
The landscape for European equity trading and liquidity

The importance of utilising accurate
data for assessing equity market
structure

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Definitions of terms and concepts

Concept	Definition
Auctions	In this report, this includes the big xyt categories of 'opening auctions', 'intraday auctions', 'closing auctions', 'periodic auctions' and 'other auctions'.
Dark venues	Trading venues where orders (prices and volumes) are not displayed prior to execution. Trading venues where dark trading takes place are typically referred to as 'dark pools'. This category includes trades that benefit from pre-trade transparency waivers, and includes the big xyt categories 'Dark order book' and 'Dark IOI Negotiation'.
Lit order book	A platform that aggregates outstanding orders, organises the orders based on priority, and matches corresponding buy and sell orders according to trading rules. Orders (prices and volumes) are visible prior to execution.
Multilateral trading facility (MTF)	One of the three categories of trading venue defined under MiFID II. According to Article 4(22), an MTF is a multilateral system, operated by an investment firm or a market operator, which brings together multiple third-party buying and selling interests in financial instruments, in the system and in accordance with non-discretionary rules, in a way that results in a contract.
Off-venue trading	Trading activity that does not occur under the rules of a trading venue. This can be broken down into the big xyt categories OTC and SI.
On-venue trading	In this report, trading activity that occurs under the rules of a trading venue. This can be broken down into the categories lit order book, auctions, dark venues, and off-book – on-exchange.
Off-book – on-exchange	Trades reported under the rules of a trading venue, which may be as a result of trading on quotes from market makers, without having been processed in an order book system. An off-order book transaction is deemed to be executed on a trading venue if it is carried through the systems or under the rules of that trading venue. According to the European Securities and Markets Authority (ESMA), only off-order book transactions that benefit from a pre-trade transparency waiver should be considered as being executed on a trading venue.
Over the counter (OTC)	Trading that occurs between two parties away from a trading venue and not under the rules of a trading venue. OTC trading is an example of off-venue trading.
Regulated market (RM)	One of the three categories of trading venue defined under MiFID II. According to Article 4(21), an RM is a multilateral system operated and/or managed by a market operator, which brings together or facilitates the bringing together of multiple third-party buying and selling interests in financial instruments, in the system and in accordance with the RM's non-discretionary rules, and in a way that results in a contract, in respect of the financial instruments admitted to trading under the RM's rules and/or systems. RMs are generally operated by traditional national stock exchanges (e.g. London Stock Exchange, Frankfurt Stock Exchange).
Systematic internaliser (SI)	Defined under MiFID II as an investment firm that, on an organised, frequent systematic and substantial basis, deals on own account when executing client orders outside an RM, an MTF or an OTF without operating a multilateral system.
Trading venue	Defined under MiFID II Article 4(26) as an RM, an MTF or an OTF.

Source: Oxera.

Executive summary

The landscape for equity trading in Europe has been going through a period of considerable change over the past few years since the introduction of the EU's Markets in Financial Instruments Regulation (MiFIR) and Second Directive (MiFID II) in 2018, and since the UK's withdrawal from the EU.

When considering the European equity trading and liquidity landscape, policymakers and market practitioners may have different questions depending on their perspectives of interest. For example, what trading mechanisms are used? Under what rules are the trades executed? How is the trade execution price determined? Where is the liquidity located? These questions require different cuts of the data on reported transactions.

Despite efforts by regulators to improve the transparency of trade reporting in equity markets in Europe, significant challenges remain that make it hard to assess the liquidity landscape. Some reported transactions that are flagged as Over the counter (OTC) and Systematic Internaliser (SI) trades are in fact technical transactions, such as collateral transfers, give-ups and give-ins, and inter-affiliate trades undertaken for operational purposes. While technical trades may be relevant from a supervisory and/or post-trading perspective, it is not informative to include them in an analysis of the trading and liquidity landscape.

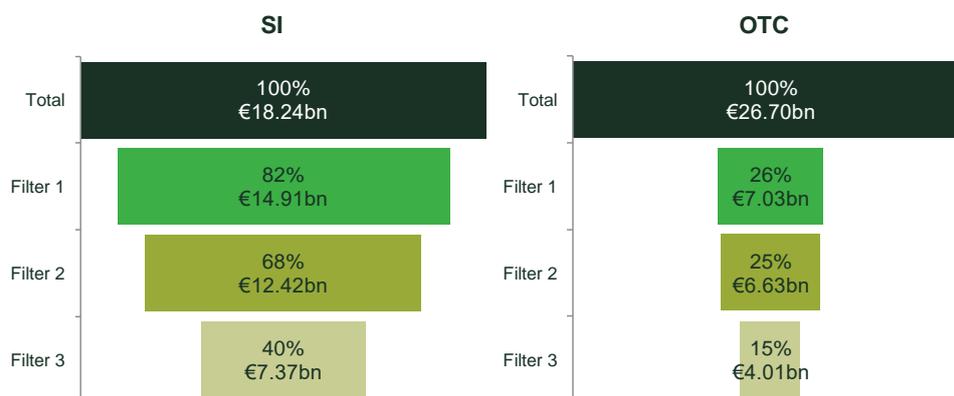
Equity trading markets exist to provide a meeting point for buyers and sellers of stocks, and trading and the provision of liquidity are about enabling investors to buy and sell securities. This report applies three cumulative filters to the full universe of reported equity transactions to distinguish economic trading activity from the reporting of technical transactions.¹ Furthermore, we break down the transactions by type of trading mechanism and type and jurisdiction of the provider of the trade execution service, thereby enabling the reader to choose the dimension that is of interest to them.

The key findings are as follows.

- A significant volume of OTC and SI reported transactions are technical in nature. After applying the first filter, the volumes of OTC and SI trades drop significantly, as shown in the figure below. This shows that an analysis based on all reported trades would over-estimate the volume of OTC and SI trades.

¹ Filter 1 removes all trade reports flagged with special conditions, except those flagged as benchmark transactions. Filter 2 additionally then removes benchmark transactions. Filter 3 additionally then removes trade reports occurring outside of trading hours. For more details, see Figure 3.1.

Deciphering OTC and SI economic trading activity from the full universe of reported transactions

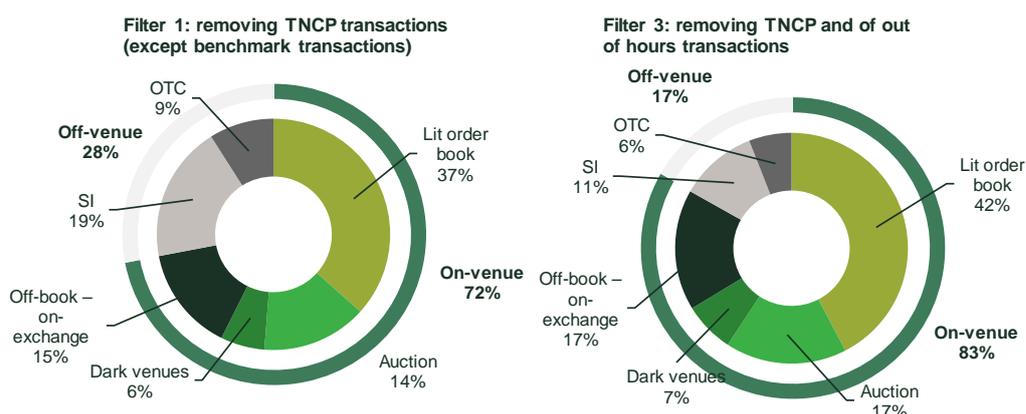


Note: See Figure A5.9. Percentages refer to the proportion of total (unadjusted) SI or OTC volume.

Source: Oxera analysis of big xyt data.

- The application of the filters changes the relative shares of the different trading mechanisms in Q1 2021, as shown in the two figures below.
 - After applying the first filter, OTC and SI trading combined accounted for 28% of European equity trading. The share of on-venue trading was 72% (of which 15 percentage points was off-book – on-exchange transactions).
 - After applying all three filters, OTC and SI trading combined accounted for 17% of European equity trading. The share of on-venue trading was 83% (of which 17 percentage points was off-book – on-exchange transactions).

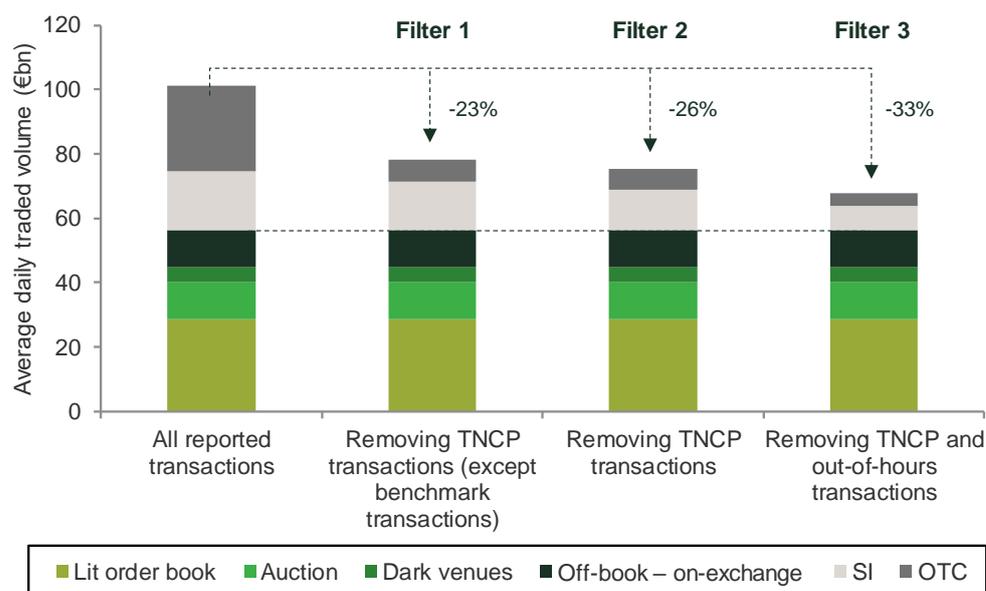
Share of European trading volume by trading mechanism, Q1 2021



Note: See Figure 3.2.

Source: Oxera analysis based on big xyt and Cboe data.

Adjusted European trading volume by trading mechanism, Q1 2021



Note: See Figure 3.2. TNCP, 'transaction not-contributing to price formation'.

Source: Oxera analysis of big xyt and Cboe data.

- Our estimates of the share of OTC and SI trading (irrespective of the filter applied) are significantly lower than the 47% share estimated by ESMA derived from all European Economic Area (EEA) reported transactions in 2019. As ESMA has also recognised, its estimates of OTC and SI trades may be high due to the inclusion of technical transactions.
- Unadjusted OTC volumes increased by 52% between Q4 2020 and Q1 2021 (from an average daily value traded of €17.5bn to €26.7bn). This sharp increase may have been linked to the removal of UK stocks from the EU Share Trading Obligation (STO) and/or increased inter-company transfers, following the UK's departure from the EU and the setting-up of new operations based in the EU.

This exercise demonstrates the importance of having and utilising accurate data from a public policy perspective. The market would benefit from further clarity on how to apply the post-trade reporting requirements for certain transaction types. There is also merit in wider adoption of a harmonised data standard (such as the FIX MMT standard and the current work being done by FIX to enhance and standardise data and flags in anticipation of the consolidated tape).

Although this report provides more clarity, further work is required to obtain a precise view of the equity trading and liquidity landscape in Europe.

1 Introduction

The landscape for equity trading in Europe has been going through a period of considerable change over the past few years since the introduction of the EU's Markets in Financial Instruments Regulation (MiFIR) and Second Directive (MiFID II) in 2018, and since the UK's withdrawal from the EU.

This report, commissioned by AFME, presents a detailed overview of the European equity trading and liquidity landscape over the past year by trading mechanism and across jurisdictions, based on data provided by big xyt.

The focus is on cash equities listed in Europe, including trading activity taking place on trading venues or with brokers based in the EU, Switzerland and the UK.

The remainder of the report is structured as follows.

- Section 2 sets out our approach to identifying the equity trading and liquidity landscape, and discusses some of the challenges with post-trade reporting in Europe.
- Section 3 presents our analysis of the equity trading and liquidity landscape.

The appendices contain more detailed information on the data sources and additional supporting material used for the analysis.

2 Identifying the equity trading and liquidity landscape—approach

2.1 Identifying the relevant universe of equity trades

When considering the European equity trading and liquidity landscape, there are a number of perspectives of interest to policymakers and market practitioners. Key questions may include the following.

- What and where is the total liquidity available at any given time, across all participants?
- What trading mechanisms are used? Under what rules are the trades executed?
- What is the split between trading with and without pre- and post-trade transparency?
- What are the proportions of ‘price-forming’ and ‘non-price-forming’ trades?

To answer each of these questions, we will need to look at slightly different cuts of the trades reported by brokers, trading venues and SIs. Our analysis breaks down the transactions by type of trading mechanism and jurisdiction of the provider of the trade execution service and the listing location of the stock, thereby enabling the reader to choose the dimension of interest to them.

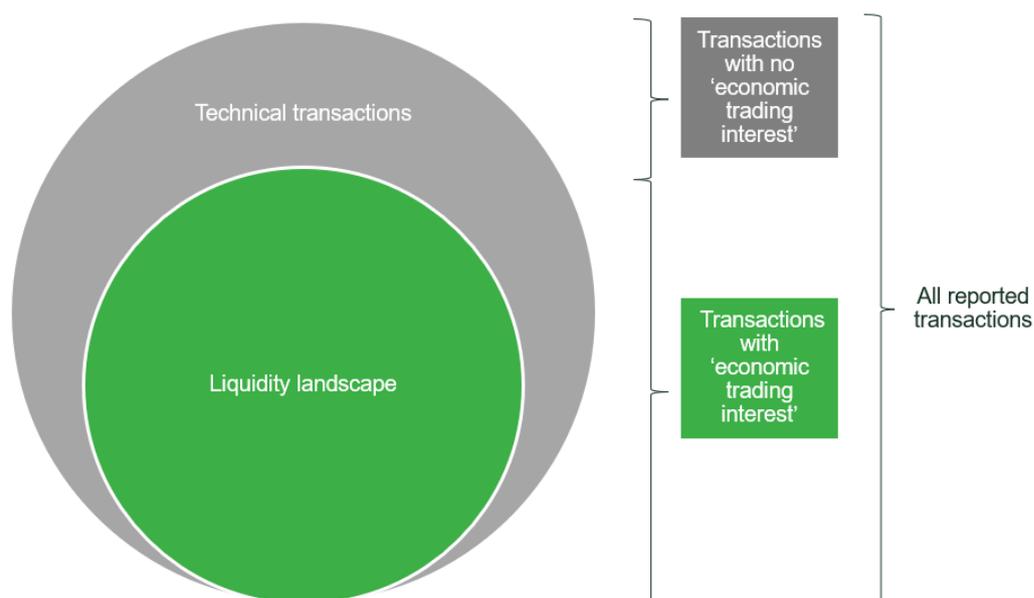
Equity trading markets exist to provide a meeting point for buyers and sellers of stocks, and trading and the provision of liquidity is about enabling investors to buy and sell securities. We note that some reported transactions that are flagged as over-the-counter (OTC) and SI trades are, in fact, technical transactions, such as collateral transfers, give-ups and give-ins, and inter-affiliate trades undertaken for operational purposes.² While technical trades may be relevant from a supervisory and/or post-trading perspective, it is not informative to include these in an analysis of the trading and liquidity landscape. Our analysis therefore applies a number of filters to the full universe of reported equity transactions to distinguish economic trading activity (referred to in this report as ‘trades that represent an economic trading interest’) from the reporting of technical transactions (see Figure 2.1). These filters are explained in section 3.

European regulation refers to the concept of ‘non-addressable liquidity’.³ There is a debate among market participants and the regulatory community about how to define and measure addressable liquidity. The definition depends on what question one attempts to answer, and what is addressable liquidity may vary depending on the perspective and position of the individual trader seeking liquidity. We do not further discuss this concept in this report, but note that technical transactions such as collateral transfers, give-ups and give-ins, and inter-affiliate trades undertaken for operational purposes would fall in the category of ‘non-addressable liquidity’, irrespective of the debate.

² See Appendix A2 for further examples of technical transactions.

³ See, for example, Article 23 of the EU’s Markets in Financial Instruments Regulation (MiFIR), and Commission Delegated Regulation (EU) 2017/587.

Figure 2.1 Universe of equity transactions



Source: Oxera.

2.2 Challenges with post-trade reporting in Europe

MiFID II and MiFIR extended the scope and relevance of the post-trade transparency regime to make transactions executed outside of a trading venue more transparent and to level the playing field between the rules applicable to trading venues and investment firms (see Appendix A1 for more detail on the MiFID II/MiFIR post-trade reporting regime).

A remaining issue is the quality of post-trade OTC and SI data reporting. It is widely acknowledged, including by ESMA, that there are significant shortcomings in terms of data quality, in particular for OTC trades.

Feedback from market practitioners highlights a number of concerns, particularly with respect to:

- diverse interpretation of trade flags, with anecdotal evidence that the same type of trade is being reported differently by different entities;
- duplication of trade reporting. MiFIR requires only one side to report, and if an SI is involved in the trade the requirement is that the seller reports the transaction in the case of an SI–SI trade and the SI in the case of an SI–non-SI trade.⁴ We understand that if an SI is unable to identify whether its counterparty is an SI in the given stock, it may opt to report the transaction regardless of whether they were a seller or not, to avoid the risk of non-compliance with reporting rules. If the counterparty was, in fact, an SI seller, this would lead to a duplicate trade report;⁵
- uncertainties around whether certain types of trade need to be reported, such as trades on shares listed outside the EU, and executed outside the EU, but originally arranged inside the EU. We understand that the reporting obligations of UK-based SIs remain unclear since the UK’s withdrawal from

⁴ See Appendix A1 for more detail.

⁵ Including an identifier code in the reporting flags would help to address this issue.

the EU, despite some ESMA clarifications.⁶ Another example is give-in and give-up transactions,⁷ which we understand (based on different legal interpretations) are sometimes reported as 'OTC' and in other cases as 'SI' transactions;

- the mixing of technical transactions and trades with an economic trading intention associated with them being reported under the same trade flags.

Industry has been working to improve the consistency of trade reporting through data standards. For example, the FIX Market Model Typology (MMT) data standard is an operational solution that enables compliance with MiFIR and supports efficient and consistent trade flag processing across data feeds.

If the MMT standard were to be widely adopted, the consistent tagging would enable an unambiguous granular categorisation of individual trade messages. In addition to a consistent data standard, the market would also benefit from more certainty and/or consistency in interpretation in terms of how to apply the standard/use the data flags.

With these caveats in mind, and with the aim of constructing a reliable picture of the equity trading and liquidity landscape, there is merit in adjusting the landscape to strip out technical transactions. This is done in the next section.

⁶ ESMA has clarified that post-trade reporting should happen on a legal entity basis, and including for transactions where at least one counterparty is an investment firm authorised in the EU. Transactions where both counterparties are not authorised EU investment firms, and that are executed outside the EU, are in any case not subject to the MiFIR transparency requirements. See ESMA (2020), 'Questions and Answers: On MiFID II and MiFIR transparency topics', SMA70-872942901-35, https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-35_gas_transparency_issues.pdf (last accessed 27 April 2021).

⁷ According to MiFID RTS 1, give-in/ups are not subject to the reporting regime. However, market feedback suggests that the definition does not accord with how give-ups are structured in the equities market in practice. We understand that when implementing the reporting regime, firms were uncertain whether to give effect to the apparent legislative intent or follow the letter of the exemption, with potentially divergent views taken by different firms. Furthermore, since implementation and as a result of the 2019 ESMA Q&A on RFMD trades (further described in section A5.3), some of these trades are now reported XOFF with the TNCP flag, depending on individual firms' interpretation of the scope of application of the ESMA Q&A. The uncertainty derives from the fact that there is no 'client trade' that is passed to another investment firm for the purpose of post-trade processing. A client's relationship and account balance is with a Prime Broker (PB), but that client might want to hedge their prime stock position using another broker. The Executing Broker (EB), following a request for market data from such a client trades on own account and then offers the own account trade or trades (or, in other words, 'gives-up' the trade), usually on a net basis and often at the end of the day, to the client's prime broker (who may be willing to take it on). The original EB (own account) trades are already reported separately.

3 Equity trading and liquidity landscape

This section presents the landscape following adjustments with the aim of presenting a closer picture of the true landscape of equity trading and liquidity.

As discussed in section 2, some reported (OTC and SI) trades are technical in nature and do not represent economic trading interest. When analysing the equity trading and liquidity landscape, it is therefore useful to apply adjustments in an attempt to remove technical transactions.⁸ This report presents a number of approaches to estimating the volumes and relative shares of economic trading interest by trading mechanism.

3.1 Approach to adjustments

The existing data set of reported transactions and transaction categories does not make it possible to easily remove ‘technical transactions’ from the universe of reported transactions. There is not currently a flag in the data reporting to identify technical transactions.

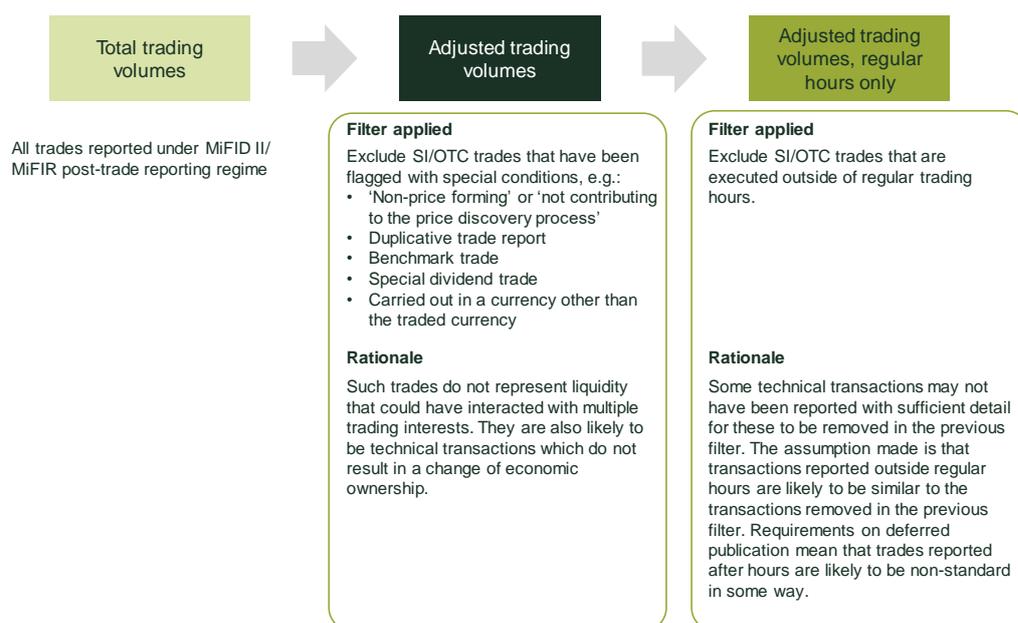
MiFIR requires certain trades to be flagged as a ‘transaction not-contributing to price formation’ (TNCP) (or similar). The TNCP flag includes technical transactions, such as collateral transfers, give-ups and give-ins, and inter-affiliate trades undertaken for operational purposes. However, it also includes a number of transactions that may represent an economic trading interest, such as benchmark trades (see Appendix A2 for more detail). Given this, it is possible that applying a filter based on the TNCP flag alone may over-estimate the number of technical transactions. On the other hand, it is not clear that all technical transactions will have been identified as TNCP. For example, in Q1 2021 there were 540 trade sub-condition codes within the SI and OTC categories across the European equity market universe.⁹ While some of these codes have not been explicitly flagged as ‘TNCP’, the precise economic nature of the transaction is not clear from the available information.

big xyt has adopted its own methodology to make adjustments to the publicly available data, with the aim of presenting a more accurate picture of the equity trading and liquidity landscape. Figure 3.1 describes big xyt’s approach and shows that two filters are applied. big xyt’s first filter removes SI and OTC trades that have been flagged with certain special conditions, and the second filter additionally then removes OTC and SI trade reports occurring outside of trading hours.

⁸ For comparative purposes, an analysis of all reported transactions is provided in Appendix A4.

⁹ For the purposes of this report, condition codes refer to the descriptive data provided with each trade print.

Figure 3.1 big xyt methodology



Note: big xyt also identifies trades that are above the Large-In-Scale thresholds, which can be removed as a third filter.

Source: big xyt methodology.

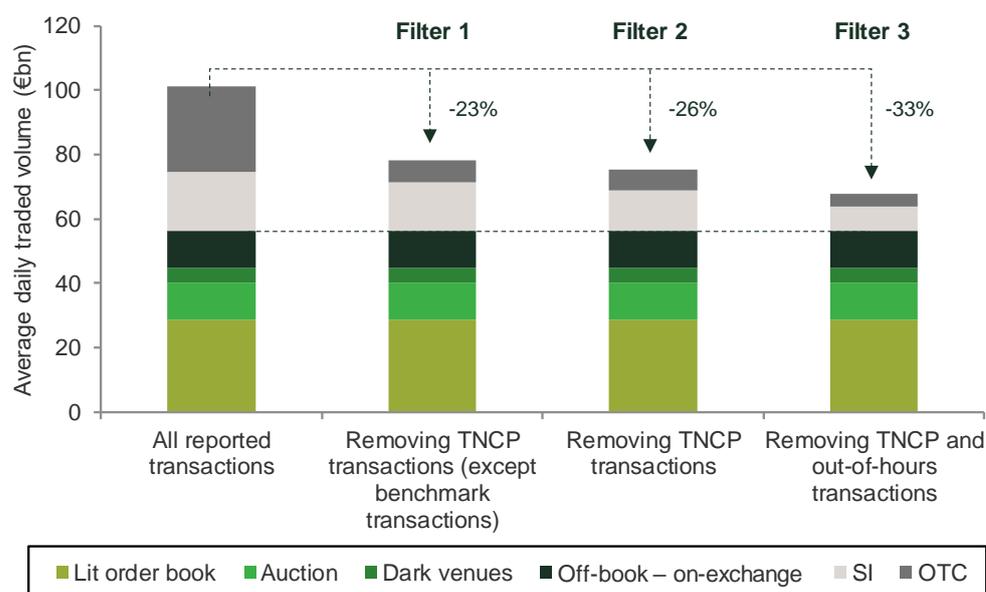
In addition to the filters applied by big xyt, we apply another filter. This is based on removing all transactions that have been flagged with special conditions (as described in the middle box of Figure 3.1), with the exception of transactions explicitly flagged as benchmark transactions, as these transactions could represent an economic trading interest (see Appendix A2 for more detail on this approach). The set of transactions then still excludes two types of other transaction that could also represent an economic trading interest but are not explicitly identified in the data.¹⁰

3.2 Market shares following adjustments to the data

Figure 3.2 and Figure 3.3 present the trading volumes and market shares of different trading mechanisms before and after filtering the data to remove technical transactions.

¹⁰ These include portfolio trades and transactions that are contingent on the purchase, sale, creation or redemption of a financial instrument and executed as a single lot.

Figure 3.2 Adjusted European trading volume by trading mechanism, Q1 2021



Note: Data covers trading activity for cash equities reported to entities based in the EEA, Switzerland and the UK. ‘TNCP’ means ‘trades not contributing to the price discovery process’ as defined by Commission Delegated Regulation (EU) 2017/587. Filter 1 is based on removing all transactions that have been flagged with special conditions (as described in the middle box of Figure 4.1), with the exception of transactions that are explicitly flagged as benchmark transactions (see row (a) of Appendix A2). The proportion of benchmark trades has been estimated based on data provided by Cboe. Filter 2 is based on removing all transactions that have been flagged with special conditions, including benchmark trades. Filter 3 is based on removing all transactions that have been flagged with special conditions and all transactions that occurred outside regular trading hours (as described in the right-hand box of Figure 3.1). Percentages show the decrease in trading volumes relative to all reported transactions after each filter is applied.

Source: Oxera analysis of big xyt and Cboe data.

Figure 3.2 shows how excluding all transactions with special conditions, apart from benchmark trades (i.e. Filter 1), leads to a significant reduction in trading volumes—around three-quarters of OTC trading volumes and almost one-fifth of SI volumes.

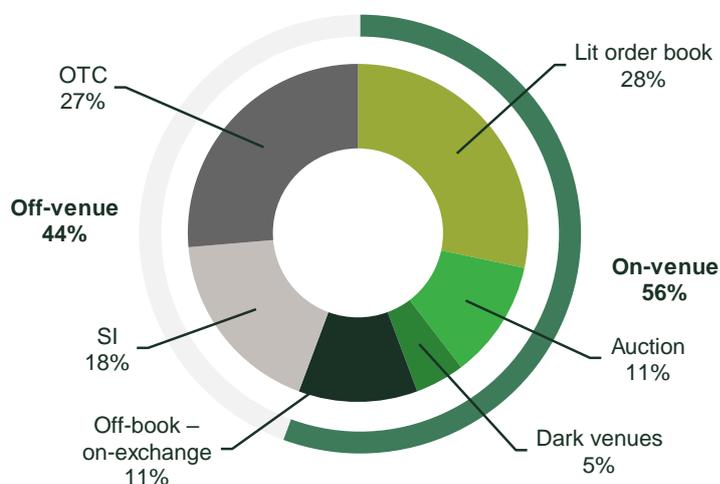
Filters 2 and 3 are based on the big xyt methodology. Taking the additional step of removing benchmark trades (i.e. Filter 2) results in an additional reduction in volumes, particularly for SI trades. Finally, removing trades executed outside regular hours from the remaining volumes causes OTC and SI volumes to drop by around two-fifths.

In terms of relative shares, Figure 3.3 shows how data covering all reported transactions in Q1 2021 provides similar estimates to those published by ESMA in its 2019 analysis.¹¹ The analysis produced by ESMA showed that total volumes in 2019 were close to evenly distributed among SIs (21%) and OTC (26%). In other words, in the ESMA analysis, on-venue (including off-book – on-exchange transactions) accounted for 53% and off-venue for 47%. In our analysis, based on Q1 2021 data provided by big xyt, on-venue accounts for 56% (of which off-book – on-exchange transactions account for

¹¹ ESMA’s analysis was based on reference (FIRDS) and transparency (FITRS) data for equity instruments received up to 8 July 2020. See ESMA (2020), ‘EU securities markets’, ESMA Annual Statistical Report, https://www.esma.europa.eu/sites/default/files/library/esma50-165-1355_mifid_asr.pdf (last accessed 7 May 2021).

11 percentage points) and off-venue transactions for 44% of all reported transactions.

Figure 3.3 Share of European trading volume by trading mechanism (all reported transactions), Q1 2021



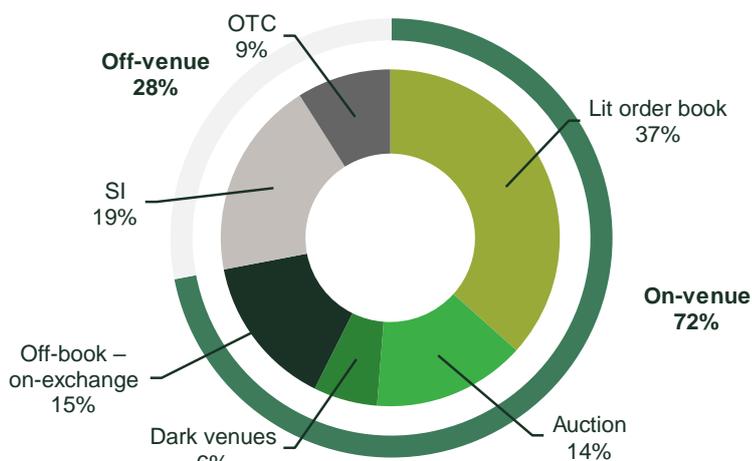
Note: See note to Figure 3.2.

Source: Oxera analysis based on big xyt and Cboe data.

The analysis also shows that, after applying Filter 1 to total reported transactions in Q1 2021, the following is observed (see Figure 3.4).

- The share of off-venue transactions amounts to just over 28% (rather than just under 45% if all reported transactions are measured), of which the share of OTC reported volume is now 9% (rather than 26%), while the share of SI transactions remains roughly the same (19% rather than 18%).
- The share of on-venue (including off-book – on-exchange) trading is now 72% (rather than 56% if all reported transactions are measured). Within this, the share of off-book – on-exchange trading is around 15 percentage points. This includes trades reported under the rules of an exchange that execute under the negotiated pre-trade transparency waiver; trades that are publication-deferred due to being large in scale; and off-book trades reported under the rules of an exchange (e.g. retail trades executed via a Retail Service Provider—RSP system).

Figure 3.4 Share of European trading volume by trading mechanism (Filter 1), Q1 2021



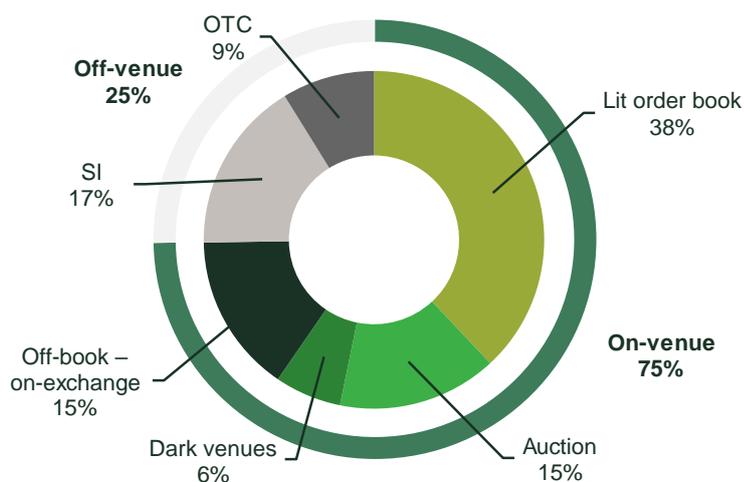
Note: See note to Figure 3.2.

Source: Oxera analysis based on big xyt and Cboe data.

After applying Filter 2 (i.e. excluding all transactions with special conditions) to total reported transactions in Q1 2021, the following is observed (see Figure 3.5).

- The share of off-venue transactions now amounts to just over 25% (rather than just under 45% if all reported transactions are measured), of which the share of OTC reported volume is now 9% (rather than 26%), while the share of SI transactions remains roughly the same (17% rather than 18%).
- The share of on-venue trading is now 75% (rather than 44% if all reported transactions are measured). Within this, the share of off-book – on-exchange trading is around 15 percentage points.

Figure 3.5 Share of European trading volume by trading mechanism (Filter 2), Q1 2021



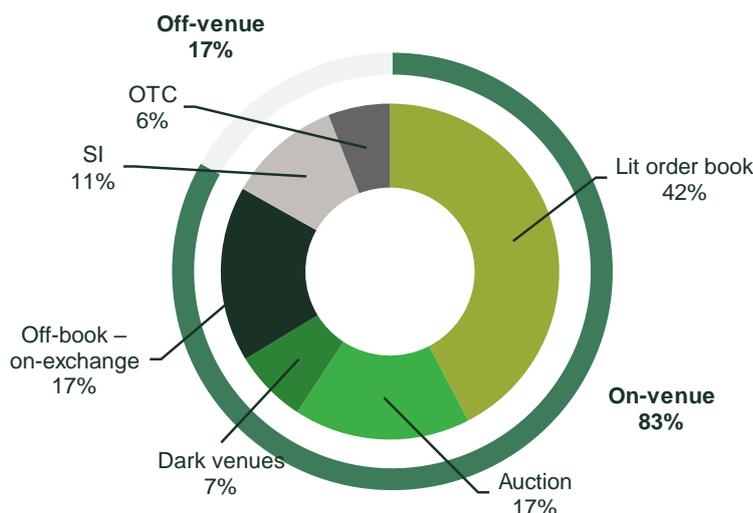
Note: See note to Figure 3.2.

Source: Oxera analysis based on big xyt and Cboe data.

After applying Filter 3 (i.e. also excluding transactions taking place outside regular hours), the following is observed (see Figure 3.6).

- The share of off-venue transactions becomes around 17% (compared with just under 45% if all reported transactions are measured), of which the share of OTC reported volume is now 6% (rather than 26%) and the share of SI transactions is now 11% (rather than 18%). In other words, this filter has a larger impact on the share of SI transactions than the other filters.
- The share of on-venue (including off-book – on-exchange) trading is now 83% (rather than 44% if all reported transactions are measured). Within this, the share of off-book – on-exchange trading is 17 percentage points.

Figure 3.6 Share of European trading volume by trading mechanism (Filter 3), Q1 2021



Note: See note to Figure 3.2.

Source: Oxera analysis based on big xyt and Cboe data.

Although these market shares are rough estimates, the analysis shows that the application of Filter 1 already results in a substantial reduction in trading volumes—the incremental effect of applying Filters 2 and 3 is, in fact, relatively small. This suggests that the unadjusted landscape (i.e. based on all reported transactions) over-estimates the number of OTC and SI trades.

All our estimates of the share of OTC and SI trading (irrespective of the filter applied) are significantly lower than the 47% share estimated by ESMA derived from all EEA reported transactions in 2019. As ESMA has also recognised, its estimates of OTC and SI trades may be high due to the inclusion of technical transactions.

Appendix A5 provides analysis of trading by mechanism and jurisdiction.

A1 MiFID II/MiFIR post-trade reporting regime

There are two broad categories of transparency requirements under MiFID II and MiFIR:

- transaction reporting, which involves notifying the competent authority of relevant reference and post-trade data;
- transparency requirements, which can be separated into pre-trade and post-trade reporting.

This appendix provides additional detail on the scope of the equity post-trade reporting regime under MiFID II/MiFIR—in particular, what must be reported and who is obliged to report.

What must be reported?

It is a requirement under MiFID II/MiFIR post-trade transparency obligations to report any trade pertaining to a MiFID II financial instrument that is traded on a trading venue.

ESMA has defined a number of transactions executed outside a trading venue that are exempt from post-trade transparency requirements (see Table A1.1)

Table A1.1 Transactions exempt from MiFIR transparency requirements

Transaction type	Description
Transactions that are exempt from the transaction-reporting regime	<p>ESMA defines a number of transactions that are exempt from the transaction reporting regime, including (but not limited to):</p> <ul style="list-style-type: none"> • securities financing transactions; • contracts arising exclusively for clearing or settlement purposes; • creation or redemption of units of a collective investment undertaking by the administrator; • the exercise of a right embedded in a financial instrument, or the conversion of a convertible bond and the resultant transaction in the underlying financial instrument; • an acquisition or disposal that is solely a result of a transfer of collateral
Transfers between collective investment undertakings that do not involve an investment firm	Transactions executed by a management company as defined in Article 2(1)(b) of Directive 2009/65/EC or an alternative investment fund manager as defined in Article 4(1)(b) of Directive 2011/61/EU that transfers the beneficial ownership of financial instruments from one collective investment undertaking to another, and where no investment firm is a party to the transaction
Give-up transactions and give-in transactions	For the purposes of transparency obligations, ESMA has defined a 'give-up transaction' or 'give-in transaction' as 'a transaction where an investment firm passes a client trade to, or receives a client trade from, another investment firm for the purpose of post-trade processing'.
Transfers of collateral for the purposes of clearing.	Transfers of financial instruments as collateral in bilateral transactions or in the context of a central counterparty (CCP) margin or collateral requirements or as part of the default management process of a CCP

Source: Commission Delegated Regulation (EU) 2017/587, Articles 2 and 13; Commission Delegated Regulation (EU) 2017/590, Article 2(5).

Table A1.2 presents the information that must be reported under MiFIR transparency requirements for equities.

Table A1.2 Equity post-trade information that must be reported

Data that must be reported for all equity trades

Trading date and time	Price currency	Publication date and time
Instrument identification code	Quantity	Venue of publication
Price	Venue of execution	Transaction identification code

Source: Commission Delegated Regulation (EU) 2017/587, Annex 1, Table 3.

Who is responsible for reporting?

The post-trade reporting obligations described above must be met by a Trading Venue (TV), by a Systematic Internaliser (SI), or by an investment firm. If the trade takes place on a MiFID II-recognised trading venue, the venue is responsible for reporting.¹² If the trade takes place on an SI or in an OTC environment, MiFIR obligations require that only one counterparty discloses details of the trade through an APA, subject to a disclosure hierarchy (see Table A1.3).

Table A1.3 MiFIR disclosure hierarchy

		Buyer		
		SI	MiFID II IF	Non-MiFID II IF
Seller	SI	Seller	SI	SI
	MiFID II IF	SI	Seller	IF
	Non-MiFID II IF	SI	IF	n.a.

Note: MiFID II IF refers to an investment firm, as defined in Article 4 of MiFID II.

Source: Commission Delegated Regulation (EU) 2017/587, Article 12.

¹² In the context of equity post-trade reporting, trading venues refer to Regulated Markets (RMs), Multilateral Trading Facilities (MTFs) and third-country trading venues that have been recognised by ESMA as trading venues for the purposes of transparency under MiFID II/MiFIR. See ESMA (2020), 'Determining third-country trading venues for the purposes of transparency under MiFID II/MiFIR', Opinion, 28 July, https://www.esma.europa.eu/sites/default/files/library/esma70-154-165_smsc_opinion_transparency_third_countries.pdf (last accessed 27 April 2021).

A2 Oxera analysis of transactions flagged as TNCP ('transactions not contributing to the price discovery process')

Type of transaction (as defined by ESMA RTS 1)	Example(s)	Oxera assessment for inclusion in liquidity landscape and explanation
(a) The transaction is executed by reference to a price that is calculated over multiple time instances according to a given benchmark, including transactions executed by reference to a volume-weighted average price (VWAP) or a time-weighted average price (TWAP).	A VWAP trade fills the client order with the average price at which a security has traded during the day. Similarly, a TWAP trade gives the client an average price of the specified period.	INCLUDE In some cases these transactions may represent an economic trading interest—for example, where a broker offering a 'guaranteed VWAP' trade agrees to trade with a client at the VWAP on a risk basis and then attempts to meet or beat the VWAP by trading in the market.
(b) The transaction is part of a portfolio trade—i.e. transactions in five or more financial instruments where those transactions are traded at the same time by the same client and as a single lot against a specific reference price.	A portfolio trade is a transaction in more than one security where those securities are grouped and traded as a single lot against a specific reference price. These are typically utilised by fund managers to invest in a basket of securities.	INCLUDE Although it may not be possible for all traders to interact with these types of transaction (as they are conditional on simultaneously trading at least five different instruments), they do represent an economic trading interest.
(c) The transaction is contingent on the purchase, sale, creation or redemption of a derivative contract or other financial instrument where all the components of the trade are to be executed only as a single lot.	Many transactions in cash equities are reliant on the execution of a related derivative(s) transaction that may be traded as a package, including the cash transaction.	INCLUDE It depends on the nature of the transactions. If there was a derivatives trading strategy that involved buying a derivative and an offsetting cash position, that would represent an economic trading interest.
(d) The transaction is executed by a management company as defined in Article 2(1)(b) of Directive 2009/65/EC of the European Parliament and of the Council (6), or an alternative investment fund manager as defined in Article 4(1)(b) of Directive 2011/61/EU of the European Parliament and of the Council (7), which transfers the beneficial ownership of shares from one collective investment undertaking to another and where no investment firm is a party to the transaction.	The transfer of risk managed by the same company.	EXCLUDE
(e) The transaction is a give-up transaction or a give-in transaction—i.e. a transaction where an investment firm passes a client trade to, or receives a client trade from, another investment firm for the purpose of post-trade processing.	Brokers use give-up/give-in transactions where they execute a trade on behalf of another broker (typically an executing broker on behalf of a prime broker) who will provide the resulting fill to their client.	EXCLUDE
(f) The purpose of the transaction is to transfer shares as collateral in bilateral transactions or in the context of central counterparty (CCP) margin or collateral requirements or as part of the default management process of a CCP.	Transfer of shares as collateral and CCP margin and default management transactions.	EXCLUDE
(g) The transaction results in the delivery of shares in the context of the exercise of convertible bonds, options, covered warrants or other similar derivatives.	Transactions to convert rights in shares.	EXCLUDE
(i) The transaction is carried out under the rules or procedures of a trading venue, a CCP or a central securities depository to effect a buy-in of unsettled transactions in accordance with Regulation (EU) No 909/2014 of the European Parliament and of the Council.	Mandatory buy-in transactions	EXCLUDE

Note: The original version of RTS 1 (Commission Delegated Regulation (EU) 2017/587) also included '(h) the transaction is a securities financing transaction;' within the list of transactions defined as not contributing to the price discovery process. The RTS was subsequently amended to remove point (h) by Commission Delegated Regulation (EU) 2019/442.

Source: Oxera analysis.

A3 ESMA definitions for the RTS 1 trade flags

Flag	Name	Type of execution or publication venue	Description
BENC	Benchmark transactions flag	RM, MTF APA CTP	Transactions executed in reference to a price that is calculated over multiple time instances according to a given benchmark, such as a volume-weighted average price or a timeweighted average price.
ACTX	Agency cross transactions flag	RM, MTF APA CTP	Transactions where an investment firm has brought together clients' orders with the purchase and the sale conducted as one transaction and involving the same volume and price.
NPFT	Non-price forming transactions flag	RM, MTF CTP	Transactions where the exchange of financial instruments is determined by factors other than the current market valuation of the financial instrument as listed under Article 13.
TNCP	Transactions not contributing to the price discovery process for the purposes of Article 23 of Regulation (EU) No 600/2014 flag	RM, MTF APA CTP	Transaction not contributing to the price discovery process for the purposes of Article 23 of Regulation (EU) No 600/2014 and as set out in Article 2.
SDIV	Special dividend transaction flag	RM, MTF APA CTP	Transactions that are either executed during the ex-dividend period where the dividend or other form of distribution accrues to the buyer instead of the seller; or executed during the cum dividend period where the dividend or other form of distribution accrues to the seller instead of the buyer.
LRGS	Post-trade large in scale transaction flag	RM, MTF APA CTP	Transactions that are large in scale compared with normal market size, for which deferred publication is permitted under Article 14.
RFPT	Reference price transaction flag	RM, MTF CTP	Transactions that are executed under systems operating in accordance with Article 4(1)(a) of Regulation (EU) No 600/2014.
NLIQ	Negotiated transaction in liquid financial instruments flag	RM, MTF CTP	Transactions executed in accordance with Article 4(1)(b)(i) of Regulation (EU) No 600/2014.
OILQ	Negotiated transaction in illiquid financial instruments flag	RM, MTF CTP	Transactions executed in accordance with Article 4(1)(b)(ii) of Regulation (EU) No 600/2014.
PRIC	Negotiated transaction subject to conditions other than the current market price flag	RM, MTF CTP	Transactions executed in accordance with Article 4(1)(b)(iii) of Regulation (EU) No 600/2014 and as set out in Article 6.
ALGO	Algorithmic transaction flag	RM, MTF CTP	Transactions executed as a result of an investment firm engaging in algorithmic trading as defined in Article 4(1)(39) of Directive 2014/65/EU.
SIZE	Transaction above the standard market size flag	APA CTP	Transactions executed on an SI where the size of the incoming order was above the standard market size as determined in accordance with Article 11.
ILQD	Illiquid instrument transaction flag	APA CTP	Transactions in illiquid instruments as determined in accordance with Articles 1 to 9 of Commission Delegated Regulation [MiFIR Level 2] executed on an SI.
RPRI	Transactions that have received price improvement flag	APA CTP	Transactions executed on an SI with a price improvement in accordance with Article 15(2) of Regulation (EU) No 600/2014.
CANC	Cancellation flag	RM, MTF APA CTP	When a previously published transaction is cancelled.
AMND	Amendment flag	RM, MTF APA CTP	When a previously published transaction is amended.
DUPL	Duplicative trade reports flag	APA	When a transaction is reported to more than one APA in accordance with Article 17(1) of Commission Delegated Regulation (EU) on [DRSP RTS]

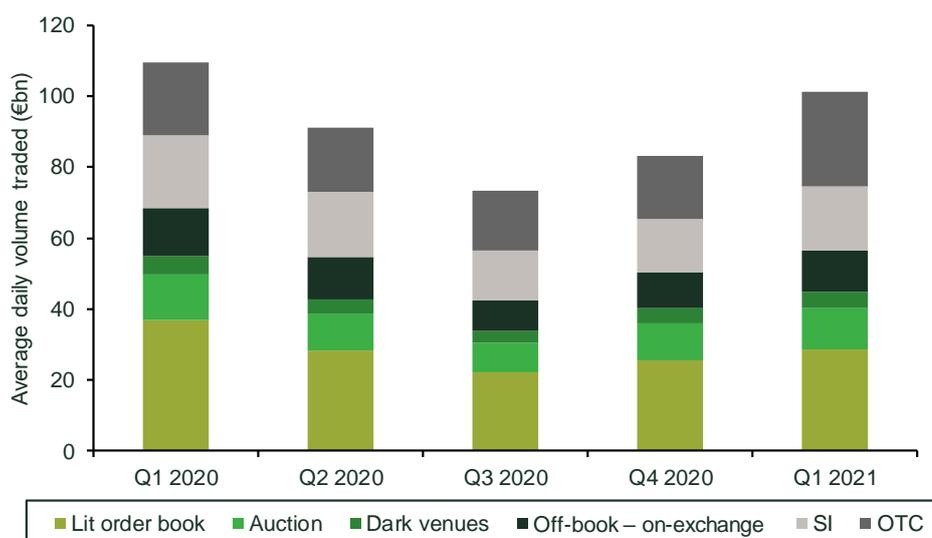
Source: FIX, Market Model Typology (MMT) Mapping Matrix – v3.04, <https://www.fixtrading.org/packages/mmt-initiative-mapping-matrix-v3-%2004/?wpdmdl=44716&refresh=5d40745ad20961564505178> (last accessed 27 April 2021).

A4 Analysis of all reported equity transactions

This appendix presents the equity market landscape in Europe based on all reported transactions—i.e. without any adjustments to account for technical transactions.

Across the market as a whole, the average daily volume traded (ADVT) was €109.4bn in Q1 2020, before reducing to €73.3bn in Q3 2020, and then recovering again to €101.3bn in Q1 2021.

Figure A4.1 Average daily volume traded by trading mechanism at the aggregate European level, Q1 2020–Q1 2021



Note: Data covers cash equities only. The data has not been adjusted for technical transactions. Europe refers to the UK, EEA and Switzerland.

Source: Oxera analysis based on data from big xyt.

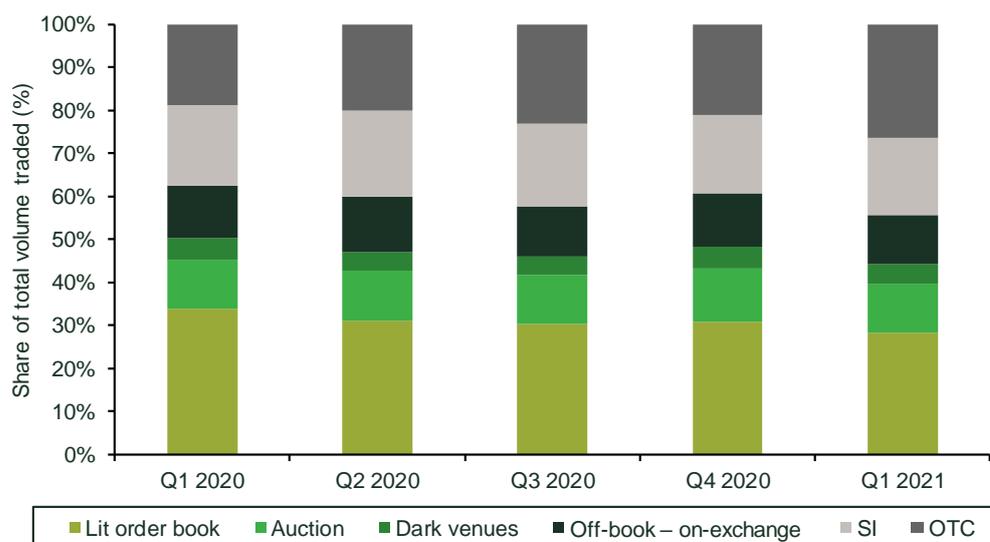
This pattern was similar across trading mechanisms. Figure A4.1 shows the ADVT by trading mechanism for all European markets. Between Q1 2020 and Q1 2021, the following is observed.

- Lit order book ADVT fell by 22.3%, from €36.9bn in Q1 2020 to €28.7bn in Q1 2021, reaching a low of €22.1bn in Q3 2020.
- Auction trading experienced a decline in ADVT, from €12.7bn in Q1 2020 to €11.44bn in Q1 2021, reaching a low of €8.4bn in Q3 2020.
- Off-book – on-exchange trading experienced a decline in ADVT of €1.8bn in Q1 2020–Q1 2021, from €13.3bn to €11.5bn, declining to €8.5bn in Q3 2020.
- Dark trading experienced a decline in ADVT from €5.5bn in Q1 2020 to €4.8bn in Q1 2021, after falling to €3.3bn in Q3 2020.
- SI ADVT declined from €20.5bn in Q1 2020 to €18.2bn in Q1 2021, reaching a low of €14.1bn in Q3 2020.
- OTC ADVT increased from €20.6bn in Q1 2020 to €26.7bn in Q1 2021, after having fallen to €16.9bn in Q3 2020. The largest increase occurred between Q4 2020 and Q1 2021, when ADVT increased by 52%.

In terms of market shares, as shown in Figure A4.2, between Q1 2020 and Q1 2021, we observe a decrease in trading on lit order books and an increase in reported OTC transactions, and, in particular:

- an increase in the share of OTC transactions (from 18.8% to 26.4%);
- small decreases in the share of trading on lit order books (from 33.8% to 28.3%), auctions (from 11.6% to 11.3%), off-book (from 12.2% to 11.3%), SIs (from 18.8% to 18.0%), and dark venues (from 5.0% to 4.7%).

Figure A4.2 Share of total volume traded by trading mechanism at the aggregate European level, Q1 2020–Q1 2021



Note: Data covers cash equities only. The data has not been adjusted for technical transactions. Europe refers to the UK, EEA and Switzerland.

Source: Oxera analysis based on data from big xyt.

A5 Specific insights by trading mechanism

This appendix presents specific additional insights by trading mechanism.

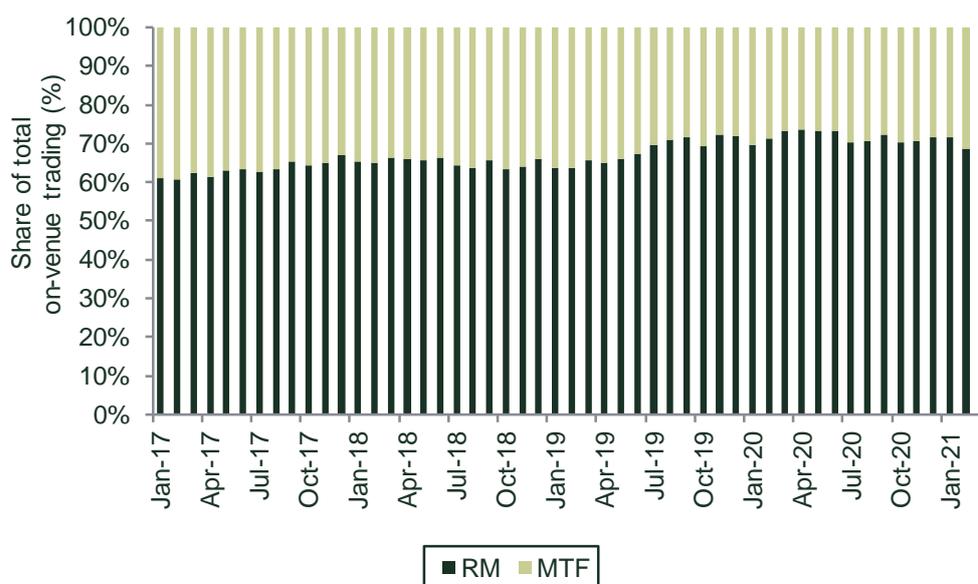
A5.1 On-venue trading

Since 2017, there has been a slight and gradual increase in the share of on-venue trading on primary venues, as traders have sought to execute on regulated markets during periods of market volatility.

Figure A5.1 shows the share of on-venue trading volumes between Regulated Markets (RM) and MTFs. The primary exchange share of total on-venue trading activity increased from 61% in January 2017 to 72% in January 2021.

There was a significant increase in the share of on-venue trading taking place on primary exchanges between Q2 2019 and Q3 2019. This was driven largely by the shift in trading of Swiss-listed equities from EU-based MTFs to SIX Swiss Exchange after EU-Swiss equivalence expired in July 2019.

Figure A5.1 Share of on-venue average daily traded volume by exchange, January 2017–March 2021



Note: Data covers volumes traded on EEA, UK and Swiss trading venues for cash equities only. This includes trades on lit order books, auctions and dark trading on MTFs and/or regulated markets. It excludes ‘off-book – on-exchange’ transactions and trading in Exchange-Traded-Funds (ETFs).

Source: Oxera analysis of big xyt data.

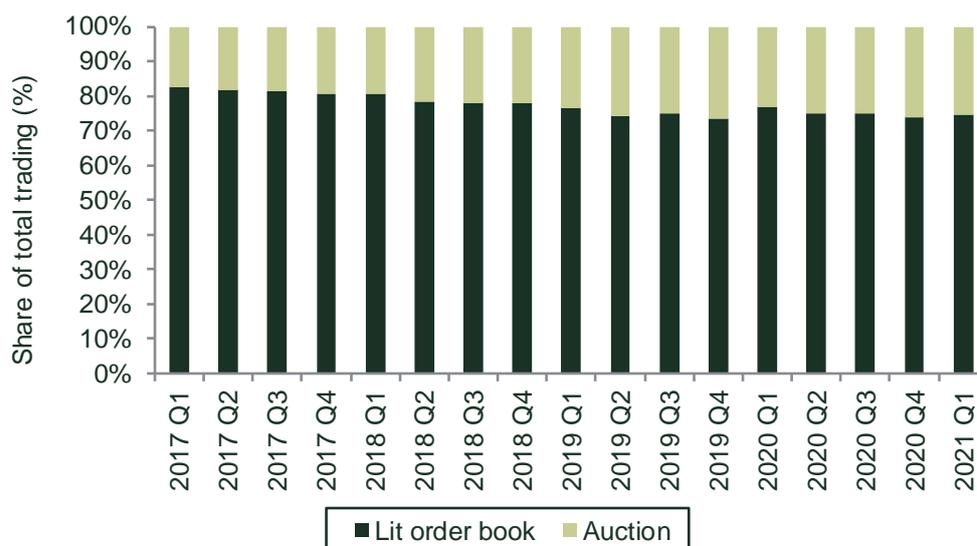
Another well-documented long-term trend has been the increase in trading executed at the end of the day in the closing auction.¹³ This has been partly driven by the rise of index investment and the use of low-cost Exchange-

¹³ See, for example, Raillon, F. (2019), ‘Growing importance of the closing auction in share trading volumes’, AMF Risk & Trend Mapping, <https://www.amf-france.org/sites/default/files/2020-02/growing-importance-of-the-closing-auction-in-share-trading-volumes.pdf> (last accessed 27 April 2021); and section 11 in Oxera (2020), ‘Primary and secondary markets in the EU’, Final report, <https://www.oxera.com/wp-content/uploads/2020/11/Oxera-study-Primary-and-Secondary-Markets-in-the-EU-Final-Report-EN-1.pdf> (last accessed 27 April 2021).

Traded-Funds (ETFs), which often make use of the price in the closing auction for rebalancing and benchmarking purposes.

Figure A5.2 shows how the share of total on-venue volumes executed via an auction mechanism increased through 2017 and 2018, remained broadly stable between 2019 and 2020, and increased slightly in the first quarter of 2021.

Figure A5.2 Share of average daily traded volume by trading mechanism, Q1 2017–Q1 2021



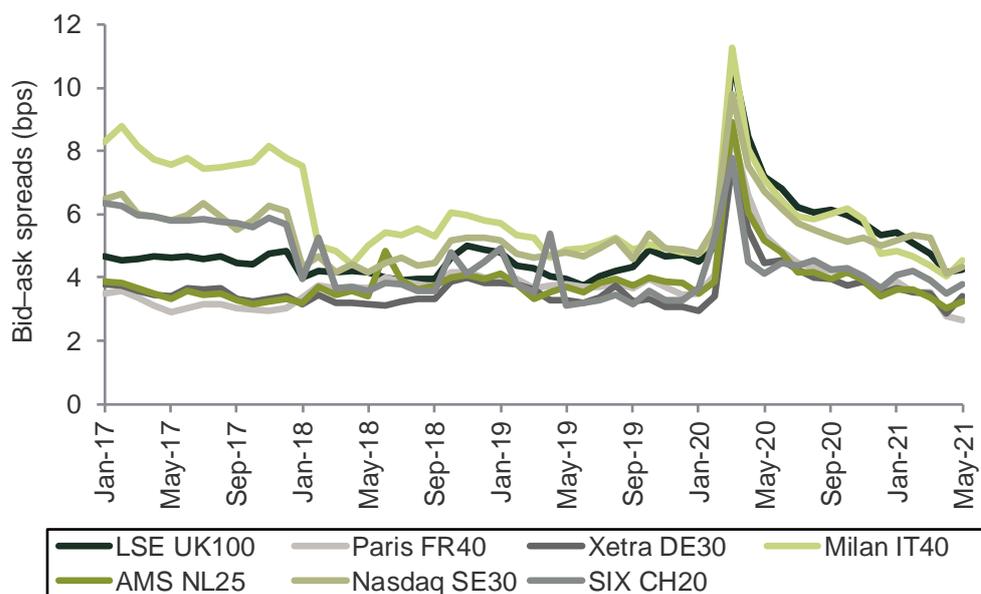
Note: Data covers cash equities only, traded on lit order books or auctions based in the EEA, UK and Switzerland. 'Auction' includes opening, intraday, closing and other auction mechanisms identified in the big xyt data, but excludes periodic auctions.

Source: Oxera analysis of big xyt data.

Over the same period, competition for equity trading has led to a fall in spreads on primary exchanges for the trading of stocks included in main European indices.¹⁴ Figure A5.3 shows how bid–ask spreads for the main Swiss, Italian and Swedish indices fell from January 2017 to December 2019, while spreads for the German, French, Dutch and UK indices remained broadly stable over the same period. All indices experienced a significant increase in bid–ask spreads in March 2020 as a result of COVID-19.

¹⁴ For further discussion, see section 12 of Oxera (2020), 'Primary and secondary equity markets in the EU', Final report, <https://www.oxera.com/wp-content/uploads/2020/11/Oxera-study-Primary-and-Secondary-Markets-in-the-EU-Final-Report-EN-1.pdf>

Figure A5.3 Bid-ask spreads by index, January 2017–March 2021



Note: Data for each index refers to weighted average ‘at touch’ bid-ask spreads, where weights are based on value traded for each component stock.

Source: Oxera analysis of big xyt data.

This section presents the equity trading and liquidity landscape by jurisdiction to assess the flows of trading activity following the UK’s withdrawal from the EU.

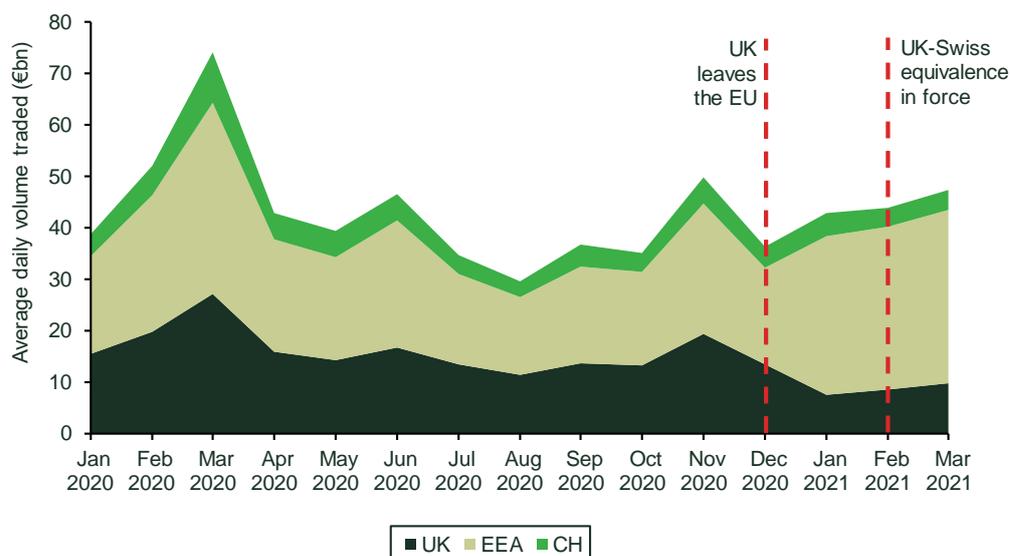
The first part presents the on-venue liquidity landscape. On-venue trading covers lit order book trading, auctions, and dark trading on MTFs and/or regulated markets. In the second part, we present the full liquidity landscape, including OTC and SI transactions, based on both total reported transactions and filters applied to remove technical transactions.

A5.2 On-venue trading by jurisdiction

This section presents the on-venue equity trading and liquidity landscape by jurisdiction to assess the flows of trading activity following the UK’s withdrawal from the EU.

Figure A5.4 shows the average daily trading volumes on UK-, EEA- and Swiss-based trading venues.

Figure A5.4 On-venue average daily trading volume by jurisdiction, January 2020–March 2021



Note: Data covers cash equities only. ETFs are excluded. ‘On-venue’ trading in this chart includes the following trading mechanisms: Lit Exchange/MTF, Auctions, and Dark MTF. It excludes the category ‘off-book – on-exchange’. OTC and SI are also excluded. UK refers to volumes that are traded on venues based in the UK; EEA refers to volumes that are traded on venues based in the EEA; and CH refers volumes traded on the SIX Swiss Exchange based in Switzerland.

Source: Oxera analysis of big xyt data.

Over the period, the following trends can be observed.

- The average daily trading volume on EEA-based trading venues increased by 17%, from €27.6bn in Q1 2020 to €32.3bn in Q1 2021.¹⁵ This represented an increase in the EEA-venue share of overall European trading activity of around 20 percentage points (from c. 50% to c. 70% over the period).
- The average daily trading volume on UK-based trading venues decreased by 59%, from €20.8bn in Q1 2020 to €8.6bn in Q1 2021.¹⁶ The UK-venue share of overall European trading activity fell from around 40% to around 20% over the period.
- The average daily trading volume on SIX Swiss Exchange, as the only Swiss-based trading venue, decreased by 40%, from €6.63bn in Q1 2020 to €3.96bn in Q1 2021. In terms of overall European trading activity, the share of SIX fell slightly, from just over 10% to around 8% over the period.

The significant drop in quarterly volumes for UK- and Swiss-based venues in Q1 2021 compared with Q1 2020 is explained partly by the significant spike in trading activity on these venues in March 2020 as a result of COVID-19. In

¹⁵ Volumes traded in the EEA include trades executed on the following venues: Aquis Exchange Europe, Athens Stock Exchange, BLINK MTF, Bolsa de Madrid, Borsa Italiana, Cboe DXE, Cboe NL LIS, Equiduct, Euronext Amsterdam, Euronext Brussels, Euronext Lisbon, Euronext OTC, Euronext Paris, Euronext Smartpool, Irish Stock Exchange, ITG Posit, Liquidnet EU, NordicOmx, Oslo Børs ASA, Prague Stock Exchange, Sigma X EU MTF, Turquoise Europe, Turquoise Europe Plato Uncross, Wiener Börse AG, WSE and Xetra.

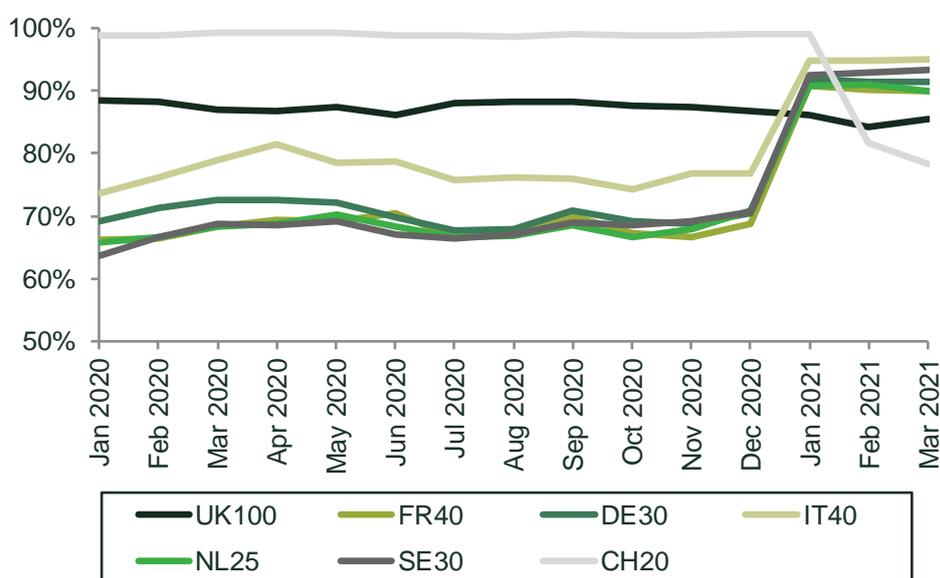
¹⁶ Volumes traded in the UK include trades executed on the following venues: Aquis Exchange, Cboe BXE, Cboe CXE, Cboe LIS, Cboe TDM, Instinet Blockmatch, ITG Posit UK, Liquidnet, LSE, Sigma X MTF, Turquoise, Turquoise Plato Uncross and UBS MTF.

fact, in Q1 2020, a large volume of trading on Swiss blue-chips led to SIX Swiss Exchange becoming the largest trading venue in Europe for a brief period in March 2020.

Between December 2020 and January 2021, trading volumes on EEA-based venues increased significantly, while volumes decreased on UK-based venues. This can be attributed to the different approaches taken by the ESMA and FCA to the Share Trading Obligation (STO),¹⁷ following the UK's withdrawal from the EU, as well as the setting-up of EU-based operations by UK-based MTFs.

This shift in trading volumes has been driven largely by the re-domiciling of trading volumes in EEA shares onto venues based in the EEA. Figure A5.5 shows how the proportion of trading in the main European indices on EEA trading venues increased from around 65–75% in January 2020 to around 90–95% in March 2021.

Figure A5.5 Proportion of on-venue trading in domestic jurisdictions, January 2020–March 2021



Note: For UK100, percentages refer to the share of trading on venues based in the UK. For CH20, percentages refer to share of trading on SIX Swiss Exchange. For all other indices, percentages refer to share of trading on venues based in the EEA.

Source: Oxera analysis of big xyt data.

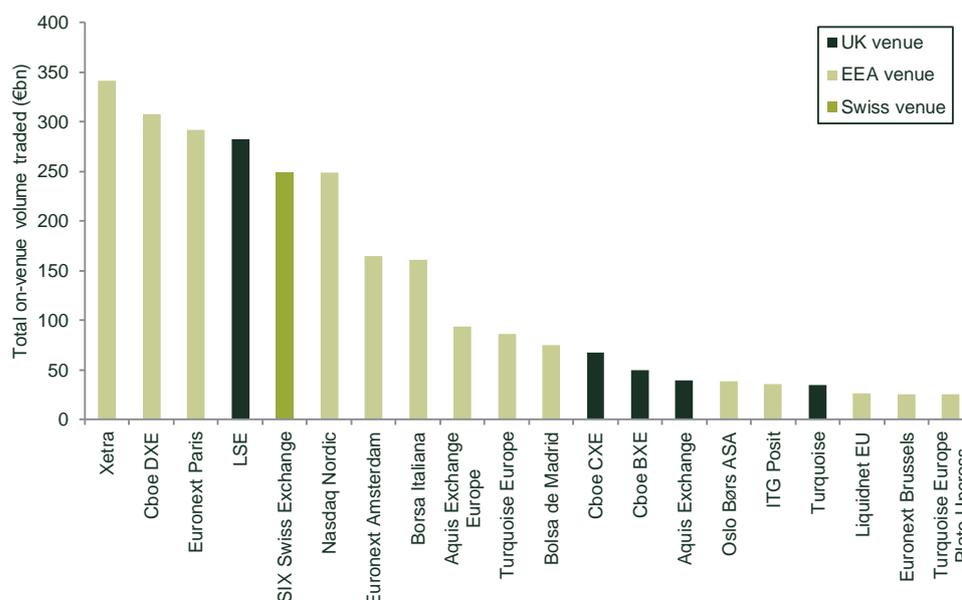
Between January and March 2021, the share of trading on UK-based venues increased slightly. Despite the impact of the EU STO, UK-based volumes have been boosted by the granting of reciprocal equivalence for Swiss and UK-based venues, and the re-listing on UK venues of over 200 previously removed

¹⁷ ESMA stated that the trading of shares with a European Economic Area (EEA) ISIN on a UK trading venue in GBP by EU investment firms will not be subject to the EU STO, implying that shares quoted in EUR would be subjected to the EU STO. On the other hand, the FCA stated that it 'will use the Temporary Transitional Power (TTP) to avoid disruption and allow firms to continue trading all shares on EU trading venues and SIs. See ESMA (2020), 'ESMA sets out final position on Share Trading Obligation', 26 October, <https://www.esma.europa.eu/press-news/esma-news/esma-sets-out-final-position-share-trading-obligation-0> (last accessed 27 April 2021); Financial Conduct Authority (2020), 'FCA sets out its approach to the share trading obligation', 4 November, <https://www.fca.org.uk/news/press-releases/fca-sets-out-its-approach-share-trading-obligation> (last accessed 27 April 2021).

Swiss shares.¹⁸ The reduction in the share of trading in Swiss blue-chips on SIX Swiss Exchange can also be seen in Figure A5.5.

In terms of individual venues, the largest single trading venue (by ADVT) in Q1 2021 was Xetra, followed by Cboe DXE, Euronext Paris and LSE (as shown in Figure A5.6).

Figure A5.6 Total value traded on-venue by venue, Q1 2021



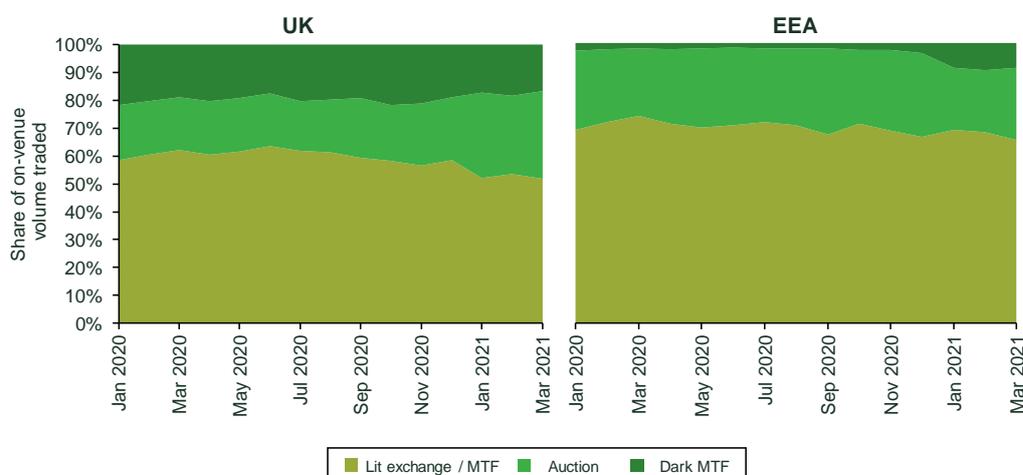
Note: Data covers cash equities only. ETFs are excluded. Values traded are based on all reported transactions, without any adjustments to remove technical transactions. 'On-venue' trading in this chart comprises lit order book trading, auctions and dark trading on MTFs and/or regulated markets. It excludes the category 'off-book – on-exchange'.

Source: Oxera analysis of big xyt data.

- Figure A5.7 shows the share of on-venue trading volumes on UK- and EEA-based venues by trading mechanism. Between January 2020 and March 2021, the following was observed. The share of UK on-venue trading on lit exchanges and MTFs decreased in January 2021, from around 60% to around 52%. For the EEA, the share remained broadly stable at around 70%.
- The share of UK on-venue trading on auctions increased from around 20% to just over 30% in January 2021. For the EEA, the share decreased at the same point in time, from around 30% to around 22%.
- The share of UK on-venue trading on dark MTFs decreased in January 2021, from around 22% to around 17%. For the EEA, the share increased from just over 3% to almost 9%.

¹⁸ HM Treasury (2021), 'Share trading obligation equivalence decision for Switzerland now in force', 3 February, <https://www.gov.uk/government/publications/share-trading-obligation-equivalence-decision-for-switzerland-now-in-force/share-trading-obligation-equivalence-decision-for-switzerland-now-in-force> (last accessed 23 April 2021).

Figure A5.7 Share of UK average daily trading volume by trading mechanism, Jan 2020–March 2021



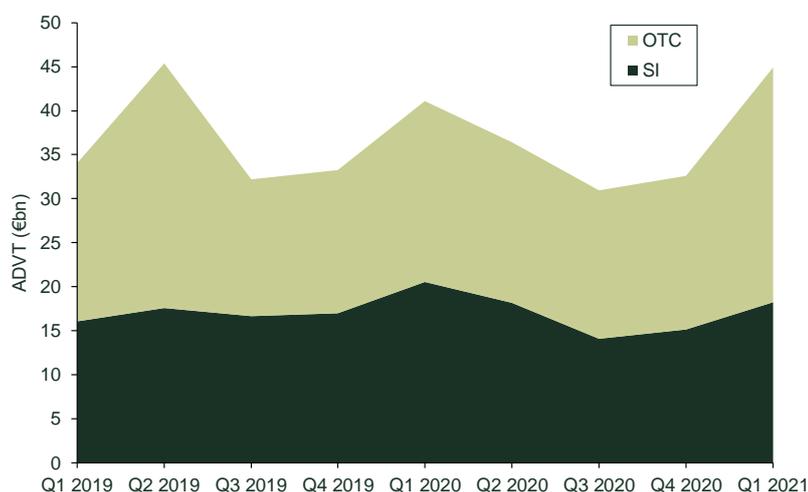
Note: Data covers cash equities only. UK refers to volumes traded on UK-based trading venues. EEA refers to volumes traded on EEA-based trading venues. 'On-venue' trading in this chart includes the following trading mechanisms: lit exchange/MTF, auction and dark MTF. It excludes the category 'off-book – on-exchange'.

Source: Oxera analysis of big xyt data.

A5.3 OTC/SI

Figure A5.8 below shows all reported SI and OTC trading volumes between Q1 2019 and Q1 2021. The data shows how total reported OTC volumes increased relative to SI volumes in both Q2 2019 and Q1 2021.

Figure A5.8 Off-venue average daily volume traded by trading mechanism, Q1 2019–Q1 2021



Note: Data covers cash equities only, based on trades reported by Cboe TDM, LSE Tradeecho, Nasdaq Nordic, Oslo Børs and SIX Swiss Exchange.

Source: Oxera analysis of big xyt data.

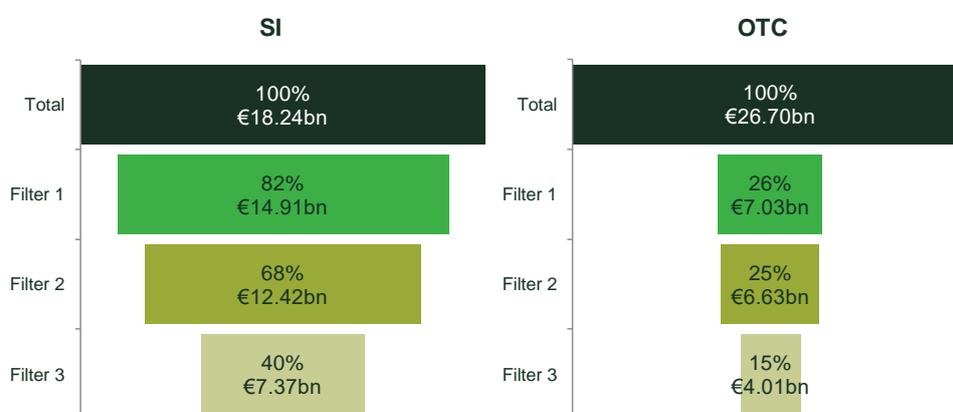
Feedback from market participants indicates that the two sharp increases in OTC relative to SI volumes traded may have been linked to changes in the post-trade reporting rules. The sharp increase in OTC volumes in Q2 2019 coincides with updated ESMA guidance on the reporting of 'RFMD give-up'

trades.¹⁹ This ESMA guidance clarified that such trades should be reported as off-venue, non-price-forming trades. The increased OTC reported transactions in Q1 2021 may be linked to the removal of UK stocks from the EU STO²⁰ and/or due to increased inter-company transfers following the UK's departure from the EU and the setting-up of new operations based in the EU.

As noted in section 3 above, making adjustments to remove 'non-price-forming' trades and trades executed outside regular hours causes the share of SI and OTC trading to fall.

Figure A5.9 below shows how the adjustments applied in section 3 affect the ADVT on SIs and OTC in Q1 2021. For OTC trades in particular, a significant proportion of volumes were explicitly flagged as 'non-price-forming' or 'not contributing to the price-discovery process', or were carried out in a currency other than the traded currency.

Figure A5.9 Average daily volume traded (€bn), Q1 2021



Note: Data covers cash equities only, based on trades reported by Cboe TDM, LSE Tradeecho, Nasdaq Nordic, Oslo Børs and SIX Swiss Exchange. See the note in Figure 3.2 for an explanation on the different filters. Percentages refer to proportion of total (unadjusted) SI or OTC volume.

Source: Oxera analysis of big xyt data.

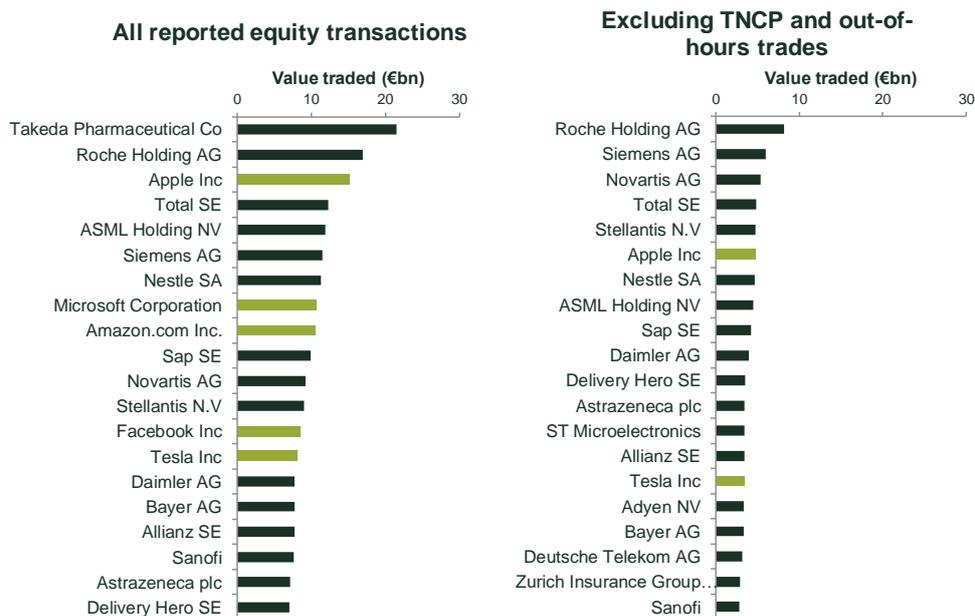
Stock-level analysis suggests that a proportion of the total SI volumes that are removed following the adjustments described above are transactions in US-listed stocks.

Figure A5.10 shows that, when unadjusted volumes are considered, the top 20 most actively traded stocks on SIs in Q1 2021 included a number of US technology firms (e.g. Apple, Amazon and Tesla). Although these trades will be included in off-venue volumes, the on-venue volumes in these stocks take place on venues outside of Europe. The presence of US-listed firms reduces after TNCP and out-of-hours trades are removed in the adjustment.

¹⁹ See ESMA Guidance on MiFIR Transparency topics.

²⁰ See ESMA (2019), 'Impact of Brexit on the trading obligation for shares (Article 23 of MiFIR)', public statement, ESMA70-154-1204, https://www.esma.europa.eu/sites/default/files/library/esma70-154-1204_revised_public_statement_trading_obligation_shares.pdf (last accessed 28 April 2021).

Figure A5.10 20 most actively traded SI stocks, Q1 2021



Note: Data covers cash equities only. ETFs are excluded. Light green bars represent stocks of US-listed companies. 'TNCP' refers to transactions not contributing to the price discovery process.

Source: Oxera analysis of big xyt data.

