. Furthermore, the TRV Report noted that the number of events triggering circuit breakers in the second and third week of March reached record levels of around 2,400 and 4,000 respectively. This compares, for example, with previous peaks of daily triggers of circuit breakers of around 1,500 around the Brexit referendum in the week of 20 June 2016. In April, the occurrences stabilised to an average of 200 per week and declined afterwards to a level close to the long-term average of around 150 per week (see Figure 10).
175. In addition to the study provided in the TRV Report, NCAs have noted that during the high volatility periods during the end of Q1 2020 circuit breakers have worked in accordance with their expectations. Some trading venues have highlighted to their regulators that trading halts parameters were adjusted during this period. These adjustments were expected given the need to adjust trading halts to market volatility. Trading venues stated that the mechanism worked quite well and addressed any potential disorderly trading concerns during the relevant period.
176. Taking into account the evidence presented by ESMA’s TRV Report and the feedback received from NCAs and trading venues regarding the application of the circuit breaker mechanism in times of high market volatility, no changes to the regulatory framework is currently envisaged by ESMA, in particular the requirements under Article 48(5) of MiFID II.
177. Furthermore, ESMA understands that the process for the calibration of the trading halts parameters and its reporting obligation as prescribed in the guidelines are giving important information to NCAs and ESMA, whilst at the same time, providing trading venues with enough flexibility to be able to undertake adjustments when required without incurring in a too burdensome process. Therefore, ESMA deems that its guidelines also remain at this stage appropriate and does not propose any changes.

Q28: Do you agree with ESMA’s analysis that the circuit breaker mechanism achieved its objective to avoid significant disruptions to the orderliness of trading?

Q29: Do you agree that the requirements under Article 48(5) of MiFID II complemented by RTS 7 and the guidelines on the calibration of circuit breakers and publication of trading halts under MiFID II remain appropriate? If not, what regulatory changes do you deem necessary?

5.4 Co-location and fee structure

5.4.1 Legal framework

178. The advancements in technology enabled the use of more sophisticated ways of trading, such as high-frequency trading. This new technique is facilitated by the co-location of market participants' facilities in close physical proximity with those of the trading venue's matching engine. In order to ensure fair trading conditions for all market participants, MiFID II imposes certain obligations on trading venues offering such co-location services.
179. Article 48(8) of MiFID II requires that the rules of the regulated markets on co-location services are transparent, fair and non-discriminatory. Further detailed requirements regarding co-location services are provided in Commission Delegated Regulation (EU) 2017/573 (RTS 10)¹⁹.
180. Article 1 of RTS 10 clarifies when the co-location services are considered fair and non-discriminatory. Article 1(2) clarifies that all users subscribed to the same services should obtain the same level of service. Article 1(3) imposes on trading venues the obligation to monitor the connections and latency measurements, while the Article 1(4) does not allow trading venues to require co-location services to be purchased in a package with other services. Article 2 of RTS 10 provides details regarding the transparency requirements trading venues should fulfil with regards to co-location services, i.e. disclosure of list of services, fees, conditions, procedures and requirements.
181. Similarly, Article 48(9) of MiFID II requires Member States to ensure that regulated markets have fee structures, including execution fees, ancillary fees and any rebates, which are transparent, fair and non-discriminatory. Fees should also not create incentives to place, modify or cancel orders or to execute transaction in a way which contributes to disorderly trading conditions or market abuse. Trading venues should also impose market making obligations against any rebates granted.
182. Article 48(9) of MiFID II allows fees to be adjusted based on the length of time for which the order was maintained and calibrated per financial instrument. Higher fees can be imposed on orders which are immediately cancelled. Similarly, participants cancelling a large number of orders compared with transactions executed and participants using high-frequency trading techniques can be subject to higher fees, in order to reflect the additional burden on the system capacity.

¹⁹ Commission Delegated Regulation (EU) 2017/573 of 6 June 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council on markets in financial instruments with regard to regulatory technical standards on requirements to ensure fair and non-discriminatory co-location services and fee structures (OJ L 77, 20.3.2019, p. 145-147).

183. Requirements regarding fee structures have been further specified in RTS 10. Article 3 of RTS 10 clarifies when fees are to be considered fair and non-discriminatory. In particular, all users that subscribed to the same services should be charged the same fee, and the fee structure should be sufficiently granular for users to predict the fee they will be charged. Furthermore, services should be provided without obliging the user to purchase them in a package with other services.

184. Finally, Article 4 of RTS 10 requires trading venues to publish the objective criteria used to set out their fees, while Article 5 of RTS 10 does not permit to create a fee structure offering a lower fee above a certain threshold and once their trades exceed that threshold, all trades benefit from the lower fee.

5.4.2 Assessment and proposals

185. In the questionnaire prepared by ESMA, only few NCAs reported that trading venues under their supervision offer co-location services. Where such services are provided, the relevant NCAs assessed the quality of information provided by the venues as adequate. The conditions describing the co-location services were easily found on the trading venues' websites and were found in compliance with the regulatory requirements. The same services were made available to all customers on fair and non-discriminatory conditions.

186. In some cases, NCAs reported that co-location services are operated by third-party providers. In those circumstances, members need to sign an agreement directly with the provider, which also provides the information required under Article 2 of RTS 10. It should be noted that, in this case, the trading venues remain responsible to ensure that their contractors respect the regulatory provisions. No NCA reported receiving a complaint about co-location services being bundled with other services. So far, no supervisory issue has been raised regarding the provision of co-location services.

187. The fee structures and any changes introduced to them are assessed by the relevant authorities on an ongoing basis. NCAs reported to be duly informed about updates of fees by trading venues under their supervision. Furthermore, if any issue arises in this context, the trading venue and its NCA engage in a discussion to find a solution prior to the entry into force of any amendment. NCAs consider their trading venues' fee structures to be fair and non-discriminatory.

188. Trading venues use different criteria when determining their rebates, incentives and disincentives. Most frequently they take into account the type of market participant and offer incentives for participants who provide liquidity and market makers. Rebates are usually decided based on the order book presence time, the average order size and the presence at the best bid and offer. Some venues do not offer any rebates, and the fees are based on traded volumes or number of traded contracts.

189. A vast majority of trading venues do not adjust their fees for cancelled orders according to the length of time for which the order was maintained. Instead, venues impose a penalty fee for those participants who exceed certain daily order to trade ratio. The threshold is usually calculated per asset class, and it also often takes into account whether a participant is an active market maker.
190. The assessment of fees by NCAs focuses on ensuring that they are in line with the regulatory requirements and do not lead to disorderly trading conditions. Some authorities have encountered situations, where the fee structure could have led to disorderly trading. An example reported was the case of a single participant benefiting from an exemption from the penalties applicable for exceeding the ratio of the number of orders placed to the number of trades executed in a given security on a given day, placing a very large volume of orders which are subsequently cancelled. Furthermore NCAs also make sure that as prescribed by the Article 5 of RTS 10, the so-called cliff edges shall be avoided, i.e. fee schedules cannot be constructed in such a way that only the marginal trade executed subsequently to reaching the threshold is executed at a reduced price. Otherwise, there is a risk of market participants making so-called “wash trades” transactions, that could be misleading to the market.
191. With regards to fees, one NCA also raised the fact that some trading venues only levy fees on sell-side participants. This situation could lead to those firms incorporating those fees into their quotes, and as a result, leading to less transparency for the buy-side regarding the price of trading (hidden fees being somewhat passed over to them). However, requiring trading venues to charge both buy and sell-side would not necessarily ensure that sell-side firms would not still incorporate part of their fees into their quotes. In addition, it appears that buy-side participants prefer to receive an all-including transaction price (no other trading fees being paid). On balance, ESMA is not minded proposing any change in this respect at this point in time.
192. Trading venues also publish certain information about their fees according to Article 4 of RTS 10. This information is also generally assessed as adequate by the NCAs, despite one authority noting that some harmonisation of the publications could be considered, in order to facilitate the comparison of the information provided by various entities.
193. Additionally, it emerged that in some cases the publications made by trading venues were not very easy to retrieve. The NCA subsequently requested that the venue collects all information in one dedicated page. Another authority stressed that from the published documentation the trading venue should made clear to whom fees will be charged. Finally, in some cases, the pricing policies were assessed as rather complex. Those entities were requested to work on simplifying their publications.
194. Overall, the assessment of fees structures and related disclosures by the trading venues were assessed as compliant and adequate by the NCAs. So far, no complaint has been

raised by the customers of the fees not being fair or discriminatory. Therefore, no amendment is being proposed by ESMA for the time being regarding those legal provisions.

Q30: Do you agree that the co-location services and fees structures are fair and non-discriminatory? Please elaborate.

Q31: Do you think that the disclosures under RTS 10 made by the trading venues are sufficient or should they be harmonised among the different entities? Please explain.

5.5 Orders to Transactions Ratio (OTR)

5.5.1 Legal framework

195. According to Article 48(6) of MiFID II, “Member States shall require a regulated market to have in place effective systems, [...] including systems to limit the ratio of unexecuted orders to transactions that may be entered into the system by a member or participant, to be able to slow down the flow of orders if there is a risk of its system capacity being reached and to limit and enforce the minimum tick size that may be executed on the market”. Further detailed requirements regarding monitoring of the ratio of orders to transactions are provided in Commission Delegated Regulation (EU) 2017/566 (RTS 9)²⁰.

196. It is clarified in Recital 1 of RTS 9 that “[...] trading venues should have a number of systems, procedures and arrangements in place to ensure that algorithmic trading systems cannot create or contribute to disorderly trading conditions including systems to monitor and, where appropriate, limit the ratio of unexecuted orders to transactions”.

197. Article 3 of RTS 9, provides further details on the methodology to calculate the OTR. In particular, Article 3(1) clarifies that two types of OTR should be monitored: the first one based on volumes, and the second one based on the number of orders and transactions. Trading venues are indeed required to calculate the ratio of unexecuted orders to transactions for each of their members or participants at least at the end of every trading session in both of the following ways: (a) in volume terms: (total volume of orders/total volume of transactions) -1; and (b) in number terms: (total number of orders/total number of transactions) -1.

²⁰ Commission Delegated Regulation (EU) 2017/566 of 18 May 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council on markets in financial instruments with regard to regulatory technical standards for the ratio of unexecuted orders to transactions in order to prevent disorderly trading conditions (OJ L 77, 20.3.2019, p. 84-89).

198. Furthermore, Article 3(2), clarifies that the maximum ratio of unexecuted orders to transactions calculated by the trading venue should be considered as to have been exceeded by a member or participant during a trading session if the trading activity of that member or participant in one specific instrument, taking into account all phases of the trading session, exceeds either or both of the two ratios.

199. Article 3(3) and (4) clarify that the calculation of the number of messages received from each member or participant should follow the counting methodology per order type set out in the Annex of RTS 9. When such calculation is not possible, the trading venue should proceed in accordance with the general system based on message counting and on the basis of the most similar order type appearing in the Annex.

5.5.2 Assessment and proposals

200. Based on the questionnaire sent to trading venues, ESMA analysed the trading venues' methodologies to determine the maximum accepted ratio of unexecuted orders to transactions and to set volume and price thresholds to reject erroneous orders.

201. The responses indicate that there are different methodologies used by trading venues to calculate their maximum limit. Several respondents confirmed they calibrate their maximum limits based on trading history. Some trading venues stated that the methodology used to determine the maximum OTR is based on both the actual capacity of the trading system and the regular trading behaviour of the trading participants.

202. In the questionnaire, ESMA also asked trading venues to explain exactly what limits are in place on a per asset class basis. Consequently, since there are different methodologies used by trading venues, the same happens with the results, more precisely on the maximum accepted ratio set by trading venues.

203. The maximum limits vary independently of the asset class, from trading venue to trading venue. Taking into consideration the responses provided, most do not have different maximum accepted ratios per asset class, but instead, an overall maximum limit applied to all instruments.

204. After the analysis of all responses to the questionnaire, it is possible to assess the highest and lowest figures calculated as maximum accepted ratio by trading venues. It is also noticeable that some trading venues have set one maximum limit for all asset classes. The below figure provides an overview on the limits reported by the trading venues:

FIGURE 11: RANGE ON MAXIMUM LIMITS, BASED ON TV'S QUESTIONNAIRE DATA

		Number based (unit)	Volume based (€)
Market Makers	Maximum reported	5,000,000	125,000,000,000
	Minimum reported	10,000	50,000
Other	Maximum reported	5,000	125,000,000
	Minimum reported	50	1,000

Source: Data collection from responses provided by NCAs on ESMA's questionnaire

205. There is therefore a very significant divergence in terms of maximum limits allowed across different trading venues. While ESMA understands that the OTR limits are linked to the level of electronicity and sophistication of the trading platform, the instruments traded and the type of trading system operated, the outcome of the ESMA survey raises questions. One could for instance wonder whether such a wide range of OTR limits really leads to an equivalent level of protection on all trading venues in the EU.

206. Consequently, ESMA believes that there is merit in assessing whether it is possible to achieve more convergence on the maximum OTRs applied on EU trading venues in order to strengthen and harmonise the level of protection these limits are meant to provide. ESMA therefore would like to propose to introduce a Level 1 amendment to include an empowerment for ESMA to develop technical standards to set out the maximum OTR ratio, calibrated per asset class.

Q32: Do you agree with ESMA's proposal to set out the maximum OTR ratio, calibrated per asset class?

207. ESMA also sought views on whether the established limits were frequently exceeded in 2019, and if, consequently, those limits were changed either upwards or downwards. Based on the responses received, most trading venues reported either zero, or a very low number of breaches during the past year.

208. In addition, the majority of respondents reported no amendments to the maximum limits. However, one trading venue stated that it was in a process of modifying the limits downwards, and another modified the limits calculated in number terms for market makers from 150,000 to 500,000 in the course of the annual review of the OTR limits and as a result of the increased number of breaches in securitised derivatives.

209. Lastly, ESMA also assessed the procedures in place by trading venues in case of a trading member exceeding the prescribed limit.

210. After analysing the responses provided by trading venues, it seems there is no harmonisation on the approach taken and each trading venue has its own procedure for dealing with exceeding the limits. Furthermore, most of the respondents stated that breaches were dealt with on a case by case basis.

211. Nonetheless, there are some commonalities on the procedures adopted by trading venues in case of a breach: most either reject the order exceeding the pre-determined volume automatically or contact the participant in order to advise on the issue and discuss a possible solution. If the situation persists, the participant usually receives a written notice and a fine may be applied.

Q33: Do you agree that the maximum limits are not frequently exceeded? Please explain any potential underlying issues in this respect that should be recognised.

Q34: Do you agree with the consequences as described of exceeding the maximum limits or should there be a more convergent approach? Please provide any comment or suggestion regarding the procedures in place by trading venues in case of a member exceeding the prescribed limit.

5.6 Monitoring of compliance with trading venues' rules

5.6.1 Legal framework

212. In addition to the requirements set out on Article 48 of MiFID II relating to systems resilience, circuit breakers and electronic trading, trading venues also have an obligation of monitoring compliance with its rules. In particular, Articles 31 and 54 require trading venues to maintain effective arrangements and procedures for the monitoring of their members and participants' compliance with its rules. The monitoring should be able to identify infringements to the trading venues' rules or disorderly trading conditions or conduct that may indicate behaviour that is prohibited under Regulation (EU) No 596/2014 (MAR) or system disruptions in relation to a financial instrument.

213. Article 31(2) of MiFID II sets out the requirement for investment firms operating an MTF or an OTF to immediately inform their competent authority of "significant infringements of [their] rules or disorderly trading conditions or conduct that may indicate behaviour that is prohibited under Regulation (EU) No 596/2014 or system disruptions in relation to a financial instrument". Furthermore Article 31(2) of MiFID II sets out the requirement for NCAs to communicate such information to other NCAs and to ESMA. Article 54(2) sets out identical obligations for regulated markets.

214. Article 81 of Commission Delegated Regulation (EU) 2017/565 further clarifies which are the circumstances in which a trading venue is bound by the requirement to immediately inform its competent authority of significant infringements of its rules or disorderly trading conditions or system disruptions in relation to a financial instrument. The list of such circumstances is detailed in Annex III Section A of the same Commission Delegated Regulation.

215. Furthermore Article 81(2) of Commission Delegated Regulation (EU) 2017/565 narrows the requirement to provide information only to such cases where “*significant events which have the potential to jeopardise the role and function of trading venues as part of the financial market infrastructure*” take place.
216. It can be noted that the circumstances mentioned in Articles 31(2) and 54(2) of MiFID II and Article 82 of Commission Delegated Regulation (EU) 2017/565 regarding cases in which trading venues should inform their NCA, and the NCA in turn should inform ESMA, of conduct that may indicate behaviour that is prohibited under MAR are already detailed in MAR and hence are out of the scope of this report.
217. ESMA has had a preliminary discussion on (i) the possible need to clarify which circumstances should be considered as encompassed by Articles 31(2) and 54(2) of MiFID II; and (ii) the possibility to adopt a common procedure for notification of such instances. Whilst ESMA did not deem necessary at this stage to take action under (i) as the relevant circumstances are clearly stated in Annex III, Section A of Commission Delegated Regulation (EU) 2017/565, it acknowledged the benefit to proceed under (ii) to adopt a common procedure to notify ESMA and other NCAs of the occurrence of circumstances under Articles 31(2) and 54(2) of MiFID II.

5.6.2 Assessment and proposals

218. The procedure to notify ESMA and other NCAs of the occurrence of circumstances under Articles 31(2) and 54(2) of MiFID II put in place in the beginning of 2020 allowed ESMA and NCAs to share important information on disruptions that took place throughout the year.
219. For example, thanks to this procedure, ESMA and NCAs became aware four different incidents that occurred recently leading to important halts of trading. A brief outline of the incidents is described below.
220. The first two incidents reported related to an issue with the Deutsche Börse T7 trading system. The first was reported on 14 April and trading was interrupted in the trading venue due to a software issue. This issue required the trading venue to stop and restart manually the system which was a heavy and time-consuming process.
221. The second incident was reported on 1 July and due to a human error. Two failures of the trading venues’ central network occurred which caused trading to be halted in Deutsche Börse.
222. In both circumstances the incident affected a significant number of trading venues given that the T7 trading system is widely used across the EU. ESMA has received a notification from 6 other NCAs that reported halts in trading in at least one of their trading venues.

Following these incidents trading venues have focused their efforts on (i) reducing the necessary time to restart the system through more automation of their processes and checks and, (ii) improving their communication vis-à-vis their clients and other trading venues using their system.

223. On 28 August, a number of NCAs reported a temporary system disruption on a number of trading venues. The incident occurred on 26 August where at about 14:00 CET the systems of Deutsche Börse have been attacked by a so called Distributed-Denial-of-Service attack (DDoS attack). The same kind of attack was also performed against the Vienna Stock Exchange at the same time. Similar to previous incidents, given the wide use of Deutsche Börse technology ESMA received reports of temporary halts to trading that lasted between one and two hours in most cases, in a variety of trading venues in Germany including EEX and Eurex as well as trading venues from another three NCAs.
224. Despite the incident occurring on the 26 August, ESMA and unaffected NCAs only became aware of this occurrence a couple of days later. Taking into account that this was a cyberattack that could potentially be performed across other jurisdictions. Some NCAs emphasised that there should be a swifter communication across all jurisdictions when a cyberattack may be imminent.
225. The fourth incident was reported on 16 October. A system disruption caused by a technical issue on a middleware component used by Euronext affected all markets operated by Euronext. This led to an interruption of trading on all cash and derivatives segments around 9:50 CET at Euronext Lisbon, Brussels, Amsterdam, Dublin and Paris.
226. Trading restarted, depending on market segments, between 12:30 and 13:00 CET, except for warrants and certificates on which trading remained halted until the end of the day. In the course of that afternoon, the technical platform was still not stabilized and the trading was halted again on some equities, ETFs and equity derivatives instruments.
227. This incident also led to an interruption of trading at around 9:48 CET at the Luxembourg Stock Exchange with trading restarting at 12:40 CET.
228. Given the growing importance of cybersecurity to the well-functioning of EU market structures, ESMA will look at how to improve the notification process in case of IT incidents and system outages. In particular, it should be noted that in some circumstances NCAs and ESMA were not informed as swiftly as desirable. Furthermore, the resuming of trading in some instances exceeded the two-hour period prescribed in Article 15(2) of RTS 7.
229. ESMA therefore sees merit in further streamlining the procedure in order to allow for a homogeneous, efficient and timely notification from trading venues to NCAs and ESMA via additional guidance. ESMA further emphasizes the importance of trading to resume

within or close to two hours to minimize disruptions and not affect the orderliness of trading.

Q35: Do you agree with the need to improve the notification process in case of IT incidents and system outages? Beyond the notification process between NCAs and ESMA, which improvements could be done regarding communication of incidents to the public?

230. When observing how these events have unravelled in the past year, ESMA has noted that where an outage suspends trading on a trading venue, there seems to be no or only very limited migrations of volumes to other trading venues which remain open for trading. This is particularly visible with respect to instruments for which the halted trading venues is the main market.

231. Some reasons for such behaviour have emerged in recent discussions on this topic, including the fact that algorithmic traders use solely the main market for their data reference points. Although this may not be a cause of concern for a relatively short outage, a long suspension on trading in the main market may affect the orderliness of markets where suddenly there is no liquidity available for otherwise very liquid instruments. One possible proposal could be to require algorithmic traders to always use at least two different reference data points to ensure there is always the possibility for the trading activity to migrate from the main market to another trading venue in the case of an outage. ESMA would welcome market participants views as to whether this or any other legislative initiative should be undertaken to ensure there is continuity of trading in other trading venues on the circumstances where the main market is affected by an outage.

Q36: Do you believe any initiative should be put forward to ensure there is more continuity on trading in case of an outage on the main market, e.g. by requiring algorithmic traders to use more than one reference data point?

6 Tick size, market making, asymmetric speedbumps, and trade feeds

6.1 Tick-size regime

6.1.1 Legal framework

232. Since 3 January 2018, trading venues in the EU need to comply with a mandatory tick size regime as prescribed under Article 49 of MiFID II²¹. In particular, Article 49(2) of MiFID II envisages the tick size regime to “(a) be calibrated to reflect the liquidity profile of the financial instrument in different markets and the average bid-ask spread, taking into account the desirability of enabling reasonably stable prices without unduly constraining further narrowing of spreads; (b) adapt the tick size for each financial instrument appropriately.”

233. Article 49(3) of MiFID II further mandates ESMA to develop “draft regulatory technical standards to specify minimum tick sizes or tick size regimes for specific shares, depositary receipts, exchange-traded funds, certificates, and other similar financial instruments where necessary to ensure the orderly functioning of markets, in accordance with the factors in paragraph 2 and the price, spreads and depth of liquidity of the financial instruments.” Article 49(4) extends ESMA’s capacity to develop draft regulatory technical standards applying to any other specific instrument other than those listed in Article 49(3) where necessary.

234. In line with Article 49 of MiFID II, ESMA has developed the Commission Delegated Regulation 2017/588²² (RTS 11) which outlines that orders in shares, depositary receipts and certain types of exchange-traded funds (ETFs) should be subject to minimum tick sizes. For other financial instruments a tick size regime was not deemed useful to contribute to the orderliness of the markets and hence, not introduced.

235. The tick size regime prescribed in Article 2 of RTS 11 is determined based on both (i) the Average Daily Number of Transactions (ADNT) in the most relevant market in terms of liquidity (i.e. the trading venue in the EU with the highest turnover) and, (ii) the price of the order. For ETFs, the tick size regime is determined based on both (i) the liquidity band

²¹ Article 49 of MiFID II imposes the requirement to comply with the tick size regime to regulated markets, while Article 18 of MiFID II imposes such requirement for MTFs and OTFs.

²² Commission Delegated Regulation (EU) 2017/588 of 14 July 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council with regard to regulatory technical standards on the tick size regime for shares, depositary receipts and exchange-traded funds (OJ L 87, 31.3.2017, p. 411–416).

in the table in RTS 11's Annex corresponding to the highest ADNT and, (ii) the price of the order.

236. Article 3 of RTS 11 sets the duty and procedure for the CA of the most relevant market in terms of liquidity to calculate yearly the ADNT for that financial instrument in that market and ensure the publication of that information. In practice, this task has been delegated to ESMA which publishes the necessary information through its Financial Instruments Transparency System (FITRS)²³.
237. During the first months of application of the tick size regime, ESMA was made aware that EU trading venues were facing challenges due to the lack of applicability of the tick size regime to systematic internalisers and the application of the tick size regime to shares for which the main pool of liquidity was located outside of the EU.
238. ESMA noted that the ability of systematic internalisers to provide quotes not subject to the tick size regime could undermine the overall quality of the liquidity available, the efficient valuation and pricing of financial instruments, and the level playing field between trading venues and systematic internalisers. Hence, following ESMA's proposal, Commission Delegated Regulation 2019/442²⁴ amended Article 10 of RTS 1, prescribing that SIs, when providing quotes for shares and depositary receipts up to standard market size, should be subject to the tick size regime.
239. Furthermore, ESMA published a Q&A²⁵ clarifying Article 15(2) of MiFIR which states that "in justified cases" systematic internalisers may execute orders at a better price than the quoted prices provided that the price falls within a public range close to market conditions. ESMA, in this respect, specified that "to ensure that price improvements do not undermine the efficient pricing of instruments traded, price improvements on quoted prices would only be justified when they are meaningful and reflect the minimum tick size applicable to the same financial instrument traded on a trading venue".
240. Further amendments to the tick size regime were introduced in November 2019 in the context of the Investment Firm Review (IFR) Regulation and IFR Directive undertaken by the European Commission. The IFR Regulation added Article 17(a) to MiFIR requiring systematic internalisers' quotes and price improvements to comply with the tick size regime while exempting SIs from the tick size regime when matching LIS orders at mid-point within the current bid and offer prices. The regime initially was envisaged to enter into force by 26 March 2020²⁶, but then delayed due to market circumstances and the

²³ https://registers.esma.europa.eu/publication/searchRegister?core=esma_registers_fitrs_equities

²⁴ Commission Delegated Regulation (EU) 2019/442 of 12 December 2018 amending and correcting Delegated Regulation (EU) 2017/587 to specify the requirement for prices to reflect prevailing market conditions and to update and correct certain provisions (OJ L 77, 20.3.2019, p. 56–58).

²⁵ Q&A 29 from the Tick Sizes section in [Q&A on MiFID II and MiFIR market structures Topics](#)

²⁶ In March 2020, ESMA announced an extension of the deadline for the new regime's application: [Public Statement](#).

COVID-19 crisis. The IFR Directive amended Article 49 of MiFID II to introduce a similar exemption for regulated markets when matching LIS orders at mid-point (the exemption applies also to MTFs and OTFs through Article 18(5) of MiFID II).

241. With regards to third-country shares, ESMA's Final Report²⁷ published in December 2018 concluded that the determination of tick size for third-country shares based on ADNT in the EU could result in an underestimation of the available liquidity, leading to larger tick sizes in the EU compared to third countries and contributing to a competitive disadvantage for EU trading venues. As a result, in February 2019, Commission Delegated Regulation 2019/443²⁸ amended RTS 11 modifying the tick size regime for third-country shares²⁹, and allowing NCAs to adjust the ADNT for the relevant third-country share taking into account the transactions executed on the third-country trading venue with the highest turnover for that share.
242. ESMA has published a number of Q&As addressing various aspects of the tick size regime. Among the clarifications that have been introduced, ESMA has specified that, as the tick size regime aims at ensuring the orderly functioning of the market³⁰, its application extends to all orders submitted to trading venues, including orders that are waived from pre-trade transparency. As an exemption to the previous, the tick size regime is not applicable to transactions executed in systems that match orders on the basis of a reference price as per Article 4(1)(a) of MiFIR, or to negotiated transactions as per Article 4(1)(b) of MiFIR. As per the recent amendments to MiFID II and MiFIR adopted in the context of the IFR review (see above), orders above the large-in-scale threshold can also now be executed at mid-points.
243. ESMA has further clarified that the tick size regime applies to Frequent Batch Auction (FBA) systems and where those systems do not benefit from a reference price waiver³¹. This prohibits the execution of transactions in those systems at a price that corresponds to the mid-point in cases where the spread consists of an uneven number of ticks.

²⁷ [Final report: Amendment to Commission Delegated Regulation \(EU\) 2017/588 \(RTS 11\)](#)

²⁸ Commission Delegated Regulation (EU) 2019/443 of 13 February 2019 amending Delegated Regulation (EU) 2017/588 as regards the possibility to adjust the average daily number of transactions for a share where the trading venue with the highest turnover of that share is located outside the Union (OJ L 77, 20.3.2019, p. 59–60).

²⁹ Financial instruments traded or admitted to trading on an EU trading venue where the most liquid trading venue by turnover is located outside the Union.

³⁰ Q&A 6 from the Tick Sizes section in [Q&A on MiFID II and MiFIR market structures Topics](#)

³¹ [Final Report: Call for evidence for Periodic Auctions](#) and Q&A 11 from [Q&A on MiFID II and MiFIR market structures Topics](#)

6.1.2 Tick size regime applicable to shares

6.1.2.1 Analysis

244. Several studies have investigated the effects of the introduction of the MiFID II tick size regime in particular on share trading. This section aims to offer a brief summary of the current evidence, focussing on analysis performed at country level.
245. In February 2019, the Autorité des Marchés Financiers (AMF) published a paper³² analysing the impact that the new MiFID II tick size regime had on various market microstructure indicators, such as spread, market depth and transaction costs, analysing data ranging over 10 months of observation³³ for more than 500 securities split by category, based on market cap. In May 2020, The Danish Financial Supervisory Authority (Danish FSA) published a similar study³⁴ which assesses the impact of the tick size regime on transaction costs on shares traded in the Danish stock market, grouped by market cap, for trades below DKK 500,000.
246. The AMF study aims to isolate the impact of the entry into force of the new tick size regime from other exogenous factors (e.g. volatility). Such goal is achieved by estimating the difference between the average of the indicator on the group of securities for which there is a change in tick size after January 2018 and the group of securities for which tick size remains constant, while taking into account the spread that originally existed between the two groups before the regime was introduced. In order to ensure that exogenous variables have an analogous impact on securities the study is conducted on sub-groups of shares having similar ADNT.
247. The study highlights that with the introduction of the new tick size regime, there is a slight increase in spreads for most liquid securities and at the same time an increase in depth at the best limit. The increase in depth is associated with a drop in HFTs market share, concluding that additional liquidity provision is offered by non-HFT participants. In terms of transaction costs borne by the counterparty placing an aggressive order, for less liquid securities there is evidence that the increase in spread is overall offset by an increased depth at best limits. Although the increase in depth does not always fully offset the widening of the spread, the impact remains nevertheless extremely limited. Furthermore, the study shows that computing transaction costs on the basis of a measure of aggressiveness of market participants³⁵ highlights that for client and proprietary accounts there is a reduction in effective transaction costs.

³² AMF, 2019. "[MiFID II: Impact of the new tick size regime after several months of implementation](#)"

³³ Data ranges from August 2017 to May 2018.

³⁴ Danish FSA, 2020. "[Assessment of the tick size rules in MiFID II](#)"

³⁵ HFTs acting as Market Makers are classified as aggressive participants, while client and proprietary accounts are classified as non-aggressive.

248. Overall, the study concludes that the increase in tick size has had the desired effect on microstructures as order books appear more stable, with longer order lifetime, larger transaction size and smaller OTR, which all together enable a clearer legibility of the price formation process. For SME shares the new tick size regime, which allows for a more appropriate calibration of tick sizes, has a beneficial effect resulting in more volumes traded.
249. The Danish FSA paper aims at measuring the effect of the tick size regime on transactions costs. It analyses in particular how the best bid-ask spread and the cost of a round trip, defined as the time weighted average of the cost of first buying and then selling for a certain amount at the same time, changed as a result of a variation in the tick size. The study notes that evaluating the cost of a round trip takes into account the effects on market depth contrary to a measurement of the bid-ask spread in isolation. Furthermore, the paper investigates whether best bid-ask spread and round-trip costs are affected differently by a change of tick size depending on whether the volatility is high or low³⁶. Shares are classified according to their liquidity profile similarly as in the AMF paper.
250. The paper concludes that a reduction on the tick size for large cap (liquid) shares might contribute to lower transaction costs, despite that such reduction could also be driven by other exogenous factors. For small and medium cap shares, the impact that the change to the new regime had on transaction costs is found to be negligible, at least for trades below DKK 500,000. In relation to situations of high volatility, the study suggests that, at least for more liquid shares, the change in tick size does not seem to have a relevant impact. An important point highlighted from this paper is that the tick size regime contributed to avoid tick size competition, which in the past had detrimental effects for venues' market share and affected market quality.
251. In light of the previous evidence it seems that the tick size regime had a beneficial effect in limiting competition on tick among venues and has overall benefitted passive investors in terms of transaction costs.
252. While the above-mentioned study does not specifically concern depositary receipts, ESMA is not aware of specific concerns in respect of these instruments and would expect that the conclusions reached with respect to shares also apply to depositary receipts.

6.1.2.2 Conclusions and proposals

253. In light of the findings of the studies published by the AMF and the Danish FSA, ESMA considers that the tick size regime overall had a beneficial effect, limiting competition in

³⁶ The underlying idea is that tick sizes may be more important in periods with high volatility as the price movements are more frequent and investors, including market makers, may risk that quoted prices in the market will become stale more easily which might provide an advantage to investors who benefit from higher speed.

ticks among venues. Furthermore, there is an indication that the tick size regime might have increased market depth and reduced transaction costs for less aggressive market players. Hence ESMA does not suggest any change to the tick size regime for shares and depositary receipt at this point in time.

254. Although ESMA does not propose any changes on substance, it believes that there could be merit in moving the provisions contained in Article 49 of MiFID II into MiFIR. Those provisions, which are anyhow specified in a Delegated Regulation (RTS 11) directly applicable in the EU, do not seem to necessitate adaption at national level and Article 49 of MiFID II has, as far as ESMA is aware, only been copied and pasted into national laws without modifications. The transposition mechanism therefore appears superfluous here and introduces less legal certainty for market participants. Article 49 of MiFID II is therefore one of the provisions that could be moved to MiFIR giving it direct binding legal force. This approach would also be consistent with the decision by co-legislators to stipulate directly into MiFIR that systematic internalisers are also subject to the tick size regime (see new Article 17a of MiFIR).

Q37: Do you agree with the view that the tick size regime had overall a positive effect on market depth and transaction costs?

Q38: Is there any further issue you would like to highlight regarding tick size regime?

6.1.3 Tick size regime applicable to third-country shares

6.1.3.1 Analysis

255. During the very first months of application of MiFID II, ESMA received concerns from certain trading venues regarding the tick size regime applicable to third-country shares, i.e. shares with a main pool of liquidity located outside the EU. For these shares, the minimum tick size applicable was calibrated to the ADNT on the most liquid market in the EU. While this metric is a good and simple liquidity indicator for the vast majority of equity instruments, it is not well suited for financial instruments traded or admitted to trading on an EU trading venue but for which the most liquid trading platform is located outside the Union.

256. In these cases, the mandatory tick size was calculated based only on a subset of the overall trading activity in the relevant instrument. As a consequence, European trading venues were subject to minimum tick sizes that were larger than those applicable on non-EU venues. These larger tick sizes were putting European venues at a competitive disadvantage to their counterparts in a third country leading to the migration of liquidity away from the European venues.

257. As explained above, RTS 11 was amended in February 2019 to address this situation. After consultation with market participants, an alternative procedure was introduced for these shares allowing NCAs to adjust the ADNT used to determine the applicable tick size regime so as to take into account the transactions executed on the third-country trading venue with the highest turnover for trading of that share. It was also considered that this alternative ADNT determination method would mainly be relevant to instruments with reasonable frequency in the EU and the adjustment is therefore limited shares trading on average at least once per day on the most liquid EU trading venues (i.e. ADNT on the most relevant market in terms of liquidity for the previous year is equal to or higher than one).
258. While ESMA has not performed a dedicated analysis of the impact of ADNT adjustment for third-country shares, it appears that the procedure has led to positive results when such adjustment was implemented. Evidence that ESMA received from some trading venues indicates, for instance, a very significant increase in trading volumes after the adjustment of the ADNT (and therefore of the applicable tick size) for third-country shares.
259. However, some concerns appear to remain in particular among German trading venues which traditionally offer for trading a very large variety of third-country shares (more than 10,000 of those shares on certain German trading venues). They stress first that the adjustment is very resource intensive since it requires ADNTs to be adjusted on a per-share basis. In addition, they highlight that the tick size regime has led to a significant increase of spreads and, hence, costs for investors trading on their platforms.
260. For those reasons, in the context of the consultation on the review of the transparency regime for equity and equity-like instruments³⁷, those trading venues asked ESMA to change its approach and simply exempted third-country shares from the tick size regime.

6.1.3.2 Conclusions and proposals

261. The concerns raised with respect to the tick size regime applicable to third-country shares appear to be primarily in relation to those shares with an ADNT on the EU most relevant market in terms of liquidity (MRMTL) smaller than one and for which it is not possible to use the new adjustment procedure for third-country shares.
262. ESMA notes first that the decision to limit the application of the new adjustment procedure to shares with a minimum liquidity in the EU was made after thorough consultation. It was considered a reasonable trade-off between adopting a regime for third-country shares that allows EU trading venues to maintain, where most necessary, their competitiveness and market share while providing a framework that remains manageable and gives

³⁷ Please, refer to: <https://www.esma.europa.eu/press-news/consultations/consultation-mifid-ii-mifir-review-report-transparency-regime-equity-and>.

sufficient legal certainty to market participants. The arguments raised recently do not appear fundamentally different from those raised at the time of the consultation and ESMA would therefore consider it premature to reopen this debate less than two years after the start of application of this adjustment procedure.

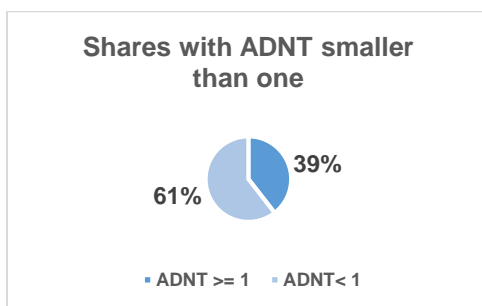
263. ESMA also noted that the number of instruments with an ADNT smaller or equal to one is not negligible (see below). There are currently more than 13,000 ISINs with an ADNT below one which represents more than 60% of the shares included in FIRDS. Allowing tick size adjustments also for these ISINs would therefore increase significantly the administrative burden for all parties involved but this would also mean that the exceptions become the norm.

FIGURE 12: NUMBER OF ISINs WITH ADJUSTED ADNT PER RCA

RCA	Number of ISIN with adjusted ADNT
CZ	1
DE	1452
FR	1
GB	74
IE	4
SE	1

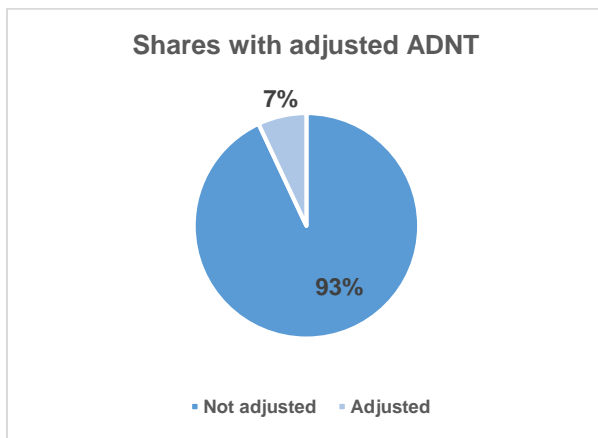
Source: ESMA/ FITRS, data extracted on 10/09/2020.

FIGURE 13: PERCENTAGE OF SHARES IN FITRS WITH AN ADNT ON MRMTL SMALLER THAN ONE



Source: ESMA/ FITRS, data extracted on 10/09/2020.

FIGURE 14: PERCENTAGE OF SHARES IN FITRS WITH AN ADJUSTED ADNT



Source: ESMA/ FITRS, data extracted on 10/09/2020.

264. From a more practical standpoint, ESMA was made aware of misleading data reported by certain trading venues (e.g. non-exclusion of LIS transactions for determining the MRMTL) which has led to certain shares being ineligible for ADNT adjustments. This had negative consequences for lit venues offering trading in those instruments. Those misreporting block size venues have indeed a large turnover but sometimes a small ADNT. Misclassifying them as MRMTL therefore resulted, in certain cases, in having them as MRMTL with an ADNT of less than one while other lit trading venues had more frequent trading activity and would have benefitted from the adjustment. ESMA is confident that this issue has now been addressed and that the adjustment procedure only remains unavailable to third-country shares that have very thin liquidity (if any) on EU trading venues.
265. With respect to third-country shares with an ADNT equal to or higher than one, ESMA is pleased to see that the new adjustment procedure has had positive results with increased reported volumes for shares that have benefitted from such an adjustment. ESMA records indicate that, currently, 8% of shares in FIRDS have benefitted from the adjustment procedure and have a tick size regime determined based on a “manually” adjusted ADNT.
266. Some market participants remain nevertheless unsatisfied about a procedure that they consider too resource intensive, in particular, for trading venues with a very high proportion of third-country shares. When amending RTS 11, ESMA has indeed opted, after consultation, for ADNT adjustments on an ISIN per ISIN basis. While this requires more resources for all parties involved, it also allows more accurate calibration of the regime.
267. In addition, trading venues’ operators and competent authorities will be able to leverage on previous years’ calculation exercises (e.g. for the identification of third country shares or the sourcing of data for third country venue ADNTs) making the adjustment procedure more efficient over time. ESMA is also working on targeted amendments of its IT system

to allow for simplified and more efficient reporting of tick-size adjustments for third-country shares.

268. For those reasons, ESMA does not propose to amend the tick size determination procedure for third-country shares again. ESMA remains in particular unconvinced about a general exemption from the regime for all third-country shares. ESMA notes that if some third-country shares are sparsely traded in the EU, others show much more significant volumes and it does not seem appropriate to simply waive all those shares for the tick size regime. The UK withdrawal from the EU has in addition further blurred the line between EU and non-EU shares making it even more difficult and sensitive to introduce a general exemption for the latter.

Q39: Do You agree with the proposal not to amend the tick size regime for third country shares? Please explain.

6.1.4 Tick size regime applicable to ETFs

6.1.4.1 Analysis

269. RTS 11 prescribes that ETFs which have shares and depositary receipts as underlying should be subject to the tick size regime due to the correlation between ETFs and the underlying equity instruments. In case of an ETF where one or more underlying components are not subject to the tick size regime, the ETF itself is not required to comply with the regime. For ETFs that are subject to the tick size regime, a tick size should be applied which is equal to or greater than the tick size corresponding to (i) the liquidity band in the Annex of RTS 11 corresponding to the highest ADNT and (ii) the price of the submitted order. This corresponds in practice to the most granular minimum tick size possible under RTS 11.

270. ESMA received concerns regarding in particular the identification of ETFs that are subject to the regime. Trading venues notably stressed that they do not necessarily have information regarding the exact list of constituents making it difficult for them to differentiate between those ETFs that are subject to the regime and those that are not. In addition, ESMA receiving questions from market participants about the regulatory framework applicable to ETFs which incorporate, for technical reasons, instruments that are not subject to the tick size regime. This would typically be the case for ETFs which are created to track as closely as possible the price of an index but, for technical reasons, also have a marginal set of derivatives as underlying.

6.1.4.2 Conclusions and proposals

271. ESMA acknowledges the concerns raised about the identification of ETFs subject to the tick size regime. This might create diverging application of the relevant provisions and create an unlevel playing field between EU trading venues trading the same instruments.
272. In addition, ESMA notes that there is a general regulatory objective to bring more ETF trading on multilateral systems. With this in mind and considering the likely development of on-venue ETF trading over the years to come, ESMA would like to propose extending the scope of application of the regime to all ETFs traded in the EU.
273. This extension would simplify the regime and, at the same time, ensure more legal certainty and consistent application of RTS 11 in the EU. ESMA also notes that ETFs would remain subject to the highest liquidity band of the Annex of RTS 11 and therefore to the most possible granular tick sizes possible in the EU. The impact on the trading of those instruments should therefore remain very limited. It is also important to stress that this would only prescribe minimum tick sizes and that the concerned trading venues would therefore remain free to apply less granular price increments if they considered that this best fits their need.

Q40: Do you agree with the proposal to widen the scope of the tick size regime to all ETFs? Would this pose challenges in your view? Please explain.

6.1.5 Tick size regime for non-equity instruments

6.1.5.1 Analysis

274. As described above, Article 49(4) of MiFID II gave the possibility to ESMA to “develop draft regulatory technical standards to specify minimum tick sizes or tick size regimes for [non-equity financial instruments] where necessary to ensure the orderly functioning of markets, in accordance with the factors in paragraph 2 and the price, spreads and depth of liquidity of the financial instruments”.
275. Back in 2015, when ESMA finalised its proposed draft RTS, it was not considered necessary to develop tick size regimes for non-equity instruments. Recital 2 of RTS 11 emphasized for instance that for instruments other than shares, depositary receipts and certain ETFs, “given the nature of those instruments and the microstructures of the markets on which they are traded, a tick size regime cannot be presumed to effectively contribute to the orderliness of the markets and, hence, those instruments should not be subject to the tick size regime”.

276. While market structures and microstructures for certain non-equity financial instruments have developed since 2015, in particular following the application of MiFID II / MiFIR, they remain at a level of sophistication, electronification and interconnectedness that is far below equity instruments and shares, in particular. Even for fungible non-equity financial instruments like bonds, the market share of high-frequency traders remains limited when compared to shares (see for instance figures 6 and 7 above).

277. Lastly, while MiFID II has introduced more competition between trading venues, ESMA has not been made aware that tick sizes had started to be used as a competition tool between them to attract more orders to their platforms.

6.1.5.2 Conclusions and proposals

278. For those reasons, ESMA remains of the view that tick size regimes for non-equity financial instruments are not necessary at this stage. This would introduce unnecessary complexity which does not seem justified by the current practices. ESMA therefore does not propose to broaden the scope of the MiFID II tick size regime to any other instruments beyond the one that are mentioned in the three sections above.

Q41: Do you agree with the proposal not to widen the scope of the tick size regime to non-equity instruments? Please explain.

6.2 Market making agreements

6.2.1 Legal framework

279. As stated in Recitals (62) and (113) of MiFID II, there are two main goals in establishing market making agreements as envisaged in MiFID II. Firstly, as advanced technologies may bring new risks to the market, MiFID II aims to maintain market participants' ability to transfer risks efficiently during stressed market conditions ensuring sufficiently liquid markets. Secondly, the Article 17 provisions aim at introducing an element of predictability to the provision of liquidity in the order book by requiring contractual obligations for firms deploying certain types of strategies.

280. To this end, Article 17(3) of MiFID II requires investment firms that engage in algorithmic trading to pursue a market making strategy to notify the trading venue where such strategy is deployed and to enter into a binding agreement with specific quoting obligations. These obligations include carrying out their strategy continuously during a specific proportion of the venue's trading hours, except under exceptional circumstances, and have in place effective systems and control to ensure the fulfilment of these quoting obligations.

281. Article 17(4) details when an investment firm engaging in algorithmic trading should be considered as pursuing a market making strategy. This is the case when the firm posts “firm, simultaneous two-way quotes of comparable size and at competitive prices relating to one or more financial instruments on a single trading venue or across different trading venues, with the result of providing liquidity on a regular and frequent basis to the overall market”.
282. Article 48 of MiFID II similarly requires regulated markets to have in place “written agreements with all investment firms pursuing a market making strategy on the regulated market” as well as “schemes to ensure that a sufficient number of investment firms participate in such agreements which require them to post firm quotes at competitive prices with the result of providing liquidity to the market on a regular and predictable basis, where such a requirement is appropriate to the nature and scale of the trading on that regulated market.” Article 18(5) extends these obligations to MTFs and OTFs.
283. Article 48(3) of MiFID II prescribes that the written agreements between the investment firm and the trading venue specify at least the obligations of the investment firm in relation to the provision of liquidity and any incentives offered by the trading venue for this activity. The trading venue is further expected to monitor compliance of investment firms with such written agreements, inform the competent authority about the content of such agreements and, if requested, provide further information to the competent authority.
284. As mandated under Article 48(12)(f) of MiFID II, ESMA has further specified these obligations in Commission Delegated Regulation (EU) 2017/578 (RTS 8)³⁸. It clarifies both the provisions relating to investment firms which engage in algorithmic trading pursuing market making strategies and the provisions relating to the venues where such strategies take place.
285. RTS 8 requires members or participants engaged in algorithmic trading pursuing a market making strategy to enter into a market making agreement with the operator of the trading venue where they operate. This obligation applies more specifically to investment firms that have, during half of the trading days over a one month period, posted “firm, simultaneous two-way quotes of comparable size and competitive prices [...] for at least 50 % of the daily trading hours of continuous trading”.
286. Trading venues should specify in their market making agreements, among other issues, the financial instrument or instruments covered by the agreement and the minimum

³⁸ Commission Delegated Regulation (EU) 2017/578 of 13 June 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council on markets in financial instruments with regard to regulatory technical standards specifying the requirements on market making agreements and schemes (OJ L 87, 31.3.2017, p. 183–188).

obligations to be met by the investment firm in terms of presence, size and spread³⁹. Article 2 of RTS 8 clarifies that the agreement should, at the minimum, impose to the concerned investments firms to post “firm, simultaneous two-way quotes of comparable size and competitive prices in at least one financial instrument on the trading venue for at least 50 % of daily trading hours of during which continuous trading takes place excluding opening and closing auctions and calculated for each trading day”.

287. The MiFID II market making framework also includes, as explained above, an obligation for trading venues to adopt schemes incentivising the provision of liquidity on their platforms on a regular and predictable basis. The provision of incentives for market making is mandatory only for a subset of traded instruments specified in Article 5 of RTS 8, where those instruments are traded on a continuous auction order book. In order to incentivise continuity in liquidity provision even in stressed market conditions, market making schemes should describe the incentives offered by the trading venue distinguishing between normal and stressed market conditions.

288. The question of the incentives to be offered raised some questions amongst market participants and ESMA has provided guidance through Q&As. For example, ESMA has clarified that trading venues have the ability to adjust their scheme of incentives, which may well be of a “monetary” or “non-monetary” nature as long as they effectively support trading and provision of liquidity to the market on a regular and predictable basis and in particular when it is the most volatile⁴⁰.

289. Article 7 in RTS 8 further requires venues to make public the terms of their market making agreements, the firms which have signed such agreements and the financial instruments covered. In order to provide for fair and non-discriminatory market making schemes, venues are required to provide the same type of incentives to participants which perform equally.

6.2.2 Assessment of the regime

6.2.2.1 General Assessment

290. As for other issues covered in this consultation paper, ESMA has conducted an ad hoc data collection to gather input from NCAs and trading venues on the application of the market making regime. This data collection was organised with a view to understand

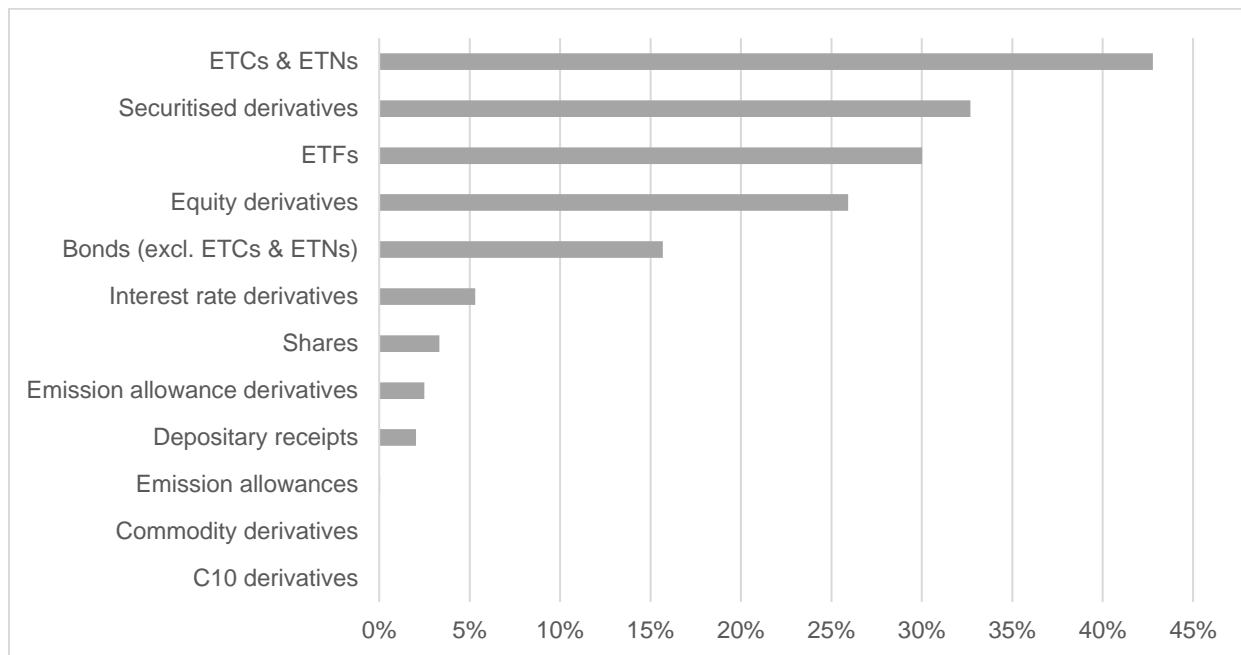
³⁹ Investment firms shall be required at least to post firm, simultaneous two-way quotes of comparable size and competitive prices in at least one financial instrument on the trading venue for at least 50 % of daily trading hours of during which continuous trading takes place excluding opening and closing auctions and calculated for each trading day.

better the exact impact of the MiFID II market making provisions and where it could be necessary to revisit this regime.

291. The analysis of market making activity in the EU requires notably to analyse order level data which tends to be less harmonised than transaction level data and reveals more challenging to aggregate. ESMA is therefore aware that the results presented below might not be fully representative of the current practices in market making. They nevertheless allow to provide a general overview of the market making landscape in the EU.

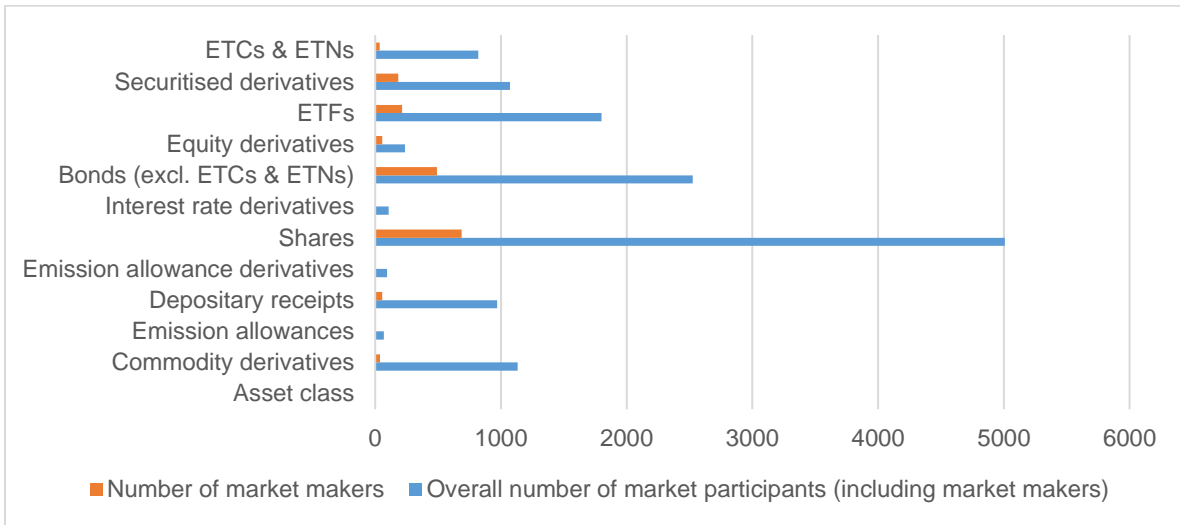
292. The ESMA analysis first shows that the presence of market makers significantly differs from one asset class to another. The market share of market makers is particularly prominent for ETCs / ETNs, securitised derivatives, ETFs, and equity derivatives.

FIGURE 15: THE ROLE OF MARKET MAKERS IN TRADED VOLUMES PER ASSET CLASS



Source: Data collection from RMs and MTFs in the EU Member States.

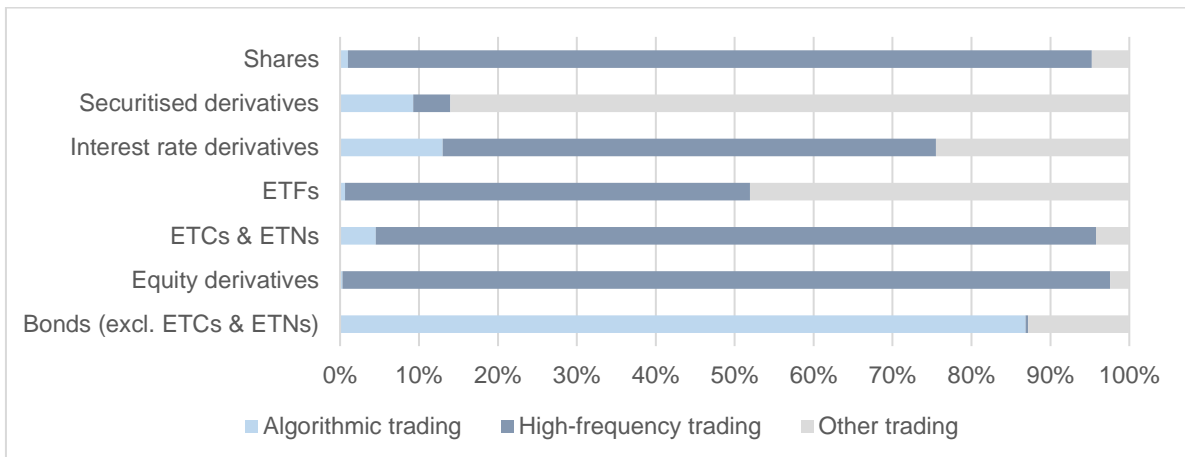
FIGURE 16: NUMBER OF MARKET MAKERS AND OVERALL PARTICIPANTS PER ASSET CLASS



Source: Data collection from RMs and MTFs in the EU Member States.

293. When looking more closely, it appears that the electronification of the market making activity differs from one asset class to another. For certain asset classes (e.g. shares, ETCs / ETNs and equity derivatives), market making appears to be largely dominated by high frequency traders. For other markets (e.g. securitised derivatives and ETFs), non-algorithmic market making remains significant.

FIGURE 17: TRADING OF MARKET MAKERS BY TYPE AND ASSET CLASS



Source: Data collection from RMs and MTFs in the EU Member States.

294. In addition, ESMA received further inputs from trading venues regarding the application of the RTS 8 requirements and, more specifically, the impact of these measures during the recent volatility episodes.

295. The responses received indicate first that “RTS 8 market makers” (i.e. investment firms which have been obliged to sign a market making contract with the trading venue where

they operate as opposed to market makers which have signed a market making contract outside the provision of RTS 8) are more prevalent on regulated markets than MTFs or OTFs. ESMA understands that this might be related to the trading systems used on those markets, i.e. continuous auction order book. Regulated markets typically have between 10 and 20 “RTS 8 market makers” operating on their platforms.

296. A majority of trading venues nevertheless stated they do not have any “RTS 8 Market makers”. As mentioned above, this can be explained by the type of trading system the trading venues operate. In addition, the presence of “RTS 8 market makers” is also related to the degree of electronification of the concerned market segment and the liquidity of the instruments traded.
297. Some trading venues have however clarified that their participants can decide freely whether or not to enter into market making agreements. ESMA notes in this respect that RTS 8 does not explicitly exempt any type of trading venue or trading systems from the obligations to identify and sign contractual agreements with market makers. As clarified in a Q&A, “there is a generic obligation, not restricted to specific financial instruments, for trading venues to sign written market making agreements with all investment firms pursuing a market making strategy on their systems (Article 48(2) and Article 17(3) and (4) of MiFID II) when the circumstances described in Article 1(2) of RTS 8 are met”⁴¹. Only the requirement to have market making schemes in place is limited to certain instruments and trading systems (Article 5 of RTS 8).
298. However, the provisions of Article 1 and 2 of RTS 8 appear very much targeted to continuous auction order books referring for instance to “continuous trading” and “opening and closing auction”. ESMA understands that there is therefore merit to further clarifying the scope of application of those provisions.
299. For other provisions of RTS 8, a certain degree of discretion has voluntarily been left to trading venues as reflected in the responses received. This concerns for instance the incentives to be offered by trading venues where the provisions in Article 48 of MiFID II and in Article 6 of RTS 8 remain quite open (e.g. monetary vs non-monetary incentives). Recital 8 of RTS 8 however clarifies that incentives to market makers should be “effectively contributing to liquidity provision under stressed market conditions”⁴².
300. In the responses received, trading venues that offer monetary incentives explained they typically provide for a rebate on trading fees to market makers (either for placing orders or more generally for executing transactions). Certain trading venues clarified that the rebate applies retroactively in case it is confirmed that the investment firm has engaged in a market making strategy. ESMA notes that some trading venues clarified that they do

⁴¹ Q&A 20 of section 3 of Q&A document on MiFID II and MiFIR market structures topics (ref. ESMA70-872942901-38).

⁴² See also Q&A 26 of section 3 of Q&A document on MiFID II and MiFIR market structures topics (ref. ESMA70-872942901-38).

not have incentives in place even though trading instruments listed under Article 5 of RTS 8.

301. Regarding incentives provided during stressed market condition, only a limited number of trading venues offers additional monetary incentives (mainly in the form of an additional rebate). Most commonly, trading venues double the authorised quoting spread during stressed market conditions. Others adjust the maximum OTR for market makers or allow market makers not to provide quotes.
302. Additionally, responses collected by ESMA indicated that, during the volatility episode in March 2020, trading venues adopted different approaches regarding whether to qualify these episodes as “stressed market conditions”. Only one third of the trading venues that provided feedback qualified the volatility as stressed markets. ESMA understands that this difference of treatment is due not only to the different conditions that the trading venues have experienced (the level of volatility was not the same everywhere) but also to the absence of guidance regarding what should qualify as stressed market conditions.
303. In general, EU markets have not experienced a significant liquidity issue during the covid-19 crisis in March 2020. The MiFID II market making provisions seem however to have had only a limited impact on market makers behaviours during this period; trading venues judging the impact of the incentives provided as very limited (if any). According to the feedback received, market makers have changed their trading behaviour in a similar way as other type of market participants, posting wider spreads, quoting smaller sizes and being overall less present in the market – some simply leaving the markets during the most volatile period.

6.2.2.2 Possible conflict with other contractual liquidity provision obligations

304. In the context of the review report on the MiFIR transparency regime for non-equity financial instruments⁴³, some market participants stressed possible conflicts in the application of the MiFID II / RTS 8 requirements on the one hand and, on the other hand, other obligations stemming from contractual liquidity provision agreements an investment firm can voluntarily entered into.
305. More specifically, the comments received pointed to conflicts that might arise for investment firms designated as “Primary Dealers” by the relevant Debt Management Office (DMO) or sovereign issuer.
306. Input received highlighted first that the RTS 8 obligations duplicate the monitoring and reporting requirements for those firms which have already voluntarily signed a liquidity

⁴³ Consultation Paper on MiFID II/ MiFIR review report on the transparency regime for non-equity instruments and the trading obligation for derivatives, ref. ESMA70-156-2189 ([here](#)).

provisions agreement. Both the concerned investment firms and trading venues remain indeed bound by the obligations contained in RTS 8 imposing additional compliance costs on them. Feedback received also noted that this is a source of confusion, in particular for the concerned Primary Dealers, who often do not understand the distinction between the contractual obligation they have with the DMO and those imposed by the MiFID II-mandated market making agreement. ESMA noticed a similar confusion amongst the response received to its questionnaire.

307. RTS 8 market making agreement can be sometimes more demanding than the DMO's requirements. This could lead to situations where a trading venue can find a Primary Dealer in breach of the MiFID II requirements even though this Primary Dealer operating in full compliance with liquidity provision agreement with the DMO.

308. Lastly, the comparable size requirement was also claimed to impose unnecessary restrictions on Primary Dealers who are rather bound to a "minimum quoting size" in the contract with DMOs. The comparable size requirement restricts them to post materially divergent quotes on the 2 sides of the spread which can however sometimes prove necessary. It was noted that conforming to this comparable size requirement usually leads to reducing the larger quantity rather than increasing the smaller quantity with a negative impact on the overall provision of liquidity.

309. The suggested solution to alleviate those concerns was to exempt Primary dealers and "designated platforms" (i.e. trading venue where the Primary Dealer operates) from RTS 8 requirements (or to consider that they satisfy those requirements by complying with the liquidity provision agreement concluded with the DMO).

6.2.3 Conclusions and proposals

310. Regarding first the obligation for investment firms pursuing a market making strategy to enter into binding market making agreement, the provisions in MiFID II and RTS 8 appear to have been designed for a specific type of market making, i.e. market making activity undertaken by algo or HFT traders trading through continuous order book. As clarified in Recital 59 of MiFID II, such new provisions were primarily meant to make the market making activity, which was carried out by new players such as algorithmic and high frequency traders outside the standard liquidity provision agreements, more predictable and subject to more stringent regulatory framework. Less emphasis was put on bringing more liquidity to instruments that are less liquid, for which market makers are less present or that are traded through other type of trading system (e.g. Request for Quotes systems).

311. Similarly, the incentives foreseen in market making schemes are limited to instruments and trading systems where algorithmic trading and HFT market makers are already very active. In practice, they seem to have little impact on their activity as reported by trading venues. ESMA also notes that the incentives are often "procyclical" in particular those

offered during stressed market conditions. They typically adapt the obligations foreseen in the market making agreement to the standard behaviour of market participants during volatility episodes (less presence, reduced volumes and wider spread).

312. The new rules and their practical implementation therefore appear to have enshrined in law a practice that used to be performed outside a dedicated regulatory framework and often without contractual agreements being signed with the issuers or the trading venues where the market making strategies of algorithmic and high-frequency traders were deployed. The new regime therefore brings more predictability into the high-speed market making activity as performed by HFT and algorithmic traders and in particular during normal market conditions. It is however maybe less effective in incentivising the provision of liquidity and, in particular, with respect to instruments where liquidity is scarcer or during volatility episodes (e.g. stressed market conditions).

Q42: Do you agree with ESMA findings and assessment of the current MiFID II market making regime?

313. In this context, ESMA would like to seek for market participants views on the possible amendments aiming at both streamlining the MiFID II market making regime and making it more effective. In particular, in order to provide more legal clarity and, at the same time, accommodate a greater variety of liquidity profiles and trading patterns, ESMA proposes to:

- a. limit the application of the scope of Articles 1 and 2 to continuous trading order books;
- b. broaden the obligation of have market making schemes to all instruments and types of trading systems;
- c. require the establishment of monetary incentives (including fee rebate for the best liquidity providers only) for illiquid instruments and SME growth market segments.

Q43: What do you think of ESMA proposals and suggested amendments to RTS 8? In your view, what other aspects of the market making regime require to be amended and how?

314. In addition, the market making regime currently leaves a certain degree of discretion to trading venues to define the content of the market making agreements (e.g. what constitutes a “competitive price”) or of their market making scheme. Regarding the latter, the relevant provision in level 1 refers to schemes ensuring “sufficient number of investment firm” participate in such agreements (Article 48(2)(b) of MiFID II) and calls for taking into account “the nature and scale of trading” when establishing those schemes of incentives (Article 48(12)(f) of MiFID II). Similarly, the provisions in RTS 8 are not too

prescriptive, leaving leeway to trading venues to design their incentives or qualify volatility episodes as “stressed market conditions”.

315. While discretion is beneficial to allow trading venues to adapt the rules to the nature and scale of their activity, it also limits the convergent application of the rules and, to a certain extent, their effectiveness. ESMA in this context wonders whether certain concepts and provisions should be further clarified and in particular those mentioned in the preceding paragraph.

Q44: What are market participants views regarding the flexibility left in the MiFID II market making regime? Would you agree with ESMA further clarifying certain relevant concepts? If yes, which ones?

316. Regarding the coexistence on EU trading venues of RTS 8 market making requirements and other contractual liquidity provision obligations, ESMA does not necessarily see them as conflicting. As explained above, RTS 8 requirements focus primarily on high-speed market makers with the objective to better regulate their activity. It remains nevertheless possible for trading venues and issuers to enter into other types of market making agreements and typically those that are designed for other types of liquidity providers - e.g. liquidity providers that operate on the basis of the an establish inventory and maintain overnight positions.

317. However, if there are therefore many complementarities between those types of market making agreements, ESMA acknowledges that there is merit to further explore the possible overlaps that might also exist and, in particular, if those lead to less efficient liquidity provision. ESMA therefore stands ready to investigate possible alleviations for Primary Dealers. ESMA is however concerned about the possible regulatory loophole such an exemption could create and would welcome to receive more feedback about both how the DMO agreements are designed and how to better take them into account for the purpose of the application of RTS 8.

Q45: Could you please describe how Primary Dealers agreements are designed (number of designated Primary Dealers, transparency about investment firms having signed such agreements, typical obligations contained, etc...). Do you consider that Primary Dealers should be exempted from the Article 1 of RTS 8? Do you consider that this can introduce a regulatory loophole?

6.3 Speedbumps in Financial Markets

318. In financial markets, a “speedbump” is a mechanism implemented by some trading venues, consisting in a delay applied to incoming orders before they enter the matching

engine for execution. Speedbumps have been introduced with the aim to regulate the speed of high-frequency traders and to curb ultrafast trading strategies, as some argue that this could increase overall market quality.

319. The length and design of the speedbumps can vary considerably across trading venues, but mainly it is possible to distinguish between two types of speedbumps: (i) “symmetric” speedbump, whereby the duration of the delay is same across all orders and, it is therefore imposed equally to all order types, and (ii) “asymmetric” speedbump, meaning that the delay does not apply to all order types (e.g. delays apply only to aggressive orders and not passive orders).

6.3.1 Legal framework

320. Currently there is no specific legal provision targeting the introduction and functioning of speedbumps. Some provisions of MiFID II however appear relevant when analysing the legislative regime applicable to such arrangements and ESMA has carried out a preliminary legislative analysis below.

a) Article 47 of MiFID II, Organisational requirements for regulated markets

321. Article 47(1)(d) of MiFID II requires Member States to ensure that regulated markets establish “transparent and non-discretionary rules and procedures that provide for fair and orderly trading and establish objective criteria for the efficient execution of orders”. Article 18(1) of MiFID II contains similar requirements in relation to MTFs and OTFs.
322. It can be argued that the introduction of asymmetric speedbumps is transparent if market participants are informed about the mechanism and its features through the venue rulebook, notices or other information tools. Furthermore, the measure can be seen as non-discretionary as any participant may provide passive liquidity and, therefore, benefit from any potential advantage. However, it could be questionable if such a measure aims at providing for fair and orderly trading.
323. While the concepts of “non-discretionary rules” and “fair trading” are not defined under MiFID II, this can be understood as not providing an illegitimate advantage or favouring one market participant or a subset of market participants⁴⁴. In light of such interpretation, the question whether asymmetric speedbumps could entail an advantage for a specific set of market participants arises (i.e. liquidity providers). The latter, in fact, would not be subject to any delay when cancelling their bid and ask quotes, while the rest of market participants would submit orders based on liquidity displayed in a book that can be

⁴⁴ As per IOSCO Objectives and Principles of Securities Regulation: “The fairness of the markets is closely linked to investor protection and, in particular, to the prevention of improper trading practices. Market structures should not unduly favour some market users over others. Regulation should detect, deter and penalize market manipulation and other unfair trading practices”.

modified when their orders eventually enters the matching engine – once the applicable delay elapses.

324. Furthermore, the impact of asymmetric speedbumps on orderly trading could also be questioned, as such mechanisms could entail the risk of increasing non-tradeable liquidity in the order book, as it could happen that market makers post more competitive quotes to attract liquidity, and use the time delay to subsequently cancel or modify them. This could reduce the reliability of the liquidity displayed in the book.

b) Article 48 of MiFID II, system resilience, circuit breakers and electronic trading

325. Article 48(2)(b) of MiFID II requires regulated market to have in place “schemes to ensure that a sufficient number of investment firms participate in [market making] agreements which require them to post firm quotes at competitive prices with the result of providing liquidity to the market on a regular and predictable basis, where such a requirement is appropriate to the nature and scale of the trading on that regulated market”. As per Article 18(5) of MiFID II, MTFs and OTFs operators also must comply with the same provision. Similarly, Article 17 of MiFID II imposes to the most active liquidity providers, when their activity is above a certain threshold, to provide quotes “continuously during a specified proportion of the trading venue’s trading hours”.

326. An asymmetric speedbump creates an artificial delay for incoming aggressive orders, while applying immediacy for cancellation or modification of orders. This mechanism aims at offering some protection to market makers against investment firms benefitting from high speed advantage (through avoiding execution of stale quotes or providing immediate cancellation of quotes in case of adverse market movements).

327. In this context, the question could be raised about whether the liquidity is provided on a regular and predictable way by these market makers not subject to the artificial delay and who would be able to cancel or modify their quotes before incoming orders enter the matching engine. Market making obligations have been envisaged with the aim of introducing “an element of predictability to the apparent liquidity in the order book” (Recital 1, RTS 8) and it can be questioned if such a mechanism is in line with such objective.

328. RTS 8 specifies that market makers have the obligation to post simultaneous firm quotes for at least 50% of the daily trading hours. In this respect speedbumps could again be questioned, as it could be argued that despite the quotes provided can be matched in principle, they are also subject to favourable cancellation or modification conditions. In this context, one could wonder whether a market maker can be considered as complying with RTS 8 obligations (posting competitive quotes for 50% of the time) when it has the possibility to cancel in priority its quotes (i.e. before they get executed).

329. Beyond the question about the compliance to the existing rules, asymmetric speedbumps raise the question about the benefit that asymmetric speedbumps bring to the markets where they are deployed, whether they allow more market makers to operate there increasing the competition and generally favouring tighter spread. This would typically be the case for less sophisticated and high-speed market makers who may not otherwise be able to viably post competitive quotes in absence of such a mechanism and need adequate protection to offer their liquidity provision service.

6.3.2 Analysis

330. Speedbumps as such, originated in the US and their first application on US venues was “symmetric”. The first speedbump was in fact introduced in the US by Investor Exchange (IEX) in 2013, and it consisted in an equal delay applied to all incoming orders, which were kept on hold once received before entering its matching engine. This initiative was presented as a mechanism that protects investors from the potentially harmful effect of latency arbitrage. The US Securities and Exchange Commission (SEC) discussed at large the measure with IEX and finally granted approval for a speedbump of 350 microseconds.

331. In 2015, the Canadian exchange TSX Alpha implemented the first asymmetric speedbump. The speedbump was adopted along with two features contributing to an overall market redesign: (i) an asymmetric speedbump that exempts passive limit orders if above a minimum size and (ii) an inverted fee structure (rebates provided to liquidity takers). The Canadian approach of designing the speedbump as asymmetric represents the forerunner of a trend that has spread across several trading venues in Europe, US and Russia.

332. The first proposal on the introduction of a speedbump in Europe was put forward by the London Metal Exchange (LME) in August 2018. The LME proposed to apply speedbumps on their market segment “LMEprecious”, with a subsequently confirmed delay of 8ms. The mechanism implemented by the LME is asymmetric, as the speedbump applies to any order except the cancellation of orders. The implementation of the fixed minimum delay received non-objection from the FCA in May 2019 and a 12-month trial period commenced on 9 March 2020.

333. The second European trading venue to put forward a similar proposal for an asymmetric speedbump on equity options and FX futures was Eurex Exchange (Eurex). Eurex’s proposed speedbump apply to “aggressive orders” only. An aggressive order is an order that is executable upon arrival at the matching engine and reduces the liquidity in the order book. However, it does not apply to modifications or cancellations of resting orders and furthermore, it does also not apply to passive orders, which distinguishes it from the recently approved ICE Futures U.S., Inc. (ICE U.S.) mechanism.

334. The Commodity Futures Trading Commission (CFTC) approved in May 2019 a functionality proposed by ICE U.S. called "Passive Order Protection" (POP), which is designed to reduce the impact of a speed advantage among higher-speed traders by implementing an asymmetric delay. The delay will affect "aggressive" orders that normally would be executed against "resting" or "passive" orders. The POP functionality applies to ICE's Gold Daily and Silver Daily futures markets, at first, for a three-millisecond delay.
335. Some EU venues have implemented mechanisms that appear to practically have an effect analogous to the one of speedbumps, even if they are not categorised as such. For example, some of those mechanisms allow liquidity providers to have the possibility of posting passive orders that can be executed only against retail order flow where the prices proposed by such liquidity providers improve the liquidity offered in the central limit order book. Hence such mechanisms, offer to liquidity providers protection from aggressive trades and more generally high frequency traders, and as a consequence should benefit retail investors as those "protected liquidity providers" can post improved quotes, without the risk of being adversely selected.
336. ESMA understands that such mechanisms have been developed in several venues across the EU during the last few years and seeks stakeholders view on the overall effect that such mechanisms might have had on liquidity in the order book, market fragmentation, execution of orders and other relevant variables. Even if ESMA understands that segments with specific rules targeted to retail investors might allow the latter to benefit in terms of price improvements, ESMA still deems relevant to understand the effects on the overall market quality and if such arrangements merit further consideration.

FIGURE 18: EXISTING PROPOSALS

Exchange	Country	Date	Status	Type	Who is delayed?	Delay	Instruments
Investors Exchange (IEX)	US	October 2013	Active	Symmetric	Everyone	350 μ s	U.S. cash equities
Aequitas NEO Exchange	Canada	March 2015	Active	Asymmetric	Liquidity takers	3-9 ms	
TSX Alpha Exchange	Canada	September 2015	Active	Asymmetric	Liquidity takers	1-3 ms	Canada cash equities

Thomson Reuters	US	June 2016	Active	Asymmetric	All but cancel orders	0-3 ms	Spot FX
NYSE American	US	July 2017	Active	Symmetric	Everyone	350 μ s	U.S. equities
Moscow Exchange	Russia	April 2019	Active	Asymmetric	Order messages other than cancel messages	2-5 ms	USDRUB spot FX currency pair
London Metal Exchange (LME)	UK	May 2019	Pending implementation	Asymmetric	Order messages	8 s	Commodity futures
ICE Futures	US	May 2019	Pending implementation	Asymmetric	Liquidity takers	3 ms	Gold daily and Silver daily futures contracts
Eurex Exchange	Germany	June 2019	Active	Asymmetric	Liquidity takers	1 or 3 ms	German and French single stock options, FX futures
Chicago Stock Exchange	US	Proposed	Dismissed	Asymmetric	Liquidity takers	350 μ s	U.S. equities
NASDAQ OMX PHLX	US	Proposed	Pending approval	Asymmetric	Liquidity takers	5 ms	U.S. cash equities
(Cboe) EDGA Exchange	US	Proposed	Rejected	Asymmetric	Liquidity takers	4 μ s	U.S. equities
MEFF Exchange	Spain	June 2019	Active	Symmetric	Everyone	24 ms	FX rolling spot futures

Q46: Do you think that venues which introduced asymmetric speedbumps provide enough information regarding the mechanism used? If not, what additional information would be useful to disclose to market participants?

Q47: Reflecting on those mechanisms which allow liquidity providers to provide quotes that can be filled only against retail order flow, do you think that such mechanisms are beneficial in terms of market quality? Is there any specific aspect that you think should be further taken into account, also considering the type of instruments traded? Please specify the venue of reference and the type of arrangement discussed.

6.3.3 Assessment and proposals

337. ESMA has undertaken an in-depth analysis on the functioning of speedbumps, inviting selected market participants and scholars to a roundtable. The event aimed at gathering further understanding on the possible effects of such measure to ensure an informed policy decision.

338. During the event, Eurex presented the reasoning behind the introduction of Eurex Passive Liquidity Protection (Eurex PLP, i.e. speedbump mechanism) and a study summarising the preliminary findings of the speedbumps pilot experiment on the German and French option segments.

339. Eurex representative explained that the introduction of speedbumps was meant to allow slower market makers to have time to update their quotes and be less exposed to the risk of latency arbitrage. This in turn would allow less sophisticated liquidity provider to operate on those markets and, more generally, market makers to quote at tighter spreads while still generating profits, attracting more market participants and hence providing more liquidity. Such improvement in liquidity benefits investors, especially the buy side.

340. As per the analysis presented, the main effects of speedbumps were an increase in quoted volumes, but without significant tightening of spreads and an increase in the volume of trades consuming passive liquidity placed by agents executing on behalf of clients. The study had not reached yet any final evidence on the overall effects on traded volumes, but overall suggested a decline in the segments introducing speedbumps due to “protected volume”⁴⁵.

⁴⁵ Protected volume is defined as the number of contracts an aggressive order did not match, due to the fact that the respective “matchable” passive volume was deleted from the order book during the delay (aggressive order subject to speedbump). In other words, protected volume is the volume of passive orders that would have been executed, all things equal, in the absence of asymmetric speedbumps.

341. The discussion of the findings mentioned above raised some interesting points. Attendees raised questions regarding the overall quality of the liquidity, noting that “protected volumes” could be seen as non-addressable liquidity, which could create noise in the information available to market participants and, overall, reduce the accurateness of the information (pre-trade information mainly) available to market participants.
342. The question was also raised whether such mechanism could allow market makers to withdraw from the markets where they operate in case of disorderly trading conditions, creating possible domino effects. Other participants considered that, on the contrary, the new Eurex’s PLP could allow market makers not only to post tighter spread during normal market conditions but also to stay in the market when trading conditions deteriorate.
343. At the same time, one could consider that HFTs undertaking both passive and aggressive strategies (acting both as liquidity takers and providers) might be able to provide tighter spreads due to profits earned from their sniping strategies, hence being able to post more competitive prices. The introduction of speedbumps might have an impact on such outcome and the liquidity provided.
344. In the absence of solid data analysis, it is difficult for ESMA to draw clear conclusions at this stage regarding the general impact of asymmetric speedbumps on how tight the market makers’ quoted spreads are. Regarding more specifically the impact of the provision of liquidity during volatility episodes, ESMA agrees that the advantage asymmetric speedbumps offer to market makers increases the risk of fading liquidity during stressed conditions. ESMA therefore wonders whether venues which introduce speedbumps, should be required to tighten their market making requirements and would welcome feedback on this.

Q48: Do you think that venues which introduce asymmetric speedbumps should set tighter market making requirements? Please explain why and how tight those new requirements should be.

345. During the discussions organised by ESMA, some stakeholders wondered whether the introduction of asymmetric speedbumps does not simply shift adverse selection from liquidity providers to liquidity consumers creating essentially a rebalancing of profits to the detriment of the latter but without net benefit for the market overall.
346. More generally, the question was raised about what exactly “was broken” on the relevant market that the new speedbump arrangements are trying to fix and who the asymmetric speedbumps are trying to protect (liquidity providers or investors?). If the idea is to reduce asymmetry of information, one could wonder whether the introduction of speedbumps

that are asymmetric by design does not have the opposite effect, i.e. creating an asymmetry of information to the benefit of passive liquidity providers.

347. Overall, the conclusion reached was that intentional access delays might be suited for certain types of financial instruments for which pricing is derived from an underlying. This is especially relevant when geographical conditions (e.g. data centres dispersed within Europe rather than geographically close) might favour latency arbitrage. Furthermore, intentional access delays might be suited for the option market due to lack of perfect fungibility between instruments traded on different venues (clearing, customization). If there is debate about the real added value of those mechanisms, market participants also appeared to generally concur on the fact that the introduction of speedbumps does not really add visible complexity to the market structure of the concerned markets (the delays being managed at venue level).

348. The conclusion was however different for other asset class and more specifically equity instruments. With respect to equities, feedback ESMA received stressed that:

- a. The signals on which equity pricing is based are more difficult to define (multitude of factors and sources) and, hence calibrating a delay would be extremely complex.
- b. Equities are fungible hence the application of speedbumps on a venue could increase order flow fragmentation.
- c. Introduction of speedbumps in equity markets would provide high frequency trading firms with a clear advantage (in terms of information gathering from other markets and order flow anticipation).
- d. In general, if for options markets the introduction of speedbumps does not really add visible complexity for market participants, it would be very different for equity markets (more fragmented market structures, different price formation mechanism, etc...) and all feedback received seem to concur that this would add unnecessary complexity.

349. In addition, ESMA notes that past experiences of speedbumps applied to equity markets have not proved successful. For example, ESMA understands the introduction of speedbumps on TSX Alpha Exchange in Canada has led to sharp decrease of TSX Alpha's market share at NBBO (roughly 20%). While this is not fully clear whether this decrease was exacerbated by other factors, these previous examples should nevertheless be considered in the overall consideration about speedbumps being applied to equity markets.

Q49: Do you agree on the conclusion that speedbumps might not be a well-suited arrangement for equity markets? If yes, do you think that such arrangements for equities should be prohibited in Level 1? Please explain.

Q50: Do you think that the introduction and functioning of speedbumps should be further regulated? If yes, which specific requirements would you like to be included in EU legislation?

Q51: Is there any specific issue you would like to highlight about speedbumps?

6.4 Asymmetry of private and public feeds

350. In recent times, discussion in the market has arisen around trading venues' private and public transaction data feeds. A private feed is understood to be the individual trade confirmation to the counterparties of the transaction (hereafter referred to as "private fill confirmation") whereas the public feed concerns the trade publication to all market participants (hereafter referred to as "public trade message").

351. These private fill confirmations and public trade messages will at all trading venues be transmitted through distinct systems, which is a set-up that naturally leads to an asymmetry in the timing of the information dissemination. The current discussion revolves around the discrepancy in the timing of the two feeds, and on market participants not receiving market data at the same time.

352. Broadly speaking, these models can be deterministic or non-deterministic. In the first case, this would concern making a choice between prioritising either the private fill confirmation or the trade message. It would also include adding another layer in the fixed publishing sequence, such as a sequence in which a partial private fill confirmation is disseminated, followed by the public trade message, followed by the rest of the private fill confirmations. In the other case of non-deterministic models, the publishing sequence is not pre-determined.

353. Furthermore, time frames with respect to the above models can vary, and although measured at a very granular latency level, the difference between the timing of the private fill confirmation or the trade message can be greater or smaller.

354. The ad hoc data collection that ESMA launched to gather input from trading venues did not include a section on this subject, as the collection was launched already prior to the surging of this market debate. Noting that this is an area where market participants may differ in opinion, ESMA would therefore invite stakeholders to comment on this matter, and would like to understand the implications of the timing of public trade messages versus private fill confirmations and the advantages and disadvantages of one preceding the other. In particular, ESMA is interested in the potential information advantages and discriminatory aspects of the different models that are operated. While there is currently no specific legal provision in MiFID II/MiFIR, ESMA is consulting whether this may merit any Level 1 or Level 2 amendments.

6.4.1 Legal framework

355. As stated, there is currently no specific legal provision targeting explicitly the information dissemination via public trade messages and private fill confirmations and discrepancies in the timing of feeds. Some provisions of MiFID II however appear relevant when looking at the aspects of latency, informational advantages and non-discriminatory access to services. ESMA has carried out a preliminary legislative analysis below.
356. First of all, Article 6 and 10 of MiFIR require trading venues to publish transactions as close to real-time as is technically possible. These post-trade transparency requirements relate closely to the timing and availability of the public data message.
357. Provisions regarding the private fill confirmations are slightly different and less pronounced. In general, the private fill confirmation will confirm for the market participant that the trade took place and is commonly used for back office recording. In particular to this respect, it would seem relevant to mention Article 47(1)(e) and Article 19(3)(b) of MiFID II, which stipulate the requirement, for regulated markets and MTFs respectively, to have effective arrangements to facilitate the efficient and timely finalisation of the transactions executed under its systems.
358. Article 47(1)(d) of MiFID II prescribes Member States to ensure that regulated markets establish “transparent and non-discretionary rules and procedures that provide for fair and orderly trading and establish objective criteria for the efficient execution of orders”. Article 18(1) of MiFID II contains similar requirements in relation to MTFs and OTFs.
359. As mentioned in the section above on speedbumps, the concepts of “non-discretionary rules” and “fair trading” are not defined under MiFID II. However, this can be understood as not providing an illegitimate advantage or favouring one market participant or a subset of market participants.
360. Last but not least, reference can be made to co-location services. Co-location is a type of infrastructure intended to minimise network and other types of latencies, and requirements to this respect clarify, inter alia, that all users which have subscribed to the same co-location services shall have access to the network under the same conditions. Article 48(8) of MiFID II requires regulated markets to ensure that its rules on co-location services are transparent, fair and non-discriminatory. Article 18(5) requires MTFs and OTFs to comply with this provision as well. Further detailed requirements regarding co-location services are provided in RTS 10.

6.4.2 Assessment and proposals

361. ESMA would note as a general remark that in line with the MiFIR transparency provisions all effort should be made to publish post-trade information within the public feed as close

to real-time as technically possible. ESMA considers that theoretically, the best solution would be that the two feeds are published at the same time. However, ESMA understands that such a solution is not conceivable given the inherent characteristics of these feeds and associated systems.

362. Also, in general, ESMA would tend to consider that the model should be deterministic, so that the sequencing of feeds is clear, consistent and predictable. Furthermore, it should be transparent to all market participants which model is employed by the trading venue.
363. In order to ascertain how these models would work best within the MiFID II/MiFIR framework and objectives and whether ESMA should undertake any policy measures or propose any legislative changes, ESMA would deem it most important to determine whether there exists a structural informational advantage for a subset of market participants in the models put forward. Furthermore, it is important whether the information can potentially be used to the advantage of this subset of market participants.
364. With respect to practices of private confirmation messages preceding the public feed dissemination, a market participant receives a confirmation of the trade prior to it being known to the public. Each market participant will only receive such private fill confirmations for their own orders, and this information is provided to any participant of a trade. While the confirmation message concerns only his own executed order and resulting trade, the question is whether it contains other valuable information.
365. In a similar vein, it will also be relevant which type of activity the participant can undertake with this information. ESMA understands that the information could provide market makers with the opportunity (i) to hedge their position, (ii) to manage and cancel quotes in correlated symbols, (both considered as risk management techniques) but also (iii) to potentially use this information as “inside information” and adjust their trading strategy and arbitrage other market participants.
366. ESMA understands that proponents of prioritising the private fill confirmations argue that:
- the mentioned risk management techniques can be identified in the market, but that there is no evidence that the information received through private fill confirmations is used as “inside information”;
 - the information in the private fill confirmation allows market makers to adjust their own position but does not contain sufficient information (e.g. full size of the trade) to take more global trading decisions;
 - this dynamic is accessible to anyone in the market. While the ‘private first’ dynamic may allow for a subset of people to send new orders and cancel orders, this concerns the subset of people that actually has a financial interest;
 - in contrast, a ‘public first’ dynamic may provoke competitive behaviour among traders that do not per se have a financial interest. When all information is published publicly,

speed becomes the only differentiating factor and HFT traders may benefit from microsecond latency to the disadvantage of parties that have a financial interest but are not HFT;

- a 'public first' dynamic would also likely see liquidity worsen because of other types of utility (i.e. hedging and market making) being lost.

367. ESMA understands that opponents of this mechanism argue that:

- the information in the private fill confirmation is very similar to the public trade message and can indicate an expected market movement;
- sub-zero latency reactions to trades can be identified in the market, and this is likely due to the market reacting to a trade before the information about this is publicly disseminating. It should be examined whether these trades are legitimate risk management trades (i.e. for hedging purposes mainly) or whether they are more part of an aggressive arbitrage strategy and could therefore constitute insider trading (also in the context of MAR);
- in addition, there are examples of triggering trades that are smaller than the reaction to the private fill confirmation. This would demonstrate that the orders and positions taken are based on the private fill confirmation and are therefore not intended to manage risk but to take risk. For such trigger trades there may in particular be benefits in case of iceberg orders;
- in theory firms employing low latency connections and trend-following investment strategies could potentially benefit from such information advantage;
- the potential for the use of the private fill confirmation as "inside information" is already harming market integrity. Only the prioritisation of public trade messages over private fill confirmations can by design ensure legitimate market behaviour and level playing field.

368. ESMA would like to further research the advantages and disadvantages of having one feed preceding the other.

Q52: What are your views on the relative timing of private fill confirmations and public trade messages? If you are a trading venue, please provide in your answer an explanation of the model you have in place.

Q53: Do you consider information on the sequencing of these two feeds at trading venues to be easily available? If you are a trading venue, please provide a link to where this information can be found publicly.

Q54: Do you think there should be any legislative amendments or policy measures in respect of these feed dynamics?

7 Annexes

7.1 Annex I

Summary of questions

Q1: What is your overall assessment of the MiFID II framework for algorithmic trading, HFT and DEA?

Q2: In your views, are there risks other than the one mentioned in MiFID II or impacts on market structure developments due to market electronification/ algorithmic trading that would deserve further regulatory attention? Please elaborate.

Q3: Do you consider that the potential risks attached to algorithmic trading should also be given consideration in other trading areas? Please elaborate.

Q4: Do you agree with this analysis? If not, please explain why.

Q5: Did you encounter any specific issue with the definition of HFT? Do you consider that the definition should be amended? Do you have any suggestion to replace the high message intraday rates with other criteria or amend the thresholds currently set in Level 2? Please elaborate and provide data supporting your response where available.

Q6: Based on your experience, is sub-delegation of DMA access a frequent practice? In which circumstances? Which benefits does it provide to the DEA user and to the sub-delegatees? Are you aware of sub delegation arrangements in the context of Sponsored access? If so, please elaborate.

Q7: (for DEA Tier 1 clients) Do you sub-delegate direct electronic access? If so, are your Tier 2 clients typically regulated entities/investment firms? Are they EU-based or third-country based?

Q8: Do you agree with this analysis? If not, please explain why. Do you consider that further clarification is needed in this area? If so, what would you suggest?

Q9: Do you agree with ESMA's proposal? If so, do you consider that the requirements considered above relevant? Should there be additional ones? If you disagree with ESMA's proposal, please explain why.

Q10: Do you agree with ESMA's proposals above? Please elaborate.

Q11: Do you agree with ESMA's proposal? Please elaborate.

Q12: Do you see merit in ESMA developing a template for notifications to NCAs under Articles 17(2) and 17(5) of MiFID II? If not, please justify your position.

Q13: Do you agree that it would be useful to clarify that notifications should be done ‘without undue delay’?

Q14: Do you agree with ESMA’s approach for the exchange of information between NCAs? If not, please justify your position.

Q15: What is your view on clarifying the definition of algorithmic trading? If you deem it beneficial to refine the definition and account for further types of algorithms or algorithmic trading strategies, please provide your suggestion as well as underlying rationale.

Q16: Do you think there should be specific requirements for different type of algorithms or algorithmic trading strategies in RTS 6? Please explain.

Q17: What is your experience with testing environments? Are they used frequently? If not, why? Do you see a need for any improvements?

Q18: Do you agree that the definition of “disorderly trading conditions” should be clarified? If yes, how would you define such trading conditions?

Q19: Do you agree that ESMA should provide additional guidance on the expectations concerning the checks and testing to be done, in particular for testing on disorderly trading conditions?

Q20: Would you agree that it could be beneficial if ESMA develops a prescribed format for the self-assessment foreseen in Article 9 of RTS 6?

Q21: Do you agree with the changes proposed to the self-assessment of Article 9 of RTS 6?

Q22: Would you propose any other targeted legislative amendments to RTS 6? Please include a detailed explanation of the proposed amendment and of the underlying issue that this amendment would aim to tackle.

Q23: Do you agree with ESMA’s proposal to harmonise and create a clear structure for the performance of the self-assessment?

Q24: Do you agree with limiting the self-assessment to every two years and to require trading venues to share it with their relevant NCA?

Q25: Do you agree with ESMA’s analysis about the overlapping requirements between RTS 6 and 7? Are those overlaps considered beneficial, should they be removed or are there any gaps? Are there any further points that should be clarified?

Q26: What is your view with regards to the testing of algorithms requirements? Do you agree that more robust testing scenarios should be set?

Q27: Are the testing environments available for the testing of algorithms appropriate for this purpose?

Q28: Do you agree with ESMA's analysis that the circuit breaker mechanism achieved its objective to avoid significant disruptions to the orderliness of trading?

Q29: Do you agree that the requirements under Article 48(5) of MiFID II complemented by RTS 7 and the guidelines on the calibration of circuit breakers and publication of trading halts under MiFID II remain appropriate? If not, what regulatory changes do you deem necessary?

Q30: Do you agree that the co-location services and fees structures are fair and non-discriminatory? Please elaborate.

Q31: Do you think that the disclosures under RTS 10 made by the trading venues are sufficient or should they be harmonised among the different entities? Please explain.

Q32: Do you agree with ESMA's proposal to set out the maximum OTR ratio, calibrated per asset class?

Q33: Do you agree that the maximum limits are not frequently exceeded? Please explain any potential underlying issues in this respect that should be recognised.

Q34: Do you agree with the consequences as described of exceeding the maximum limits or should there be a more convergent approach? Please provide any comment or suggestion regarding the procedures in place by trading venues in case of a member exceeding the prescribed limit.

Q35: Do you agree with the need to improve the notification process in case of IT incidents and system outages? Beyond the notification process between NCAs and ESMA, which improvements could be done regarding communication of incidents to the public?

Q36: Do you believe any initiative should be put forward to ensure there is more continuity on trading in case of an outage on the main market, e.g. by requiring algo traders to use more than one reference data point?

Q37: Do you agree with the view that the tick size regime had overall a positive effect on market depth and transaction costs?

Q38: Is there any further issue you would like to highlight regarding tick size regime?

Q39: Do You agree with the proposal not to amend the tick size regime for third country shares? Please explain.

Q40: Do you agree with the proposal to widen the scope of the tick size regime to all ETFs? Would this pose challenges in your view? Please explain.

Q41: Do you agree with the proposal not to widen the scope of the tick size regime to non-equity instruments? Please explain.

Q42: Do you agree with ESMA findings and assessment of the current MiFID II market making regime?

Q43: What do you think of ESMA proposals and suggested amendments to RTS 8? In your view, what other aspects of the market making regime require to be amended and how?

Q44: What are market participants views regarding the flexibility left in the MiFID II market making regime? Would you agree with ESMA further clarifying certain relevant concepts? If yes, which ones?

Q45: Could you please describe how Primary Dealers agreements are designed (number of designated Primary Dealers, transparency about investment firms having signed such agreements, typical obligations contained, etc...). Do you consider that Primary Dealers should be exempted from the Article 1 of RTS 8? Do you consider that this can introduce a regulatory loophole?

Q46: Do you think that venues which introduced asymmetric speedbumps provide enough information regarding the mechanism used? If not, what additional information would be useful to disclose to market participants?

Q47: Reflecting on those mechanisms which allow liquidity providers to provide quotes that can be filled only against retail order flow, do you think that such mechanisms are beneficial in terms of market quality? Is there any specific aspect that you think should be further taken into account, also considering the type of instruments traded? Please specify the venue of reference and the type of arrangement discussed.

Q48: Do you think that venues which introduce asymmetric speedbumps should set tighter market making requirements? Please explain why and how tight those new requirements should be.

Q49: Do you agree on the conclusion that speedbumps might not be a well-suited arrangement for equity markets? If yes, do you think that such arrangements for equities should be prohibited in Level 1? Please explain.

Q50: Do you think that the introduction and functioning of speedbumps should be further regulated? If yes, which specific requirements would you like to be included in EU legislation?

Q51: Is there any specific issue you would like to highlight about speedbumps?

Q52: What are your views on the relative timing of private fill confirmations and public trade messages? If you are a trading venue, please provide in your answer an explanation of the model you have in place.

Q53: Do you consider information on the sequencing of these two feeds at trading venues to be easily available? If you are a trading venue, please provide a link to where this information can be found publicly.

Q54: Do you think there should be any legislative amendments or policy measures in respect of these feed dynamics?

7.2 Annex II

Commission mandate to provide technical advice / Legislative mandate to [develop technical standards]

Article 90 (1)(c) of MiFID II:

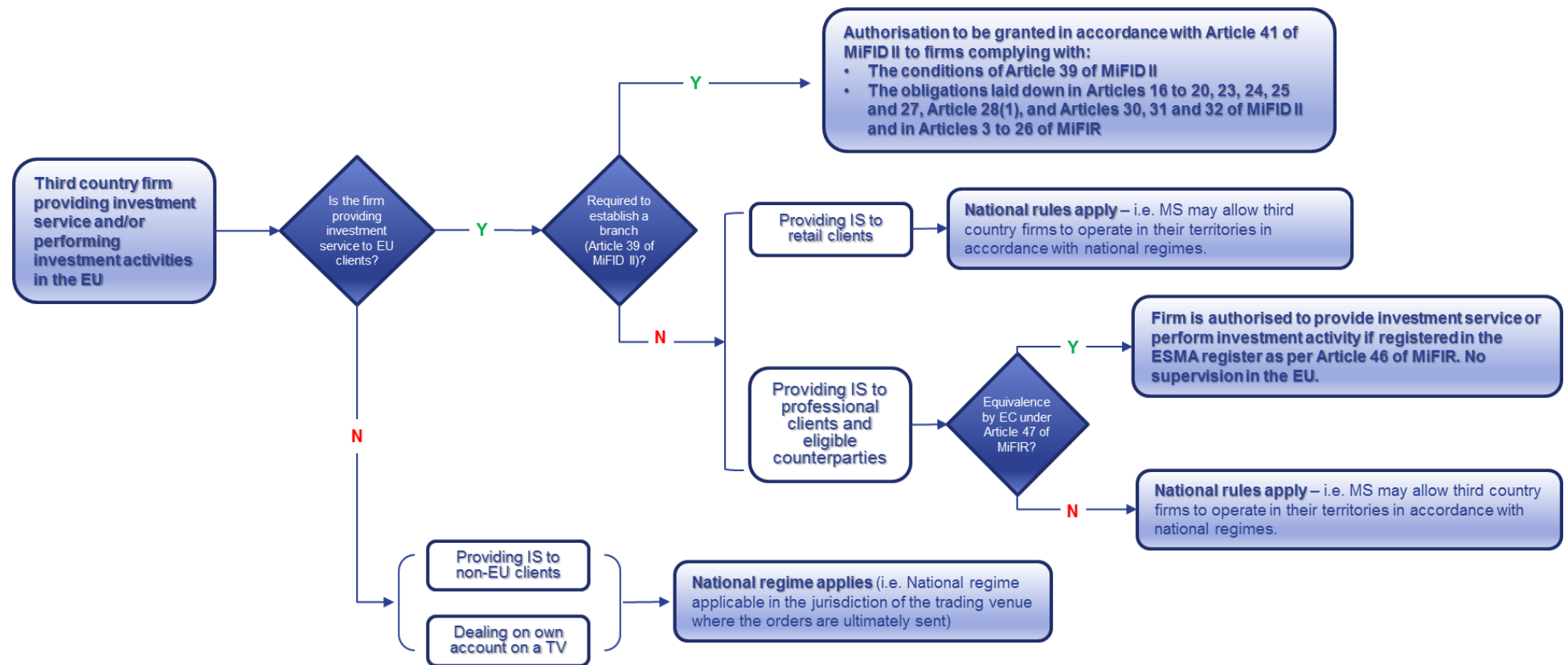
Before 3 March 2019 the Commission shall, after consulting ESMA, present a report to the European Parliament and the Council on:

- (a)
- (b)
- (a) the impact of requirements regarding algorithmic trading including high-frequency algorithmic trading;

[...]

7.3 Annex III

Annex III-A: General third country regime in MiFID II / MiFIR:



Annex III-B: Outcome of the stocktaking exercise

The information below is for general guidance purposes only. Market participants are invited to check with their legal counsel the requirements that would apply to them considering their specific situation.

Member State	Are third country firms dealing on own account required to establish a branch in the EU?	Authorisation regime applicable to third country firms dealing on own account and falling under the cases listed under points (ii) and (iii) of Article 2(1)(d) of MiFID II
Austria	No	Third Country firms that hold no EU banking license are not permitted to deal on own account in Austria
Bulgaria	Yes	Third country firms dealing on own account have to establish branches authorised and supervised in accordance with the criteria of Article 39 to 41 of MiFID II.
Czech Republic		No specific authorisation needed.
Cyprus	Yes	Third country firms dealing on own account have to establish branches authorised and supervised in accordance with the criteria of Article 39 to 41 of MiFID II.
Finland	No	No specific authorisation regime in Finland but FIN-FSA has issued binding regulations on the conditions on which Finnish trading venues may accept third country entities dealing on own account as their members or participants.
France	No	No specific authorisation needed.
Germany	N/A	No specific authorisation for third country firms accessing EU trading venues via DEA until a European regulation is in place.

		HFT firms need to establish branches authorised and supervised as per Articles 39 to 41 of MiFID II
Greece	No	No specific requirement /authorisation needed.
Ireland	No	No specific authorisation needed.
Italy	Yes/No (see next column)	In alternative to the establishment of a subsidiary in Italy, third country firms shall: <ul style="list-style-type: none"> • establish a branch (in accordance with articles 39 to 41 MiFID II), or • be registered by ESMA following a Commission's equivalence decision pursuant to Article 47(1) of MiFID II. In the absence of the Commission decision or where such decision is no longer in effect, third country firms may provide such services in Italy even without the establishment of a branch only if duly authorised to do so by Consob, subject to the fulfilment of specific conditions identified by the law.
Latvia	Yes	Third country firms dealing on own account have to establish branches authorised and supervised in accordance with the criteria of Article 39 to 41 of MiFID II.
Luxembourg	No	No specific authorisation needed. For third country firms dealing on own account when executing clients orders , where the execution of clients orders is taking place in Luxembourg, the concerned third country firms (which do not benefit from the MiFIR equivalence or the CSSF equivalence regime) needs to establish branches authorised and supervised as per Articles 39 to 41 of MiFID II.

Malta	Yes	<p>To date, the MFSA does not have an authorisation regime that is applicable to third country firms dealing on own account and falling under the cases listed in points (ii) and (iii) of Article 2(1)(d) of MiFID II</p> <p>Third country firms dealing on own account have to establish branches authorised and supervised in accordance with the criteria of Article 39 to 41 of MiFID II.</p>
The Netherlands	No	<p>No authorisation required. Under Dutch law, third country firms that trade exclusively on own account on NL trading venues can request an exemption from authorization granted by the AFM.</p>
Poland	Yes	<p>Third country firms dealing on own account have to establish branches authorised and supervised in accordance with the criteria of Article 39 to 41 of MiFID II.</p>
Portugal	Yes	<p>Authorisation regime depends on the activity undertaken. A third country firm can deal on own account as a member or participant of a trading venue or through DEA without being authorised. However, where this third country firm undertakes market making or HFT activities or is dealing on own account when executing client orders, it will have to establish a subsidiary and be authorised as an EU investment firm.</p>
Spain	No	<p>No specific authorisation needed.</p>

Sweden	Yes	Third country firms dealing on own account have to establish branches authorised and supervised in accordance with the criteria of Article 39 to 41 of MiFID II As a temporary measure, from 31 December 2020 to the end of 2021, third country firms that have DEA to a trading venue and are trading solely on own account will be able to do so without having to establish a branch in Sweden subject to certain conditions. Should these conditions not be fulfilled, an establishment of a branch will be required.
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Annex III-C: Algorithmic Trading in some third countries

Algorithmic Trading Requirements in the United States

In the US, FINRA member firms are required to be member firms of the FINRA) that engage in algorithmic strategies are subject to SEC and FINRA rules governing their trading activities, including SEC Rule 15c3-5 (Risk management controls for brokers or dealers with market access) and [FINRA Rule 3110 \(Supervision\)](#).

Under SEC Rule 15c3-5, brokers or dealers with market access must establish, document, and maintain a system of risk management controls and supervisory procedures reasonably designed to manage the financial, regulatory, and other risks of the business activity. This requirement encompasses firms that use market access to trade in a proprietary capacity, as well as those that offer market access as agent for customers. The required procedures are intended to address the risks of automated trading, including algorithmic strategies.

A firm's procedures to manage financial risks must (i) prevent the entry of orders that exceed appropriate pre-set credit or capital thresholds in the aggregate for each customer and the broker or dealer and, where appropriate, more finely-tuned by sector, security, or otherwise by rejecting orders if such orders would exceed the applicable credit or capital thresholds; and (ii) prevent the entry of erroneous orders, by rejecting orders that exceed appropriate price or size parameters, on an order-by-order basis or over a short period of time, or that indicate duplicative orders.

A firm's procedures to manage regulatory risks must (i) prevent the entry of orders unless there has been compliance with all regulatory requirements that must be satisfied on a pre-order entry basis; (ii) prevent the entry of orders for securities for a broker or dealer, customer, or other person if such person is restricted from trading those securities; (iii) restrict access to trading systems and technology that provide market access to persons and accounts pre-approved and authorized by the broker or dealer; and (iv) assure that appropriate surveillance personnel receive immediate post-trade execution reports that result from market access.

Under FINRA Rule 1220(b)(4)(A), an "algorithmic trading strategy" is an automated system that generates or routes orders (including order-related messages), but does not include an automated system that solely routes orders, in their entirety, to a market centre. Covered systems include those that generate or route orders (or order-related messages) in any equity security (including options), preferred security or convertible debt security, whether sent to an exchange or handled over the counter.

FINRA has published several initiatives aiming at increasing the scope of trading information FINRA receives, providing more transparency into trading activities to market participants and investors, and requiring firms engaged in electronic trading and their employees to be trained, educated and accountable for their role in equity trading.⁴⁶

As such, FINRA guidance⁴⁷ include several effective supervision and control practices that firms can employ to reduce the likelihood and mitigate the impact of future problems including market-impact events related to technology issues. These suggested practices include the following:

General Risk Assessment and Response – Firm should undertake a holistic review of their trading activity and consider implementing a cross-disciplinary committee to assess and react to the evolving risks associated with algorithmic strategies.

Software/Code Development and Implementation – Firms should also focus efforts on the development of algorithmic strategies and on how those strategies are tested and implemented.

Software Testing and System Validation – Testing of algorithmic strategies prior to being put into production is an essential component of effective policies and procedures.

Trading Systems – Firms should develop their policies and procedures to include review of trading activity after an algorithmic strategy is in place or has been changed.

Compliance – Ensuring that there is effective communication between compliance staff and the staff responsible for algorithmic strategy development is a key element of effective policies and procedures.

Furthermore, a person who is primarily responsible for the design, development or significant modification of an algorithmic trading strategy relating to equity, preferred or convertible debt securities, or who is responsible for the day-to-day supervision or direction of such activities, must pass the Series 57 exam and register as a Securities Trader. Requiring this minimum standard of knowledge aims at ensuring that developers are properly educated in securities rules and able to assess whether the products they are designing to implement trading strategies comply with applicable regulations.

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⁴⁶ See FINRA Regulatory Notice 15-09, available at <https://www.finra.org/rules-guidance/notices/15-09>.

⁴⁷ <https://www.finra.org/rules-guidance/key-topics/algorithmic-trading#overview>.

On 17 December 2015, the Commodity Futures Trading Commission (CFTC) published a notice of proposed rulemaking, Regulation Automated Trading, and on November 25, 2016, following the conclusion of a reopened comment period, the CFTC issued a notice of proposed rulemaking to supplement Regulation AT (together, “Regulation AT”).⁴⁸ Regulation AT proposed pre-trade risk controls at the level of exchanges as well as the trading firm or futures commission merchant level. the Regulation AT NPRM included provisions that would have (1) Required certain types of market participants, based on their trading functionality, strategies, or market access methods, to register with the Commission notwithstanding that they did not hold customer funds or otherwise intermediate futures markets. (2) Compelled those registrants, including participants not currently registered with the Commission, to produce source code to the Commission without a subpoena; and (3) required exchanges, FCMs, and certain trading firms to implement risk controls.

On 15 July 2020, the CFTC withdrew Regulation AT and rejected the policy responses listed above as means of addressing the perceived associated with automated trading or algorithmic trading relative to other forms of electronic trading underlying Regulation AT .⁴⁹ Instead, on the same date, the CFTC issued Proposed Risk Principles for Electronic Trading which require exchanges to take steps to prevent, detect, and mitigate market disruptions and system anomalies associated with electronic trading.⁵⁰

Under those Proposed Risk Principles, first, exchanges must have rules to prevent, detect, and mitigate market disruptions and system anomalies associated with electronic trading. Second, exchanges must have risk controls on all electronic orders to address those same concerns. Third, exchanges must notify the CFTC of any significant market disruptions and give information on mitigation efforts. The Proposed Risk Principles include acceptable practices, which provide that an exchange can comply with the principles by implementing rules and risk controls that are reasonably designed to prevent, detect, and mitigate market disruptions and system anomalies associated with electronic trading.

The National Futures Association (NFA)) in June 2002 issued Interpretive Notice 9046 (“Interpretative Notice”), subsequently revised in December 2006, relating to the supervision of automated order routing systems (“AORSs”).⁵¹ The Interpretative Notice applies to all NFA members that employ AORSs, and provides binding guidance to, among other things, implement firewalls, conduct testing, and perform capacity reviews, as well as consider implementation of pre-trade controls.

⁴⁸ Regulation Automated Trading, 80 FR 78824 (Dec. 17, 2015) and Regulation Automated Trading, 81 FR 85334 (Nov. 25, 2016).

⁴⁹ Regulation AT Withdrawal, 85 FR 42755 (July 15, 2020).

⁵⁰ Electronic Trading Risk Principles, 85 FR 42761 (July 15, 2020).

⁵¹ NFA, Interpretive Notice 9046, “Supervision of the Use of Automated Order-Routing Systems” (Dec. 12, 2006), available at <https://www.nfa.futures.org/rulebook/rules.aspx?RuleID=9046&Section=9>.

Algorithmic Trading Requirements in Japan

In Japan, the report published in 2016 by the Financial Services Agency of Japan (the “FSA”) recommended the development of the regulatory framework for “high-speed algorithmic” traders. In response to the recommendation, the Financial Instruments and Exchange Act (FIEA) was amended in May 2017 to require that any person who conducts High-Speed Trading⁵² in Japanese market be registered as “High-Speed Traders” (hereinafter “HST”)⁵³ and that the person ensure the robust internal control framework including system risk controls, governance framework and appropriate risk management.

Under the FIEA, "High Speed Trading" is generally defined as algorithmic trading of securities or derivatives that minimises latency by submitting orders in close proximity to the trading venue’s matching engine and that ensures any measure by which such orders are segregated from other orders. This definition would include algorithmic trading using virtual servers which are located inside a stock exchange, exemplified by the co-location service provided by the Tokyo Stock Exchange and Osaka Stock Exchange.

In general, FSA’s regulatory and supervisory framework for HST introduces a registration system and rules in order to enable authorities to monitor HST’s transactions and internal controls so that the authorities could require HST to comply with domestic requirements in a fair and appropriate manner. FSA rules’ main aspects include:

Registration system: the FIEA requires registration of any person conducting High Speed Trading in Japanese market who is not yet licensed as Financial Instruments Business Operators (FIBOs), Registered Financial Institutions or remote Trading Participants⁵⁴. In the process of entering into registration, HST are required to clarify which markets to conduct High Speed Trading, what categories of securities or listed derivatives to trade, and which broker dealers to use. The FIEA also prohibits domestic broker dealers from intermediating orders from unregistered HST or licensed HST when broker dealers are unable to confirm the adequacy of operational control system or risk controls of HST.⁵⁵ In addition, the registration system also requires HST domiciling overseas to

⁵² Under the FIEA (<http://www.japaneselawtranslation.go.jp/law/detail/?id=3538&vm=04&re=02>), there is no requirement for high frequency and the defining term "High-Speed Trading" is used. Article 2 (41): The term "High-Speed Trading" as used in this Act means any of the following acts for which the determination on performance of the act is automatically made by an electronic data processing system, and the provision of information necessary for conducting the purchase and sale of Securities or a Market Derivatives Transaction based on that determination to a Financial Instruments Exchange or any other person specified by Cabinet Office Order is made by means of information and communications technology, which is specified by Cabinet Office Order as a means of shortening the time normally required for the provision of information (excluding acts specified by Cabinet Order as those which, in consideration of their content and other factors, are found not to compromise the protection of investors).

⁵³ See the Article 2 (42) of the FIEA: The term "High-Speed Trader" as used in this Act means a person registered by the Prime Minister pursuant to Article 66-50.

⁵⁴ See Article 2 (19) of the FIEA.

⁵⁵ See Article 116-4 of the Cabinet Office Order on Financial Instruments Business, etc. (Acts Equivalent to Act of Accepting the entrustment of Sale and Purchase of Securities Pertaining to High-Speed Trading to be Conducted by Persons Other Than High-

appoint a Japanese representative/agency so that they can communicate with the Japanese authorities smoothly and swiftly.

Regulations governing the business of high frequency traders: the FIEA and the Guidelines for HST Supervision require HST to develop robust operational control system monitoring their own High Speed Trading transactions and to ensure robust governance structure and adequate human resources to conduct their business in an appropriate manner. The requirement also includes establishment of internal rules and the mechanism/procedures to prevent unauthorised transactions (i.e. unexpected orders or orders that may cause disruptions in domestic markets) and to mitigate the impacts of such orders promptly.

Supervision and notifications for high frequency traders: when there is any change in the registered information of HST, broker dealers and HST are required to notify the authorities within two weeks from the day of change. In case there is any change in the contents or methods of trading, they are required to notify FSA without delay. Additionally, the authority may issue the reporting order and/or business improvement order if deemed necessary and appropriate for public interest or protection of other investors. The authority may also revoke the registration or order the suspension of all or part of HST's business activities when significant breaches of regulations are found.

Record-keeping and annual business reporting: HST are required to keep records of their transactions by for example, order tickets and transaction blotters and to retain them for 7 to 10 years depending on the type of the records. Foreign traders can alternatively rely on books and records made in accordance with foreign regulations (such as MiFID II) to comply with Japan's HST requirements. HST are also required to annually submit a business report which contains the information prescribed in the FIEA including the summary of their annual business activities, and the amount of trades corresponding with their strategies, as well as BS and PL.

Controls and Training: robust internal control framework for preventing unfair trading and appropriate training for employees are also required. Specific rules require HST to develop and maintain robust internal control framework to prevent any type of

Speed Traders) Article 116-4 The acts to be specified by Cabinet Office Order as referred to in Article 38, item (viii) of the Act are the following acts: (i) an act of a High-Speed Trader which has received an order for suspension of business pertaining to High-Speed Trading (including a person provided in Article 16-4-2 of the Cabinet Order; the same applies in the following item) accepting the entrustment of sale and purchase of Securities or Market Derivatives Transactions pertaining to the High-Speed Trading; (ii) an act of a High-Speed Trader which cannot be confirmed to have implemented the measures for securing sufficient management of an electronic data processing system and other facilities for High-Speed Trading accepting the entrustment of sale and purchase of Securities or Market Derivatives Transactions pertaining to the High-Speed Trading; and (iii) High-Speed Trading to be conducted by a person other than a High-Speed Trader provided in Article 38, item (viii) of the Act (limited to those pertaining to the acts specified in Article 2, paragraph (41), item (iii) of the Act; hereinafter the same applies in this item) or the act specified in item (i) of that paragraph pertaining to the High-Speed Trading under the preceding two items conducted by the High-Speed Trader provided in these items.

unfair trading such as insider trading and trading through abuse of material non-public information, as well as develop and maintain robust market surveillance framework against market manipulation.

Investigations and penalties: the Securities and Exchange Surveillance Commission (SESC) may conduct investigations against HST to check compliance with domestic regulations and may issue a recommendation to FSA to take administrative actions when deemed appropriate. Exchanges may also investigate against HST to ensure compliance with regulations.⁵⁶ Penalties are also applicable (both pecuniary/imprisonment) in case there are significant deficiencies in information provided during the registration process (i.e mendacious information in registered information), violation of administrative order to suspend trading or significant misreporting.

Algorithmic Trading Requirements in Hong Kong

In 2014 in Hong Kong, the Securities and Futures Commission introduced specific rules addressing Electronic Trading and Algorithmic Trading specifically in the [Code of Conduct](#) for licensed or registered persons.

The SFC's Code of Conduct identifies "Algorithmic trading" as a form of Electronic Trading (together with internet trading and direct market access - DMA) and defines it as computer generated trading activities created by a predetermined set of rules aimed at delivering specific execution outcomes. No specific definition is provided for High Frequency Trading, which is treated as a form of Algorithmic trading.

Section 18 of the SFC's Code of Conduct sets out the general principles applicable to all forms of Electronic Trading. Principles related to electronic trading in general include obligations relating to the control and supervision of orders and operations, adequate security, reliability and capacity, contingency measures, record keeping and post-trade controls.

It also contains specific requirements on algorithmic trading which includes: (i) **obligations for licensed or registered persons** involved in the design and development or approved to use algorithmic trading systems to be adequately qualified; (ii) appropriate **testing for**

⁵⁶ See Article 85-5 of the FIEA. (Investigation on Persons Engaged in High-Speed Trading) Article 85-5 (1) Beyond what is provided for in Article 84, a Financial Instruments Exchange is to investigate the compliance of a person engaged in High-Speed Trading with laws and regulations and dispositions by government agencies which are based on laws and regulations and to take any other necessary measures, in accordance with this Act and with its articles of incorporation and other rules, in order to ensure the fair purchase and sale of Securities and Market Derivatives Transactions on the Financial Instruments Exchange Market, as well as to protect investors.

algorithmic trading system and trading algorithms to operate as designed; and (iii) **risk management** to be carried out by licensed or registered person to ensure the integrity of its algorithmic trading system and trading and that systems and algorithms operate in the interest of markets' integrity.

Schedule 7 of the Code of Conduct further specifies principles for algorithmic trading:

Qualifications: a licensed or registered person which uses internally developed algorithmic trading system or trading algorithms, or provides them for use by its clients, are obliged to ensure persons in charge of the design and the development of the algorithm trading system are adequately qualified to understand the compliance and regulatory issues which may arise from the use of algorithm trading system. A licensed or registered person should also provide the persons approved to use its algorithmic trading system with up-to-date documentation for operating its algorithmic trading system.

Systems testing: a licensed or registered person should ensure that the algorithmic trading system and trading algorithms it uses or provides to clients for use are adequately tested before deployment., Tests should ensure that the system operates as designed and takes into consideration extreme market circumstances, as well as the characteristics of different trading sections. Furthermore, the system needs to be tested in such a way as to be satisfied that it would not interfere with the operation of a fair and orderly market.

Risk management: a licensed or registered person has to ensure controls to avoid orders that may be erroneous or interfere with the operation of a fair and orderly market and to protect the licensed or registered person and its clients from being exposed to excessive financial risk. A licensed or registered person should regularly conduct post-trade reviews of trading activities conducted through its algorithmic trading system, including the relevant order instructions to identify any suspicious market manipulative or abusive activities or market events or system deficiencies.

Record-keeping: documentation on the designed developments, algorithmic trading systems and trading algorithms need to be documented and recorded in writing. These records should be retained for a period of no less than 2 years after its system and algorithms are ceased to be used.

In addition, Scheme 7 of the Code of Conduct sets out the obligation for licensed or registered persons to perform due diligence checks on third party services providers on electronic systems. As regard direct market access (DMA), when a licensed or registered person allows their client for sub-delegation of DMA services to another person, both the licenced or registered person and client should have risk management mechanisms and supervisory controls in place. Furthermore, such person should meet the minimum client

requirements established by the licensed or registered person and a written agreement is in place between such person and the client.

Algorithmic Trading Requirements in Australia

In May 2018, the Australian Securities and Investment Commission (ASIC) issued Regulatory Guide 241⁵⁷ on Electronic Trading (RG241) to give guidance on how trading participants should comply with their obligations under the ASIC Market Integrity Rules (Securities Markets). The goal of the ASIC Market Integrity Rules and associated guidance is “improving transparency and integrity of crossing systems and to strengthen the requirements for market participants to maintain fair, orderly and transparent markets and to deter market manipulation”⁵⁸.

RG 241 defines ‘algorithmic programs’ as automated strategies using programmable logic, system-generated (rather than human-generated) messages based on a set of predetermined parameters, logic rules and conditions. These programs include algorithmic trading, automated order generation and automated order routing. In respect to High Frequency Trading, pursuant to REP 597⁵⁹, ASIC adopts IOSCO’s principles and definition.

The current framework set by REG 241 establishes rules for trading participants using Automatic Order Processing (AOP) with specific provisions for algorithmic programs. Some of the rules on AOP entail:

Automated filters, including processes to record and to have a direct control over AOP and its parameters, including controls for immediately suspending, limiting or prohibiting AOP and trading messages.

Trading and security management arrangements to determine and log the origin of orders and messages. Systems shall ensure capacity and continuity in case of disaster and of access by unauthorised persons.

Organisational and technical requirements which include trading record obligations, capital requirements for trading participants, best execution obligations and client order priority requirements.

⁵⁷ ASIC (2018). Source: <https://asic.gov.au/regulatory-resources/find-a-document/regulatory-guides/rq-241-electronic-trading/>

⁵⁸ Dark liquidity and high-frequency Trading. Source: <https://asic.gov.au/regulatory-resources/markets/market-structure/dark-liquidity-and-high-frequency-trading/>

⁵⁹ ASIC (2018). Source: <https://asic.gov.au/regulatory-resources/find-a-document/reports/rep-597-high-frequency-trading-in-australian-equities-and-the-australian-us-dollar-cross-rate/>

Access authorisation: Before giving this access, a trading participant must ensure that the client, client's agent or representative has adequate skills and knowledge through rules and procedures demonstrating so and ensuring a continuous supervision. In addition, agreements between trading participants and authorised persons must be in place.

Review and certification of documentations and systems for AOP, including an initial review and certification to ASIC before use of its system for AOP; internal review of any material system's changes; and annual reviews and notifications to ASIC.

Where poor AOP controls lead to continuing patterns of order deletions, order amendments, high order-to-trade ratios relative to the underlying security, over trading or wash trading, ASIC may also cease, suspend, limit or prohibit AOP, access by one or more authorised persons, clients, financial product or Market.

In addition, the specific provision of REG 241 applicable to systems using algorithmic programs require to set up additional risk management and speed monitoring mechanisms. Trading participants using algorithmic programs are also expected to have an arrangement with an authorised person using their own algorithmic trading models.