FIA EPTA response to the IOSCO consultation on
Market Data in the Secondary Equity Markets (CR03/2020)
26 February 2021

Introduction

The FIA European Principal Traders Association (FIA EPTA) welcomes the opportunity to respond to the International Organization of Securities Commissions (IOSCO) Consultation Report on market data in the secondary equity markets.

FIA EPTA represents 30 independent European Principal Trading Firms (PTFs) which deal on own account, using their own money for their own risk, to provide liquidity and facilitate risk-transfer in exchangetraded and centrally-cleared markets for a wide range of instruments, including shares, options, futures, bond and ETFs. As market makers and liquidity providers, our members contribute to efficient, resilient, and high-quality secondary markets that serve the investment and risk management needs of end-investors and corporates throughout Europe. FIA EPTA's members are based in the Czech Republic, Germany, Ireland, The Netherlands and the UK.

Given our background, we will address IOSCO's questions from our experience in the European market context. However, as comparable developments regarding market data are evident in all developed financial markets, both in terms of usage and of commercial dynamics, we trust that our comments will be helpful to IOSCO's objective to gain a global perspective on this important issue.

In today's markets, market data is of crucial importance for a wide range of investors and market participants – including FIA EPTA member firms. In order for our members to effectively make markets and provide liquidity, market data is essential and it would be impossible for our members to play the role they have in financial markets without market data. Our members require comprehensive pre-trade (order book) and post-trade (trade ticker) market data provided at the lowest latency for trading and risk decisions, sourced directly from the trading venue in co-location facilities.

In our response we argue that market data provision in current European markets is inherently characterised by providers with a dominant market position, with each trading venue operating as a de-facto "mini-monopoly" in respect of the raw market data from that venue, i.e. the orders, quotes and trades that are sent to and occur on their venue. Due to this lack of competition market data fees are high and becoming increasingly prohibitive. In Europe, market participants are obliged under securities law to consume market data but the dominant position of market data providers allows for little negotiation in terms of cost. This acts as a major barrier to entry for new firms while stifling innovation and competition. This not only distorts efficent market functioning but ultimately disadvantages end-investors as it is they who are finally paying for high market data costs as those are passed on in the financial system.

We would suggest that data for the purposes of making an investment decision, assessing best execution, transaction cost, portfolio composition analysis, and regulatory compliance should be made available at reasonable cost while duplicative fee structures which require firms to pay multiple times for that same data sets when they using these for mulitple purposes (including risk management and compliance) should be viewed as inappropriate.

For jurisdictions with fragmented markets such as Europe, a consolidated, real-time post-trade tape system would further enable market participants, including institutional investors, to maintain an effective and operabale overview of the market and of market liquidity, enabling them to more efficiently carry out their activities on behalf of end-investors.

FIA EPTA believes, fundamentally, in competition to promote innovation and prevent market inefficiencies. Access to market data in this regard is essential, as it is the oil that keeps the engine of our financial markets running. Good quality market data should therefore be available at a reasonable price across all financial asset classes. Transparency and comparability of market data products and associated fees are essential in this regard. The current general lack of both justifies targeted regulatory intervention to ensure that the objective of market data being provided at reasonable cost and in a transparent manner will be met.

FIA EPTA has undertaken extensive data analysis underpinning our feedback; key findings are highlighted in our response below. We hope our answers and these data points are useful for IOSCO and we would be pleased to provide any further input to IOSCO as required.

Q1: Please identify the data elements that are necessary for investors and/or market participants to participate effectively and competitively and make informed trading decisions in today's markets. In your response, please consider:
• The type of investor (e.g. retail or institutional) that uses the data;
• How orders are sent to a trading venue (e.g. electronic, manual, direct access by clients; and
• How orders are routed
Please provide the reasons why each element is necessary.

In today's markets, market data is of crucial importance for a wide range of investors and market participants – including FIA EPTA member firms who are market makers and liquidity providers on exchanges across Europe. In order for our members to effectively make markets and provide liquidity, market data is essential and it would be impossible for our members to play the role they have in financial markets without market data. Members require comprehensive pre-trade (order book) and post-trade (trade ticker) market data provided at low latency for trading and risk decisions, sourced directly from the trading venue in colocation facilities.

For post-trade data the price, volume, transaction, published time, institution ID and venue ID flags are all critical elements of the data which should be maintained. There should be no difference between the different types of trading system. For pre-trade data it is important to consider the impact on users if they were required to move their systems to using delayed data. Pre-trade data is often used for fulfilling compliance and risk management requirements and best execution examinations amongst other uses. For most of these use cases the Level 1 (first best bid and offer) data would not be sufficient. Level 1 data does not provide a depth of information necessary to fulfil some other use case obligations. Real-time market data for such activities is not substitutable with other sources such as delayed market data or a Consolidated Tape.

In relation to order routing, FIA EPTA members provide liquidity on practically all European exchanges/trading venues. When doing so, members need access to market data from that particular exchange or market place on which the order is placed on. This information cannot be substituted with market data from other exchanges or trading venues.

Finally, we would like to point out that market data fees are high and becoming increasingly prohibitive. In Europe, market participants are obliged under securities law to consume market data but the dominant position of market data providers allows for little negotiation in terms of cost. This acts as a major barrier to entry for new firms while stifiling innocvation and compeititon. We elaborate further on this in Question 9 but it should be noted that ultimately it is the end-investor who is paying for high market data costs as the cost is passed on in the financial system.

Q2: Are there other data elements that, while not necessary to all market participants, may be necessary for some market participants or business models? Please provide the reasons for your answer.

As outlined above FIA EPTA members require a comprehensive set of pre and post trade market data in order to effectively make markets or provide liquidity. We acknowlege that other market participants may not need as sophisticated market market data as FIA EPTA members. However, we believe it is important that all market participants (including retail investors) have access to a comprehensive set of basic market data, for instance through a Consolidated Tape Provider.

Overall, FIA EPTA members are happy with the type of market data for equites provided by exchanges and other execution facilities. However, it is important to note that the cost of market data is high and has been rising over the past years. We eleborate further on this point in Question 9 and have added a model use case in the Annex to our response, to further illustrate this point.

While equity market data is largely accessible and serving our members' needs, it should be noted that fit for purpose market data in the non-equities space in Europe is lacking. We elaborate further on this point in Question 6.

Q3: Please share your view on defining Core Market Data and how such a definition can be used (for example, for compliance purposes or as a mechanism to make routing decisions, etc.

Due to their unique position in the market, the data needs of market makers and liquidity providers are more comprehensive than for some other market participants. As stated above, FIA EPTA members require comprehensive pretrade (order book) and post-trade (trade ticker) market data provided at the low latency for trading and risk decisions, sourced directly from trading venues in colocation facilities.

However, we acknowledge that for other market participants a less comprehensive set of market data could be considered "Core Market Data" e.g. for the purposes of making an investment decision, assessing best execution, transaction cost, portfolio composition analysis, and regulatory compliance. This would include real-time aggregated pre-trade price depth information to at least 5 price levels for each trading venue and a consolidated post-trade tape of executed transactions. For jurisdictions with fragmented markets such as Europe, a consolidated real time post-trade system would additionally be advantageous.

Availability of cost-effective Core Market Data to investors providers relatively smaller institutional and retail investors access to comparable information as large investors. This should contribute to creating more efficient and integrated markets ensuring that consistent and accurate data is made available to a wide variety of market participants, allowing investors to obtain a full picture of the trading in a product listed across multiple exchanges.

A Consolidated Tape which would includse basic market data information would be very useful in this regard. Despite efforts in MiFID II/MiFIR, no Consolidated Tape Provider (CTP) currently exists in the EU. This is to the detriment of the market as a whole, including retail investors. However, it should be noted that the introduction of a Consolidated Tape in Europe will by no means be a silver bullet for solving the specific problems in relation to market data as they are also discussed by us here below.

Q4: How is market data used by different types of investors or different functions of your firm? Consider, for example:

- **Type of investor (e.g. retail or institutional)**
- **Trading Desks (proprietary or client-servicing including retail and institutional), Institutional, proprietary)**
- **Compliance**
- **Risk-Management**
- **Back office functions**

As stated above, in order to effectively make markets and provide liquidity, FIA EPTA members require comprehensive pre-trade (order book) and post-trade (trade ticker) market data provided at the lowest latency for trading and risk decisions, sourced directly from trading venues in colocation facilities. Investment firms which operate a systematic internaliser[1] are also obliged to consume this data in order to be able to operate. Real-time market data for such activities is not substitutable with other sources such as delayed market data or a Consolidated Tape.

In addition to data needed for trading/routing decisions, FIA EPTA members also need market data for compliance and risk management purposes. Compliance teams use market data to monitor for market integrity and orderliness purposes. In this context, it is worth noting that market data providers charge separately for this data, so called "nNn-display other." I.e., a certain data set could be purchased for trading purposes but then also be relevant for compliance, in which case this data is charged for separately, meaning that our members estentially pay twice for the same data because it is used for two different purposes, of which one is non-commerical and mandated by law.

FIA EPTA members contend that the category of use "Non-display other" is being used by market data providers as a catch-all to generate additional usage charges from market data subscribers. The use of non-specific usage categories should in our view be explicitly excluded from market data policies.

More generally, the various categories of usage for market data bear no correspondence to the cost to aggregate and distribute market data. It more closely reflects the perceived value in the use of market data which is contradictory to the 'reasonable commercial basis' provisions which in the EEA and UK are set out in MiFID II.

[1] investment firms which, on an organised, frequent, systematic and substantial basis, deal on own account when executing client orders outside a regulated market, a multilateral trading facility (MTF) or an organised trading facility (OTF).

Usage categories result in our members unduly paying multiple subscriptions for the same sets of market data. We recommend that regulatory standards clarify that such duplicative data fees are inappropriate, so that all subscribers of a given user category will be treated in a non-discriminatory fashion and with only the unit of count used to differentiate between the amount of use of a given data set.

Q5: What impact does different uses have on the need to access data? How can these impacts be managed or addressed?

See our response to Question 4.

Q6: What factors should be considered in the context of evaluating "fair, equitable and timely access"? How should these factors be considered?

FIA EPTA members connect directly to exchanges in order to have access to market data. Overall, we do not see any major obstacles in relation to accessing market data in a fair, equitable and timely manner in the equities and the exchange-traded derivatives space. However, in relation to non-equities we have observed a number of issues which hamper the way we are given access to market data. While we consider that regulatory expectations in this regard are clear, we do observe a lack of comlpliance with the relevant requirements by some exchanges. In this regard, FIA EPTA Members consider that regulatory standards should emphasise that any rules in relation to market data access should be actively enforced by supervisors.

By way of further detail: many trading venues and regulated data providers (RDPs) are still not complying with the EU requirement to make transparency data available free of charge 15 minutes after publication. FIA EPTA members believe this is particularly problematic in the case of non-equities products, where we find that the lack of transparency information and the difficulty in accessing which information is available hurts competition and acts as a barrier for entry to new participants in these markets. In particular:

- Certain trading venues and RDPs still do not provide any data free of charge.
- Certain trading venues and RDPs are not publishing data free of charge in a format that can be easily read, used and copied and that is machine-readable. For example, one RDP, widely used for fixed income and derivative trades continues to publish pre-trade data as an image file that cannot be copied and now publishes post-trade data in 2-minute slice files that are not machine-readable. As a result, users have to manually open each 2-minute slice file in order to access the published data. In the EU this directly conflicts with the supervisory guidance from ESMA, which states that "Trading venues, APAs and CTPs should publish information in an electronic format that can be directly and automatically read by a computer, and that can be accessed, read, used and copied by any potential user through computer software that is free of charge and publicly available."
- Certain trading venues and RDPs prohibit (through terms of use) any copying or redistribution of the data provided free of charge, even if these redistributors/third parties are providing services free of charge.
- Certain trading venues and RDPs continue to provide "premium" access to market data for a fee where data is published in a different and more user-friendly format.

Q7: What types of access do trading venues and RDPs provide? Are some forms of access provided only to specific market participants?

See our response to Question 6.

Q8: Please identify the type of access necessary for different investors and/or market participants to participate and make informed trading decisions in today's markets and the rationale for the type of access and identified differences. In your response, please consider:

- **Type of investor (e.g. retail or institutional)**
- **Trading Desk (Proprietary or client-servicing including retail and institutional)**
- **How orders are sent to a trading venue (e.g. electronic, manual, direct access by clients)**
- **Order routing**
- **Business models**
- **Compliance and regulatory issues**

FIA EPTA members note that market data are used throughout the value chain of securities business from research, trading, advice, portfolio management to securities administration and custody. For example, securities services in banks, investment firms or asset managers provide services to institutional investor in various areas such as Net Asset Value (NAV) computation, compliance checks, clients & regulatory reporting, fund administration and custody to name a few all of which require the production of all kinds of reports.

In the exchange space, delayed market data from other trading venues is being used for offering various market models to customers, for brokers to implement the Best Execution, for regulatory supervision, to operate regulatory reporting services, or for index calculations.

We would like to see the data available both real-time delayed (delayed data available in the same format and via the same infrastructure as the live data, just delayed by 15 minutes) and available to download for up to one week after creation.

It is important to note that delayed data cannot be used to make trade decisions and is not a substitute for real time data in the same way as a consolidated tape is not a substitute for post-trade data.

Q9: What issues or concerns arise in the context of fair, equitable and timely access to market data?

See our response Question 6.

Q10: Please share your view on interchangeability of market data between trading venues. If concerns are identified, please provide suggested mechanisms to address them.

Market data is inherently specific to each exchange, with each trading venue operating as a de-facto "mini-monopoly" in respect of its raw market data, i.e. the orders, quotes and trades that are sent to and occur on their venue. There can be no competition between trading venues when it comes to pre-trade market data as it is not possible to substitute the order book data from one trading venue where an investor wishes to trade in that of another.

Q11: How should market data fees be assessed? How could this be implemented in practice? What factors should be considered and how can they be defined or applied?

FIA EPTA believes that the near-term goal should be to achieve a significant improvement in transparency on the current costs and margins on market data. This would require regulatory standards to prescribe uniform accounting methodologies related to the cost of aggregating and disseminating market data. Without clearly defined standards it is likely that methodologies employed by market data providers will be as widely varied as policies and fee schedules are today. This runs contrary to the intention of comparability and assessment of the reasonable costs basis across a range of market data providers.

FIA EPTA members believe that adopting a common methodology will be crucial in examining the issue across a variety of market data providers and propose that the common methodology follows that put forth by the Investors Exchange (IEX)[2].

This methodology shows how market data providers can deliver clear and unambiguous information on costs. These costs can then be simply and clearly allocated to the revenue generating market data products in order to assess the reasonable cost basis of market data fees.

While all market data providers vary, this model provides the flexibility required for all market data providers to adequately account for the costs to aggregate and distribute market data. Exceptions should only be permitted with the publication of an adequate explanation as to how the model does not hold for a market data provider.

We believe that only uniformity in the model will facilitate the aims of comparability and assessment of compliance with the reasonable costs basis provisions.

As long as consistent and transparent reporting by exchanges and other market data providers persists, the actual relationship between exchange costs for producing and disseminating market data and the fees charged to users will remain unclear. However, given the shifting demographics of the exchanges' user base (away from screen-based point-and-click trading to algorithmic trading), we would contend that exchanges have started to adopt "value-based" pricing models.

Over the past 15 years, FIA EPTA has witnessed two major phases of exchange evolution — (i) the transition from privately held companies largely mutually owned by exchange members to public companies, followed (ii) by a period of consolidation to create large regional and global exchange groups. As most exchanges have become publicly listed, there is pressure to provide investors with continual revenue growth. Both research analysts and shareholders typically attach much higher multiples to predictable subscription revenue streams over potentially volatile trading fees and, in particular, will actively compare individual public companies with their peers. We believe that this context may have directly or indirectly led to exchanges focusing on ways to increase their subscriber revenues, and accordingly, the pressures of being a publicly traded company may have been a contributing cause of market data fee increases.

Likewise, FIA EPTA observes that exchanges have had a tendency to converge their commercial offerings in such areas as execution pricing, market microstructure development, and market data products. For example, in the early 2000s two exchanges pioneered the concept of non-display pricing within their market data policies and price schedules. Following the success for these exchanges in implementing these changes charging for non-display usage rapidly became the norm across all major exchanges in the US, Europe and beyond. More recently, the concept of applying additional charges for what we refer to as "Non-display other" usage (intended to capture risk, quantitative analysis, and other non-trading use cases), is gradually becoming more widespread with a further two exchanges adding this to their market data schedules as of 2018.

[2] "The Cost of Exchange Services" (See page 3: Note on Cost Methodology) https://iex-trading.com/docs/The%20Cost%20of%20Exchange%20Services.pdf

Similarly, upon the emergence of significantly more Systemic Internalisers as an effect of MiFID II, most exchanges further amended their market data schedules to capture additional revenues from this market structure change.

FIA EPTA members are not satisfied with the pricing of trading data and has observed dramatic market data cost increases in nearly every Regulated Market since 2016. To illustrate the increases, FIA EPTA has undertaken an empirical analysis into the data through a model use case (Excel model provided separately) for a small principal trading firm in which the usage characteristics remain broadly unchanged over a four-year period. The model use case is set out in the Annex to our response, below. Given the shifting demographics of the exchanges' user base (away from screen-based point-and-click trading to algorithmic trading), we contend that exchanges have started to adopt "value-based" pricing models, where market data users are charged multiple times for the same raw data based on the perceived value of different use cases, and that in certain areas, such as non-display data the fees that exchanges now charge have little relationship to the cost of producing and disseminating the data.

Furthermore, In FIA EPTA's 2019 submission to ESMA's consultation on the development of costs for market data[3], we demonstrated that a hypothetical, representative principal trading firm in Europe would have experienced an increase of 27% in market data costs between 2016 and 2019[4]. These finding are also set out in the below Annex to our present response.

FIA EPTA members are involved in market making and liquidity provision which are high volume, low margin businesses. High fees and significant increases in fixed costs impede our members' ability to provide liquidity and competitively reduce spreads, ultimately leading to increased costs for end investors.

More generally, increased costs associated with market data present a barrier to entry for participants, decreasing efficiency and hindering the continued development of capital markets.

The actual content of pre-trade market data has been subject to modest improvement over the past 10 years with the introduction of order-by-order market depth feeds. More significant changes have occurred to post-trade data as a result of regulatory requirements from MiFID II and MiFIR which saw additional information required to be published but this additional information has no impact upon the price discovery process.

This applies to a lesser degree for market data vendors where some competitive market forces are active but regulators should be sensitive to any complaints from participants regarding anti-competitive behaviours from dominant players with regards to the transparency of pricing, vendor lock-in or contract terms such as bundling of services.

Q12: Please provide details of other products or services related to market data that are provided by trading venues or other RDPs.

See Question 13

Q13: Please share your views on the fees for connected services that are necessary to access essential market data. If concerns are raised, please identify mechanisms to address them.

[3] https://www.esma.europa.eu/file/52533/download?token=gXyHnVjN

[4] https://www.fia.org/sites/default/files/2019-12/FIA%20EPTA_ESMA%20Consultation_Market%20Data_CT_FINAL_09_06_2019%20FINAL_0.pdf
(see pp. 3-6).

Co-location services is a connected service we belive is necessary for FIA EPTA members to access the market data they need at low latency. It must be noted that provision of co-location services, just like market data itself, is a “mini-monopoly” with only one co-location available for any financial market.

Our members have noted that many of the fee schedules pertaining to co-location services are not published by trading venues as the data centre may be managed by a third party. Such third parties rarely publish their fee schedule which hinders price transparency and our ability to consider these fair and non-discriminatory.

We are aware of situations where data centre owners or managers have refused to negotiate quoted prices on the basis that these must be fair and non-discriminatory but without the transparency to justify such claims. Furthermore, for co-locations that are owned and/or managed by trading venues the cost of service provision tends to be higher than for those owned and managed by third party providers specialised in data centre services.

While no supervisory issue has been raised in relation to co-location services, we believe relevant authorities should address the lack of transparency surrounding co-location service provision.

Q14: Please provide your view on the need for consolidated data where there are securities trading on multiple trading venues. What should be the primary objectives of consolidated data and what outcomes should it lead to? How should these objectives and outcomes inform the nature of the consolidated data made available?

FIA EPTA strongly believes that there is a need for consolidated data, preferably in the form of a real-time, post-trade Consolidated tape (CT) for both equities and non-equities. FIA EPTA believes 100% coverage of all relevant asset classes is vital, as otherwise the added value of the Consolidated tape would be limited and information would still be fragmented, as currently is the case in Europe.

FIA EPTA believes that the reason why no consolidated tape provider (CTP) exists to date is that the cost to create this has been perceived as too high without adequate financial incentives. However, we believe this can be addressed by clarifying that trading venues and RDPs must mandatorily contribute post-trade data to the CTP at no charge. To compensate exchanges and RDPs, we believe revenues from the CTP should be allocated back, based on the contribution of the data to executed liquidity, weighted by value. To ensure the CTP will be non-conflicted and will deliver an effective, high quality and reasonably priced CT, FIA EPTA considers that a robust governance framework, reflecting the interests of all market stakeholders, must be put in place.

We believe the CTP should begin with equities coverage, given the relative better quality of data, but should ultimately encompass other asset classes like bonds and OTC derivatives. An alternative is to allow different firms to start work on separate CTPs per asset class simultaneously, as the CTPs for non-equities and equities will likely be somewhat different in format anyway. Within each asset class it need not be considered a requirement for 100% of EU instruments be available immediately to make a CT viable and a phased implementation on a country of primary listing or issuance basis would still create significant added value for EU market participants from the first day of operation.

To provide a complete picture of liquidity across the fragmented European market landscape, it should absolutely capture Systemic Internaliser and OTC activity. Even non-price forming trades should be included, provided they are flagged properly. It is important to note that the US already has a CT for both equity and non-equity instruments.

FIA EPTA believes an additional element that has so far hindered the establishment of an equity CT in Europe is the complexity of exchange market data contracts. In establishing a CTP, we believe a more efficient model would be to harmonise a standard contract form and require input contributors to contract with a central CTP administrator, rather than requiring multiple, bilateral contracts with individual venues/RDPs.

Further, FIA EPTA members consider that in order to make the CT robust and usable as a real-time tape, all the possible deferrals and delayed reporting periods should be revisited and reduced to reasonable levels including for non-equities. We believe real-time data is crucial if the CT aims to provide a neutral and reliable source of the current market price, giving investors' confidence to trade and supporting best execution. Providing a real-time view of trading activity also consolidates EU financial markets, supporting a more integrated capital market. Beyond this, we also believe there is no reason why the CT cannot be realtime given the technological sophistication of the market as a whole and the low burden, from a technology perspective, of republishing trade events. To the extent any systems would need to be adapted to accommodate real-time reporting, we believe the cost of that investment is more than worthwhile to promote a cohesive view of liquidity across European markets accessible to all investors.

Q15: Is a consolidated data feed the most efficient mechanism to achieve these objectives and outcomes? If not, what are the alternatives that could help achieve these objectives and outcomes? How do these alternatives affect the cost of and access to market data? How can they be addressed?

FIA EPTA believes a Consolidate Tape should be a real-time, post-trade tape that democratises the latency of market data and allows (smaller) eind-investors to have low-cost access to comparable information as large investors. Where markets are fragmented, such as in Europe, this should contribute to creating a more integrated market, ensuring that consistent and accurate data is made available to market participants, and allowing investors to obtain a full picture of the trading volumes of a product listed across multiple exchanges.

We believe a CT will be a tool for investors and professionals alike to monitor executions and transaction costs. We see it being used primarily for best execution, transaction cost, and portfolio composition analysis as well as for regulatory compliance, but we do not underestimate the importance of properly sequenced, last traded price information for trading purposes. In this sense, we believe the post-trade CT may have value for informing pre-trade routing decisions for some investors.

Q16: Please describe any issues or concerns not raised by IOSCO in this Consultation Paper and describe any suggested mechanisms to address them.

n/a

Annex: Market data model use case for a principal trading firm

In order to provide an empirical view into the data, we have provided a model use case (Excel model provided separately) for a small principal trading firm in which the usage characteristics remain broadly unchanged over a four-year period. In this model we have added meta data categories in order to normalise the types of fees charged across exchanges.

Model use case for a principal trading firm – assumptions with respect to the model use cases:

- The firm is active on a broad range of European financial markets and trades both equities and equity-like products in addition to listed derivatives;
- In all cases the firm is subscribing to market data directly from the trading venues;
- Due to the highly integrated nature of EU/UK and Swiss markets and in order to fully represent the costs to a principal trading firm based in the EU we have included SIX Swiss Exchange in our model;
- 10 display users;
- 15 non-display users;
- Up to 6 additional users under Risk/Compliance/Quality Assurance;
- Internal distribution within the group but no external distribution;
- Pricing is based on the most relevant update for each calendar year (normally by January 1 or within early Q1), except for certain cases as noted in the underlying Excel sheet where material changes were made to individual venue market data agreements mid-year;
- Any non-Euro prices were adjusted to Euro using ECB average rates for the relevant calendar year.

As shown in the tables below in our model use case, this hypothetical firm on aggregate would have seen its market data costs rise by ~27% between 2016-2019 (from €917k to over €1.16m).

Table 1 – Year-on-year market data spend for a hypothetical EU principal trading firm

Exchange	Sum of 2016 Total in EUR	Sum of 2017 Total in EUR	Sum of 2018 Total in EUR	Sum of 2019 Total in EUR	% Change 2016-19
Bolsas y Mercado Es-panoles	86,016	86,016	89,984	89,984	**5%**
Borsa Italiana	120,080	125,342	125,342	125,680	**5%**
Cboe Europe	31,483	44,760	45,303	49,085	**56%**
Deutsche Borse	61,878	82,591	152,136	173,526	**180%**
Euronext	68,280	72,180	108,810	111,751	**64%**
ICE Europe	144,303	139,754	159,581	158,664	**10%**
Irish Stock Exchange	9,734	9,984	47,280	17,562	**80%**
London Stock Exchange	72,674	80,607	83,978	98,681	**36%**

Nasdaq Nordic	80,440	81,120	81,120	81,120	**1%**
Oslo Bors	6,228	6,252	6,686	7,760	**25%**
SIX Swiss Exchange	78,044	81,067	78,029	79,623	**2%**
Turquoise	19,842	18,547	18,379	20,202	**2%**
Warsaw Stock Exchange	112,064	117,209	119,883	119,971	**7%**
Wiener Borse	26,220	26,220	30,840	32,100	**22%**
Grand Total	**917,287**	**971,650**	**1,147,351**	**1,165,710**	**27%**

In the 2016-19 period a number of technical and structural changes at different exchange groups specifically impacted certain fee categories. Notably, in the period Euronext launched its new Optiq Market Data gateway during 2017. While, also in 2017, Deutsche Boerse launched the new Xetra Order by Order product. Furthermore, in 2019, Euronext completed its acquisition of the Irish Stock Exchange.

The data set can be further broken down to look at the relative impacts across different types of usage as well as by asset class, as per Tables 2-4 below:

Table 2 – Year-on-year market data spend linked to equities trading

Exchange	Sum of 2016 Total in EUR	Sum of 2017 Total in EUR	Sum of 2018 Total in EUR	Sum of 2019 Total in EUR	% Change 2016-19
Bolsas y Mercado Es-panoles	66,576	66,576	68,760	68,760	**3%**
Borsa Italiana	65,830	71,092	71,092	71,430	**9%**
Cboe Europe	31,483	44,760	45,303	49,085	**56%**
Deutsche Borse	30,678	51,391	108,000	114,720	**274%**
Euronext	55,200	58,080	66,600	70,097	**27%**
Irish Stock Exchange	9,734	9,984	47,280	17,562	**80%**
London Stock Exchange	72,674	80,607	83,978	98,681	**36%**
Nasdaq Nordic	63,880	64,160	58,560	58,560	**-8%**
Oslo Bors	6,228	6,252	6,686	7,760	**25%**
SIX Swiss Exchange	78,044	81,067	78,029	79,623	**2%**
Turquoise	19,842	18,547	18,379	20,202	**2%**

Warsaw Stock Exchange	112,064	117,209	119,883	119,971	**7%**
Wiener Borse	26,220	26,220	30,840	32,100	**22%**
Grand Total	**638,454**	**695,946**	**803,390**	**808,552**	**27%**

Table 3 – Year-on-year market data spend linked to derivatives trading

Exchange	Sum of 2016 Total in EUR	Sum of 2017 Total in EUR	Sum of 2018 Total in EUR	Sum of 2019 Total in EUR	% Change 2016-19
Bolsas y Mercado Es-panoles	19,440	19,440	21,224	21,224	**9%**
Borsa Italiana	59,530	59,752	59,752	59,860	**1%**
Deutsche Borse	31,200	31,200	44,136	56,847	**82%**
Euronext	13,080	14,100	42,210	41,654	**218%**
ICE Europe	144,303	139,754	159,581	158,664	**10%**
Nasdaq Nordic	23,560	23,360	29,760	29,760	**26%**
Warsaw Stock Exchange	20,389	23,246	26,019	26,912	**32%**
Grand Total	**311,502**	**310,852**	**382,682**	**394,921**	**27%**

In some cases, it is not possibly to easily split fees on certain venues by asset class. These fees have been labelled as “Mixed” in the underlying Excel data and the value of these fees (€39,722 in 2019) is included in both Tables 2 and 3.

Table 4a – Year-on-year market data spend (display usage)

Exchange	Sum of 2016 Total in EUR	Sum of 2017 Total in EUR	Sum of 2018 Total in EUR	Sum of 2019 Total in EUR	% Change 2016-19
Bolsas y Mercado Es-panoles	9,360	9,360	11,820	11,820	**26%**
Borsa Italiana	5,280	5,502	5,502	5,610	**6%**

Cboe Europe	7,322	7,118	7,324	7,721	**5%**
Deutsche Borse	18,410	19,620	20,736	23,084	**25%**
Euronext	17,760	16,440	17,400	17,562	**-1%**
ICE Europe	28,678	27,774	31,714	32,324	**13%**
Irish Stock Exchange	2,246	2,496	3,480	2,442	**9%**
London Stock Exchange	24,601	23,961	25,470	28,645	**16%**
Nasdaq Nordic	13,440	13,920	13,920	13,920	**4%**
Oslo Bors	3,849	3,963	4,414	4,470	**16%**
SIX Swiss Exchange	9,246	13,601	13,091	13,359	**44%**
Turquoise	1,538	1,437	1,424	1,562	**2%**
Warsaw Stock Exchange	4,345	4,454	4,900	5,974	**37%**
Wiener Borse	4,920	4,920	5,520	5,580	**13%**
Grand Total	**150,996**	**154,566**	**166,716**	**174,074**	**15%**

Table 4b – Year-on-year market data spend (non-display trading usage)

Exchange	Sum of 2016 Total in EUR	Sum of 2017 Total in EUR	Sum of 2018 Total in EUR	Sum of 2019 Total in EUR	% Change 2016-19
Bolsas y Mercado Espanoles	14,040	14,040	14,760	14,760	**5%**
Borsa Italiana	108,500	108,500	108,500	108,500	**0%**
Cboe Europe	24,162	37,642	37,979	41,364	**71%**
Deutsche Borse	43,468	62,971	82,200	92,899	**114%**
Euronext	33,120	33,120	64,620	66,209	**100%**
ICE Europe	72,347	70,066	80,007	79,435	**10%**
Irish Stock Exchange	7,488	7,488	28,800	9,450	**26%**

London Stock Exchange	35,462	34,540	36,603	47,324	**33%**
Nasdaq Nordic	60,000	60,000	60,000	60,000	**0%**
Oslo Bors	2,379	2,289	2,272	3,290	**38%**
SIX Swiss Exchange	68,797	67,466	64,937	66,264	**-4%**
Turquoise	18,304	17,110	16,955	18,640	**2%**
Warsaw Stock Exchange	103,135	108,057	109,117	108,180	**5%**
Wiener Borse	14,400	14,400	15,600	16,800	**17%**
Grand Total	**605,602**	**637,690**	**722,349**	**733,116**	**21%**

Table 4c – Year-on-year market data spend (non-display other usage – includes risk/compliance and other non-trading usage)

Exchange	Sum of 2016 Total in EUR	Sum of 2017 Total in EUR	Sum of 2018 Total in EUR	Sum of 2019 Total in EUR	% Change 2016-19
Bolsas y Mercado Espanoles	5,616	5,616	5,904	5,904	**5%**
Borsa Italiana	6,300	11,340	11,340	11,570	**84%**
Deutsche Borse	0	0	49,200	55,584	**-**
Euronext	17,400	22,620	26,790	27,980	**61%**
ICE Europe	17,207	16,664	19,029	19,395	**13%**
Irish Stock Exchange	0	0	15,000	5,670	**-**
London Stock Exchange	12,612	22,106	21,905	22,712	**80%**

Warsaw Stock Exchange	4,584	4,698	5,866	5,816	**27%**
Grand Total	**63,718**	**83,045**	**155,035**	**154,631**	**143%**

Table 4d – Year-on-year market data spend (administrative and internal distribution)

Exchange	Sum of 2016 Total in EUR	Sum of 2017 Total in EUR	Sum of 2018 Total in EUR	Sum of 2019 Total in EUR	% Change 2016-19
Bolsas y Mercado Es-panoles	57,000	57,000	57,500	57,500	**1%**
ICE Europe	26,071	25,249	28,831	27,510	**6%**
Nasdaq Nordic	7,000	6,800	7,200	7,200	**3%**
Wiener Borse	6,900	6,900	9,720	9,720	**41%**
Grand Total	**96,971**	**95,949**	**103,251**	**101,930**	**5%**

As the tables above highlight, once one drills into the detail below the top-line increase for the hypothetical firm, there is a wide variation in both the absolute costs across EU venues and the year-on-year percentage changes. Notably, the display user costs increase on a relatively modest basis in percentage terms and have a relative low absolute cost in our model firm given the relatively low number of display users. Non-display usage accounts for the bulk of the absolute spend for our model firm and shows a larger percentage increase when compared with display use. As further explained in our response to Question 3 the largest percentage increase in costs over the period arose from non-trading uses for non-display data. The contribution here comes from a mixture of relatively large percentage increases on certain trading venues alongside other venues adding this as a new explicit pricing category from 2018.

One of the major market structure changes arising from the implementation of MiFID 2 was the broad increase in the number of EU investment firms registering and operating systematic internalisers (SIs) in EU equities. If our hypothetical principal trading firm had registered as an SI at the start of 2018 it would have seen a more significant increase of ~ 83% in overall costs.

Table 5 – Year-on-year total market data spend including market data cost linked to operat-ing an SI in EU equities from 2018.

	Sum of 2016	Sum of 2017	Sum of 2018	Sum of 2019	% Change 2016-19

	Total in EUR	Total in EUR	Total in EUR	Total in EUR	
Grand Total	**917,287**	**971,250**	**1,447,526**	**1,682,273**	**83%**