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PRICING OF MARKET DATA

COMMISSIONED BY THE DANISH
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PREFACE

As documented in two previous reports by Copenhagen Economics, the cost of market data and complexity in data access has increased markedly since the mid-2000s. The first Markets in Financial Instruments Directive (MiFID I), implemented in 2007, did contain a clause that pricing of market data should be made available “*on a reasonable commercial basis*”¹ but it was never successfully implemented.

The revision of the directive, MiFID II² and MiFIR³ (and their delegated acts) addresses to a larger extent pricing of market data. Nevertheless, the fundamental issues still need to be resolved, as market data fees have continued to increase after the implementation.

Against this backdrop, the associations of security dealers in Denmark and Sweden have asked Copenhagen Economics to analyse the efficiency of the market for market data and give recommendations on how to improve it.

We have specifically been asked to:

1. Analyse the functioning of the market for market data
2. Outline the development in market data fees and costs in the past decade
3. Analyse to which extent the current regulatory framework addresses the issues with market data
4. Provide policy recommendations to improve the market

¹ Directive 2004/39/EC of 21 April 2004 on markets in financial instruments, Article 45. See also Article 44.

² Directive 2014/65/EU of 15 May 2014 on markets in financial instruments

³ Regulation (EU) No 600/2014 of 15 May 2014 on markets in financial instruments

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EXECUTIVE SUMMARY

Pricing of market data

Market data contain information indispensable for financial market participants to carry out their core business. Data on bids, asks and last traded price for financial securities (such as equities, fixed income, derivatives and currencies) enables security dealers to decide on which instruments to buy, together with where and when to buy them.

Trading venues⁴ have a monopoly on the market data generated on their trading platform. This provides the major trading venues with extensive market power in selling their market data. Consequently, without effective regulation in place, there is a risk that trading venues will exploit the situation and charge market data fees significantly above the costs of producing such market data. As we outline on the next page, there is evidence that trading venues are doing just that.

Current regulatory principle is not yet implemented in practice

These market errors call for regulation as also recognised at EU level. Already the first directive – MiFID I, which entered into force in 2007 – contained a clause that market data should be provided on a “*reasonable commercial basis*”⁵. This was confirmed in MiFID II/MiFIR⁶ with a delegated regulation to MiFIR stating that market data fees should be set with a “*reasonable relationship to the cost of producing and disseminating that data*”⁷.

However, the established agreement on to ensure reasonable pricing of market data has yet to be transposed into workable, effective mechanisms. We note in particular:

- Lack of regulation and harmonisation of market data policies, i.e. regulation of pricing schemes, market data definitions and the auditing process by trading venues.
- Regulatory authorities are yet to define exactly what costs of “*producing*” and “*disseminating*” market data mean.
- There is no formalised control mechanism to ensure that trading venues calculate costs according to well-defined methods in line with the “*reasonable cost basis*” and set fees accordingly.

In fact, some aspects of MiFID II/MiFIR works (unintended) in the opposite direction to increase market data costs:

- The “*best execution*” requirement in MiFID II establishes by law the need for security dealers to obtain market data from trading venues. This gives trading venues an even stronger market power, which could further push up market data costs.

⁴ Trading venues consist of both Regulated Markets (RM) (former called exchanges), Multilateral Trading Facilities (MTF) and Organised Trading Facilities (OTF).

⁵ Directive 2004/39/EC, Article 44/45

⁶ The successor of MiFID was a new directive, MiFID II, and a regulation, MiFIR. The part regulating market data is contained in MiFIR and further described in the supplementing regulation to MiFIR: “Commission Delegated Regulation (EU) 2017/567 of 18 May 2016 supplementing regulation (EU) No 600/2014 with regard to definitions, transparency, portfolio compression and supervisory measures on product intervention and positions”

⁷ Supplementing regulation to MiFIR

- MiFID II requires many security dealers to establish themselves as a so-called Systematic Internaliser (SI), which the trading venues are using as an occasion to significantly increase market data fees.

Lack of effective implementation is reflected in rising market data fees and erroneous pricing policies

Market data are generated through the trading and execution activities at the trading venues, and market data can be regarded as a by-product of those activities. In other words, it is not possible to execute trades at the trading venues without at the same time creating the raw data that form the basis for selling market data.

In this sense, direct costs of distributing raw market data should be a relatively low-cost service. Furthermore, radical improvements in digital technologies should have put market data fees on a downward trend.

Yet, we find increasing fees and actual revenues likely exceeding the production costs:

- Revenues above costs:
 - The revenue from market data for the European trading venues that we have examined is in the range of EUR 50 to 200 million. Based on interviews with security dealers, we assess the direct costs of distributing the market data to be lower – probably below EUR 10 million for most venues, although our estimate is subject to large uncertainty.
 - The revenues from market data vary substantially, ranging from EUR 14 to 213 million. This variation is difficult to explain from a cost perspective and is more likely demand-driven.
 - To justify the high market data earnings, trading venues allocate all sorts of common costs to market data fees, e.g. marketing, administration, treasury functions, etc.
- Increasing market data fees:
 - Since MiFID I was implemented in the mid-2000s, market data fees have soared. For example, we find an increase in fees net of inflation in the range of 30-60% since 2008, using Nasdaq Nordic Ltd. as a case.
 - This is despite a heavy cost reduction in the underlying technology used, e.g. the cost of transmitting 1 Mbps is today around 1/20 of the cost in 2008.
- New revenue sources:
 - Trading venues have tightened their auditing process and more than doubled the number of different fees in their fee schedule in the past decade, further increasing the cost of receiving market data for the security dealers. This is despite raw market data being a straightforward product to define (see definition in Box 1, chapter 1).

To further shed light on this issue, we recommend that EU regulatory bodies conduct a survey on market data costs among security dealers, investors and data vendors.

High market data fees have negative impact on consumers and enterprises

We find that the elevated market data fees have several negative implications:

- Security dealers provide limited access to view market data for investors, both retail and institutional. This makes the investment decisions of investors less informed and in general hamper the intentions in MiFID II/MiFIR to increase financial market transparency.
- Security dealers themselves try to cut back on their use of market data by limiting the number of employees having access to market data. These cutbacks are costly to implement, give rise to less informed traders and analysts and are entirely unproductive as the marginal costs of distributing the market data within a security dealer are close to zero.
- Limitations in market data can give rise to less efficient financial markets, including less efficient pricing of securities, more volatile and less liquid markets, as well as higher cost of capital for SMEs. The mirror to this is a lower risk-adjusted return for retail or institutional investors such as pensions funds.

Our suggestion: Implement a cost-based price cap on market data

The issues in the market for market data are certainly not unprecedented but rather typical for infrastructure sectors, such as postal services, telecommunications and, power grid operators. Examining how these sectors are being regulated, we have identified how the established regulatory principles in MiFIR and the delegated regulation can be implemented, i.e. to ensure market data will be provided on a “*reasonable commercial basis*”.

Concretely, we recommend the competent regulatory authorities to take three consecutive – effectively – in this order, as they have a clear sequential logic:

- I. **Regulate and simplify the access and fee structure of market data**, including:
 - a) Implementing standard definitions of market data
 - b) Regulating the auditing process of trading venues with a clear definition of costs that can be attributed to the dissemination of raw market data
 - c) Implement a standardised and simplified procedure for accessing market data for data vendors and other third-parties.

In addition to eliminating an important cost-driver, it would improve competition on the secondary market for processed data and providers of consolidated tapes, which currently lack competitive pressure. Trading venues and other financial market participants can join the new, competitive market for processed data on a level playing field.

- II. **Implement a price cap on market data based on a Long Run Incremental Cost (LRIC+) benchmark.** The results from step 1 form the basis for the implementation of a new standardised model for calculation of reasonable fees. Based on experiences from other relevant sectors, this is a model estimating so-called incremental costs, i.e. the cost savings if the trading venue were not to distribute market data anymore but continued all other services.

We expect that this practice will give a significant reduction in fees. We suggest only to regulate raw market data (that are also the focus of step one). The reason being that it is on the raw market data the trading venues have a monopoly – after the market data has been released from the trading venues, different actors are free to process and resell it.

- III. **ESMA assuming its role as a single EU supervisor**, including:

- a) Estimating the cost benchmark
- b) Implement the price caps
- c) Ensure harmonised and simple fee structure, format and access of market data across trading venues in EU.

Overall, we assess that the suggested regulatory measures can be implemented within the framework of MiFID II/MiFIR and their delegated acts. Our suggested measures are natural extensions and consequences and is a matter of effective implementation of the regulation. For example, the delegated regulation on market data states that there should be a “*reasonable relationship*” between fees and costs. This is a policy that is only possible to implement if 1) there is a clear understanding of the product that is regulated, 2) an obligation for trading venues to calculate and report such costs and 3) a method for transforming costs into a fee structure – here we recommend the LRIC+ model used in comparable sectors.

The appointment of ESMA as a single supervisor of market data could be implemented as part of the already on-going revision of the European Supervisory Authorities.

In the absence of a clear, transparent and effective regulatory follow-up to the legislation, the alternative might be that disagreements have to be resolved by the national competition authorities or in court proceedings. There is a legal case for assuming that the directly involved security dealers themselves have the right to use the market data involved in the trade to create parallel market data systems. However, we think this route will be less productive in delivering strong and competitive markets across EU trading venues.

The suggested measures will benefit investors

Ultimately, we expect the suggested measures to benefit investors through three channels:

1. Investors will have better access to market data, making them better equipped to make informed investment decisions.
2. We expect that the price cap on market data will give rise to a significant reduction in the cost of market data, which ultimately will lead to lower net trading fees.
3. The measures will remedy the above-described financial market inefficiencies, which will lead to 1) lower cost of capital, especially for small and mid-cap companies and 2) higher risk-adjusted return for retail or institutional investors (e.g. pensions funds).

CHAPTER 1

**ACCESS TO MARKET DATA IS
INDISPENSABLE FOR TRADING**

In this chapter, we set the stage for analysing and discussing the essential role that access to market data has for the functioning of the financial markets. First, in section 1.1, we describe the market for market data and define the terms that we will be using in the rest of the report. In section 1.2, we discuss the importance of market data for security dealers. In section 1.3, we analyse competition between trading venues from a theoretical point of view and what this means in terms of charging for accessing market data. Finally, in section 1.4, we discuss the legal ownership of market data.

1.1 WHAT IS MARKET DATA?

The core function of a trading venue is to facilitate trading of financial securities, such as equity, bonds, futures, options, etc.⁸ The venue receives orders from different dealers to buy or sell tradable security. Concretely, the dealers “quote” a security together with a quantity that they wish to buy or sell. The trading venue collects all the quotes via its electronic trading system – and whenever there is a match between a buy order and a sell order, a trade occurs.

Trading of securities generates data that are published as a data feed – this is called market data. We can divide the data into two general categories:

1. **Pre-trade data:** Data leading up to a trade that consist of bids and asks for different instruments (as described above).⁹ This is often divided into “level 1” that contains the top of the order book, i.e. best bid/ask, and “level 2” that contains the full order book, i.e. all bids and asks.
2. **Post-trade data:** A trade creates post-trade market data; what was traded, what was the price, which volume was traded, who participated in the trade and when did the trade occur?

The above described pre- and post-trade data are “raw” as it is simply a matter of registering the activity of the market participants, without further processing. Furthermore, the raw data can be processed, to obtain different figures and measures (as described below). We will in this report primarily focus on pricing and access of the raw data (the reason will be discussed in the next section). We have therefore, in Box 1 below, defined the term. The scope of the report includes data of all types of financial instruments

⁸ In relation to equity trading, this includes listing of companies, which allows the company to raise capital and subsequent enable security dealers to trade shares of the stock. Also cf. footnote 4 for definition of trading venue.

⁹ For example, one trader might “ask” EUR 10,000 for 100 shares of a certain company, another might “bid” EUR 9,950 EUR for 100 shares of the company.

Box 1 How we define raw market data

We define raw data as: 1) Pre-trade data: all bids and asks at the venue 2) Post-trade data: data on executed trades.

Both pre and post-trade data should include the following information:

- Price
- Volume
- Identification of the traded security (ISIN, etc.)
- Timestamp

Covering all types of latency (cf. Table 1 below).

The raw market data can be further processed

Raw market data are only relevant to use in an ‘all-machine environments’ – if the raw data should add value to “human” analysts, it needs processing. The simplest form of processing is to format the raw data, so it can be displayed on a screen. In turn, the raw data can be processed in several ways, including:

- Measures of individual instruments, e.g. average and top/bottom prices, volatility, total traded volume.
- More aggregated measures such as total trading volume on different venues, indexes of price or volatility of certain type of instruments.

All these measures have in common that they are based on raw data, and anyone with raw data could produce the figures (given they have the methodology and computational power).

Two main types of consumers

The users of market data can broadly be divided into two main categories: 1) security dealers who need market data to trade on the trading venues¹⁰ and 2) investors who want to follow the market development, cf. Box 2.

¹⁰ Either directly or through a broker.

Box 2 Users of market data

In this report, we – as a simplification – divide users of market data into two categories:

- 1) **Security dealers:** Security dealers (or brokers) that trade on the behalf of investors. It could be banks that trade on the behalf of their retail clients or other institutional clients. It could also be pension funds, asset managers or hedge funds that do their own brokering. As such, the term includes both sell- and buy-side firms.
- 2) **Investors:** Investors are customers of security dealers (and brokers). This could either be retail or institutional investors who use dealers to manage their portfolio or use brokers to carry out trades on their behalf. The investors need market data to decide on an investment strategy and in general to stay informed of market developments. The need for market data varies greatly between different investors. Some retail investors might be satisfied with only using publicly available information, whereas other institutional clients might need market data to the same extent as security dealers.

In the rest of the report, we will use these two terms to describe the users of market data.

Market data can be streamed in real-time or delayed format

Market data can be delivered at different speed, typically denoted latency. In this report, we define four categories of latency, cf. *Table 1*.

Table 1
Different latency of market data

RATING	DESCRIPTION	USE
A+	Very low latency – co-location	High-frequency trading
A	Very low latency – some distance	Electronic execution
B	Low latency – real-time connection	Traders and similar personnel
C	Delayed data	Analysts and back-office functions

Very low latency – A/A+

In electronic execution, it can be critical to have instant update on market data to achieve the best possible margins – nanoseconds can be decisive. This type of trading is based on pre-programmed algorithms which reflect a desired investment strategy of a security dealer. The orders are then automatically executed once certain parameters are fulfilled based on incoming market data. To achieve this very low latency, the market data need to come directly from the trading venue without any processing, as this will slow the market data. In high-frequency trading, it can even be advantage to have a server placed next to the servers of the trading venue to achieve as little latency as possible (A+).

Low latency – B

To perform their job proficiently, traders and sales personnel, and some risk functions, need to have immediate updates on market movements and require low latency data. However, the market data can be processed prior to being received, as the latency it introduces is neglectable in human use.

Delayed – C

Some analysts and personnel in back-office functions are relying on market data to execute their job, but it matters less if the market data are delayed, e.g. 15 min., as they do not work directly with executing orders.

Distributors of market data

The distributors of market data can be divided in two main categories:

- **Trading venues:** As mentioned, very low latency streaming of raw data (A/A+) must come directly from the trading venues. In addition, trading venues also offer a variety processed data to their customers.
- **Market data vendors:** The data are to some extent processed. It is either simply transformed to a visible interface, or has been through a further value-added processing, cf. *Box 3*.

Box 3 Market data vendors

Data vendors' main function is to collect data at the trading venues and deliver it to security dealers and investors. There are three main reasons why security dealers use market data vendors in addition to direct market data access via membership of the trading venue:

- **Simple access:** The process of accessing (and formatting of) raw market data differ from venue to venue. The biggest data vendors have access to all venues and offer to deliver the data in a standardised stream. Thus, it is more convenient to access market data from one market data vendor than, e.g. 7-8 different venues. As such, the vendors act as a consolidated tape.
- **Processed data:** Market data vendors offer a variety of processed market data. It can sometimes be more cost-efficient for the security dealers to buy the processed market data than process it themselves.
- **Other services:** Market data vendors also offer other useful services in relation to security dealing, e.g. chat functions or valuation tools.

1.2 TRADING VENUES HAVE MONOPOLY ON MARKET DATA WHICH IS INDISPENSABLE FOR TRADING

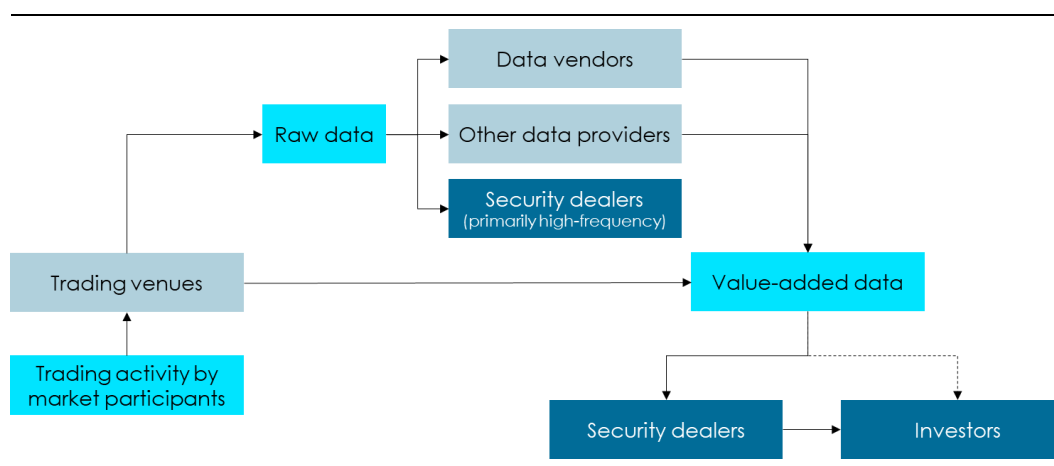
Raw market data (as defined in *Box 1*) are initially only available to the trading venue, where the trading took place, i.e. the trading venue has a pure monopoly of the raw market data generated on their platform, as illustrated in *Figure 1*.

The willingness to pay for market data is very high, as market data contain fundamental knowledge, indispensable when participating on the market for trading; the market data enable security dealers

to make fundamental decisions such as what to trade, where to trade, and at which ask or bid price, etc.

It is rarely enough to have market data from just one venue; to know where their customer can get the best price, security dealers need to obtain market data from all venues that potentially *could* have the best price. Otherwise, their customer might get an inferior trade execution. Thus, getting the right market data from their primary trading venues constitutes more or less a “licence to operate” for security dealers.

Figure 1
Illustration of flow of market data



MiFID II/MiFIR requires security dealers to outright proof that every execution they make on behalf of their customers follows a “best execution” practice. For example, if a security dealer bought stocks on the behalf of a customer, the dealer should document that the customer acquired the stock as cheap as possible. In this way, MiFID II/MiFIR – through the regulation – establishes the need of securities dealers to obtain market data from several trading venues.¹¹

1.3 A PROFIT-MAXIMISING VENUE WOULD PUSH COSTS TO MARKET DATA FEES

There are indications that the MiFID I was successful in terms of increasing competition on trading among trading venues. It allowed for new trading venues (MTFs) to challenge existing exchanges, and it allowed securities to be traded on other trading venues than where they were originally listed.

However, some of the revenue from the trading venues stems from the sale of market data, where the trading venues still hold a monopoly. This means that trading venues still do not experience any competition on a significant share of their business.

¹¹ This is also relevant when checking “the fairness of the price” for OTC products – see ESMA Q&A on Investor Protection, Q2, page 17 (3 October 2018).

From a theoretically point of view, we expect that a profit-maximising venue would push costs from the ordinary trading activity to be covered from market data, i.e., setting relatively low prices for trading and, in turn, charge relatively high fees for market data.¹² This strategy will stipulate trading activity, which will give them valuable market data, where they hold monopoly, and can charge a monopoly price, which will entail larger overall profits. And as a derived consequence market data fees will not be cost-driven but determined by the demand, i.e. willingness to pay from the market data users' side.

This hypothesis will be tested in the next chapter.

1.4 OWNERSHIP OF MARKET DATA

There is currently a legal discussion on the ownership of market data. On one hand, market data are sent to and from trading venues and trades takes place on their execution platforms. Conversely, security dealers supply the bids and asks, that, in essence, are at the origin of the market data.

The legal advisers, Danowsky & Partners, have analysed these topics. The analysis shows that the trading venues' position for claiming intellectual property rights in market data is not convincing, but trading venues are in a position to charge high fees, cf. box 4.

Box 4 Conclusion from the legal assessment on the ownership of market data

To investigate the intellectual property right of market data, Danowsky & Partners has examined whether such rights are of relevance for a market operator that provides market data. Danowsky & Partner did not find convincing support that the rules on securities trading give someone the intellectual property right in market data. In brief, their assessment is based on the following assumptions:

- Information on trading venues' market data is based solely on information from market participants trading on that market, including all input data. All efforts in the presentation of market data are automated.
- The identification of relevant instruments for bids, asks etc. is made by the market participants. Therefore, a venue ought not to have made any investments of importance with regard to the presentation of the materials, and even less in a potential prior database. The fact that trading venues add time stamps to trades, offers or bids does not change this conclusion.

Therefore, it can be concluded that:

- Market data are not the result from a substantial investment with regard to obtaining, verifying or presenting such data.
- Market data are not the original creation by a natural person.

Source: Danowsky & Partners Advokatbyrå

With “no ownership of data”, security dealers would be free to distribute market data generated by themselves, i.e. their quotes and data on executed trades, to whomever they want. This enables them to construct a so-called consolidated tape. A consolidated tape is a stream of market data

¹² See for example Zhijun Chen and Patrick Rey (2013) on competitive cross-subsidisation.

consisting of pre and post-trade data from different trading venues consolidated into one tape. Instead of being streamed from the trading venues, the market data could be gathered directly from the security dealers, as described in *Box 5*.

Box 5 An alternative consolidated tape, circumventing venues

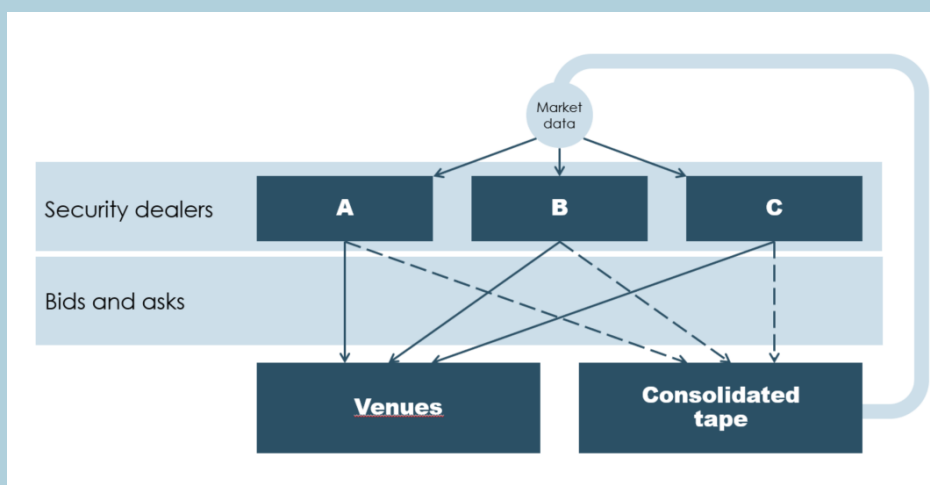
A privately organised consolidated tape between security dealers, circumventing trading venues could be constructed as follows (see also illustration below): When the security dealers submit different bids and asks at the trading venue, they simultaneously submit the ask/bid to a third-party operator, which then distribute the pre-trade data to other participating security dealers. Similarly, when dealers receive information that their bid/ask has been accepted, i.e. post-trade data, they transfer this data to the other security dealers through the third-party operator.

Such a solution could provide a viable alternative to the current high market data fees, although the solution is also not complete:

1. It will require a complex coordination task if security dealers from all 28 member states should participate in such consolidated tape. More realistic, it will only be large security dealers that will have the resources to participate and maybe in more geographically limited areas, e.g. Nordic dealers, French dealers, etc.
2. The approach will introduce latency, at least, in the post-trade data; the security dealers will first receive a confirmation that their quote has been accepted, which they will then have to distribute to the other security dealers. This latency will be irrelevant for latency B and C but not for A/A+.

Consequently, a privately organised consolidated tape, could provide a good alternative for market data with latency B-C for the largest security dealers but will probably not constitute a complete solution.

Illustration of a consolidated tape



Four takeaways from chapter 1

1. Raw market data are a fairly simple product consisting of pre- and post-trade data that come with different latency. Security dealers and investors are the two main market data users.
2. Access to market data from major security dealers contains indispensable information to operate as a security dealer. Trading venues have monopoly on the market data, giving them strong market power.
3. Consequently, we – from a theoretical point of view – expect that trading venues set fees for market data higher than what can be justified from a cost-perspective (this hypothesis will be analysed based on data in next chapter). In turn, trading venues might use some of the earnings from market data and accept lower earnings from regular trading.
4. From a legal point of view, trading venues are entitled to charge fees for market data but cannot claim intellectual property rights. This could open up for security dealers establishing an alternative consolidated tape to broadcast market data.

CHAPTER 2

COSTS OF MARKET DATA

In the last chapter, we concluded that given the market situation for trading venues, market data fees will not be set according to the costs of distributing the market data but determined on users' willingness to pay. In this chapter, we examine data from different public sources to analyse if indeed this appears to be the case.

In section 2.1, we describe the cost of distributing data, i.e. we establish the baseline to which market data fees should be analysed in comparison to. *In section 2.2*, we analyse whether current revenue from market data at the trading venues is likely to reflect the cost of distributing the market data. *In section 2.3*, we document how the market data fees have been increasing in the past decade and analyse the drivers behind. Finally, *in section 2.4*, we analyse the socioeconomic consequences of having highly priced market data.

2.1 ESTABLISHING THE BASELINE: THE COST OF PRODUCING MARKET DATA

Market data are generated through the trading activity at the trading venues. In this regard, market data can be regarded as a by-product of the trading and execution activities. The “production” simply consists of registering the pre- and post-trade data. This is confirmed by Oxera in a report commissioned by a range of European trading venues: “*Market data is a by-product of the overall operation of the trading system*”, and “*it is not possible to provide transaction services without generating market data*”.¹³ Thus, the direct costs of making market data available to security dealers are primarily the cost of distributing data already produced.

The trading venues do not publish the costs involved with producing and distributing the data, so we do not have access to exact figures on the costs. However, security dealers have similar digital infrastructure installed and can on the basis of analysing their own IT costs assess the costs for distributing market data. Using this method – which naturally is subject to large uncertainty – the security dealers assess that the annual distribution costs would likely range from EUR 3-10 million per trading venue. The estimated costs should be compared to a total revenue at the trading venues ranging from EUR 150-2,190 million.¹⁴

The fact that distributing costs are likely to be small, compared to the total revenue, is confirmed by the Oxera study, which highlights that there are “*very low/zero incremental costs of market data*”. The key word here is “*incremental*”. There might be substantial costs in facilitating trading (which is also stressed by Oxera) – however – the isolated costs of distributing the market data to the users are low.

The required latency determines the cost of distributing market data

The costs that do exist in distributing the data will primarily depend on the required latency. Very low latency (A and A+) includes some investments costs in setting up a digital infrastructure that can efficiently stream the market data as well as some ongoing operational costs, to ensure an

¹³ See Oxera (2014). The report commissioned by a range of European venues

¹⁴ At Nasdaq Nordic Ltd and London Stock Exchange Group plc., respectively.

efficient streaming. On the other hand, normal low latency and delayed (B and C) can utilise less advanced IT systems.

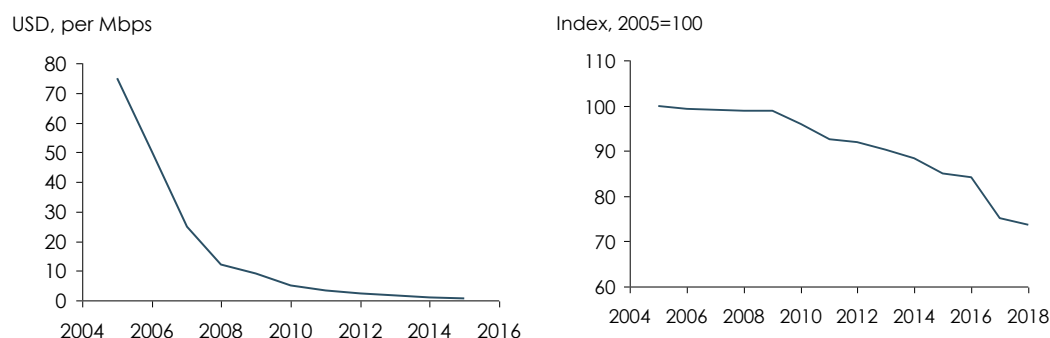
Finally, it should be noted that the costs of setting up access to market data are more or less a fixed cost per security dealer. Once a connection is established, the marginal costs of distributing more data (either to more employees or more data per person) are very low. In the regulatory discussion in section 4.1, we outline exactly which type of cost can reasonably be allocated to the distribution of market data.

If raw market data fees are cost-driven, they should have decreased during the past decade due to development in the underlying technology used in distributing the market data, *cf. Figure 2*. In sectors relying on similar technology, we have also seen declining costs in the past decade. For example, the cost for sending data through a wireless connection to end-consumers has declined significantly since the mid-2000s, despite increasing connection speeds, *cf. Figure 2*.

Figure 2
Costs of data transfer have declined

Internet transit price in US

Price index for mobile services in US



Note: Internet transit price is based on minimal internet package available.

Source: DrPeering.net and U.S. Bureau of Labor Statistics

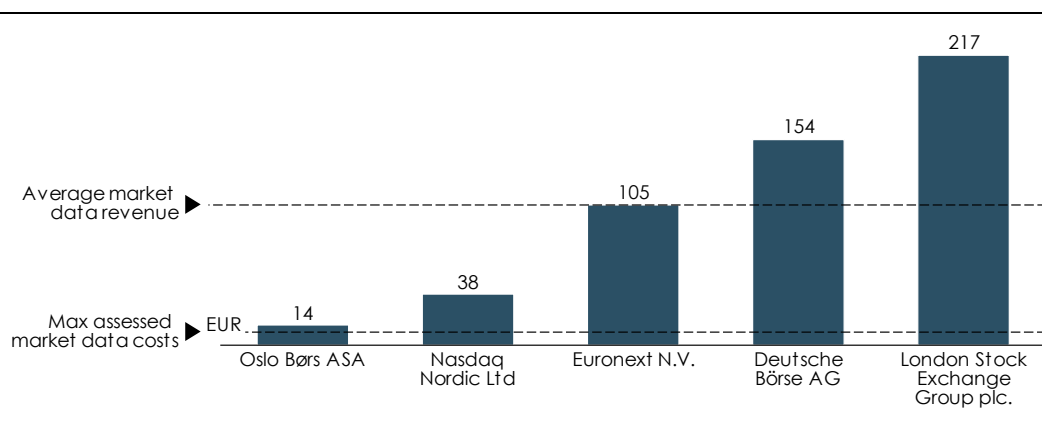
2.2 TRADING VENUES PRICE MARKET DATA HIGHER THAN DISTRIBUTION COSTS

The average market data revenue, from the trading venues examined in this report, is around EUR 100 million, *cf. Figure 3*.¹⁵ Remember that the estimated costs of distribution the data were around EUR 3-10 million. Although the estimate is subject to uncertainty, it shows that the revenue from market data at trading venues is likely to be far higher than what the estimated distribution costs.

¹⁵ In the estimate, we have only included revenue from raw market data to the extent the financial statements allowed it. Some processed data could, however, still be included in figures. See note to Figure 3 for the exact figures included.

Figure 3
Market data revenue at venues

EUR million



Note: The figure shows data for 2017. For London Stock Exchange Group plc., market data revenue includes 'real-time data' and 'other information' but excludes 'FTSE Russell Indexes' as defined in their annual report. For Deutsche Börse AG, market data consists of 'data services' and excludes 'Infrastructure services' and 'index services'.

Source: Annual reports from the venues

The revenue from market data also varies greatly, ranging from EUR 14 to 213 million. Again, this is difficult to explain from a cost perspective. We would expect some variation in costs (depending on how many users the trading venues serve, primarily hardware costs), but the variation in *Figure 3* is hardly only driven by costs of distributing.

2.3 VENUES ARE INCREASING THE COSTS OF ACCESSING MARKET DATA

As documented in section 2.1, the technological progress should have provided decreasing market data costs over the past ten years, as the general costs of streaming information have declined significantly. However, for the past decade the trading venues have increased the cost of accessing market data, indicating market data fees are not cost-driven. Concretely, the trading venues have increased fees through two channels:

1. Introduction of new market data fees and increasing existing market data fees
2. Tougher auditing procedures and increased complexity in terms of market data policies

In the following section, we will go through the two drivers.

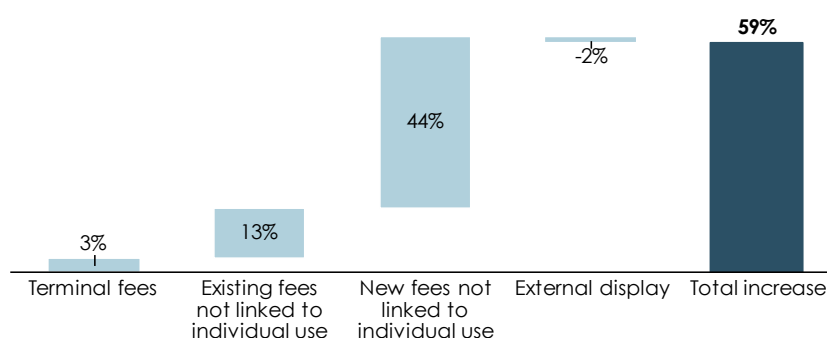
2.3.1 New and increasing market data fees

The increasing market data fees are made of a mix of trading venues increasing existing fees and new fees being introduced. To achieve a total view of how this impact users, we have created a case with a generic small Nordic investments bank (in this example only accessing market data from Nasdaq Nordic Ltd) in 2008 and 2018. The bank is described in the *Box 6* below.

In this case, we find that the market data costs for the bank have increased some 59%, net of inflation, from 2008 to 2018, *cf. Figure 4*. In the case, we have held the data needs of the bank

constant, making the increase solely reflecting higher fees. The main driver of costs for the bank is new fees not linked to individual use. This is for example a “non-display” fee, which was introduced for use of market data in applications.

Figure 4
Increase in market data costs for a small Nordic investment bank from 2008-2018
Decomposition (net of inflation)



Note: End-user fees are fees for accessing the market data in a terminal, i.e. individual use. On top, venues charge a range of other license fees, e.g. a non-display license fee, etc. External display is the costs of allowing a customer of the security dealer to access market data. All fees are outlined in appendix B. Numbers are rounded.

Source: Prices lists from Nasdaq Nordic Ltd.

Box 6 Case: A small generic Nordic investment bank

This case considers a small Nordic investment bank. The bank only trades equity and fixed income and has 20 traders, 20 sales people, and 10 analysts, equally divided between the two asset classes.

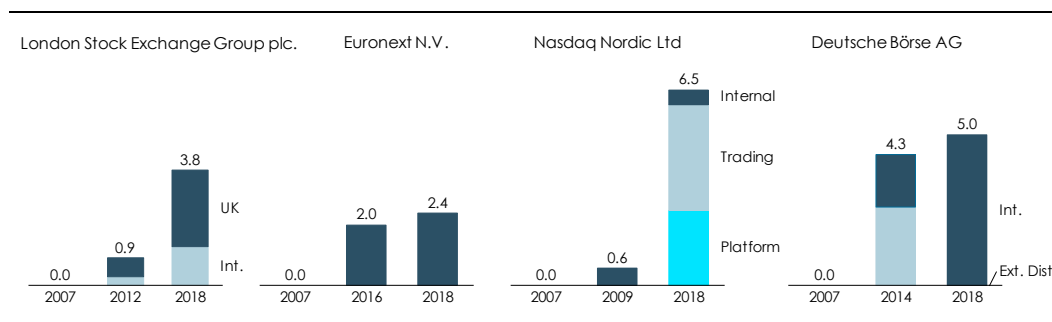
The investment bank only uses Nasdaq Nordic Ltd. and gets all its market data directly from Nasdaq Nordic Ltd. For equity, we assume that traders require real-time total view access, sales require real-time level 2 and analysts require real-time level 1. All fixed-income personnel require real-time level 2, and in addition require real-time level 2 data for derivatives.

The bank also has 30 institutional customers that get real-time level 2 access to equity and fixed income, through the bank's online trading platform.

The case is not a one-to-one representation all security dealers, as they vary in size and the need of market data. If we considered a case with a major investment bank with 200 employees with access to market data (instead of 50) and 120 institutional clients that get real-time level 2 access to equity and fixed income (instead of 30), we find that total market data costs would have increased 27% net of inflation. In that case, the introduction of new fixed fees has a smaller impact on total market data costs, whereas the increase of end-user fees (cost of individual users) has a larger impact.

As illustrated by the case, market data fees not linked to individual access are the biggest driver of market data charges. A particularly costly fee is the non-display license fee, which was introduced by most venues after the first MiFID was implemented, *cf. Figure 5*.

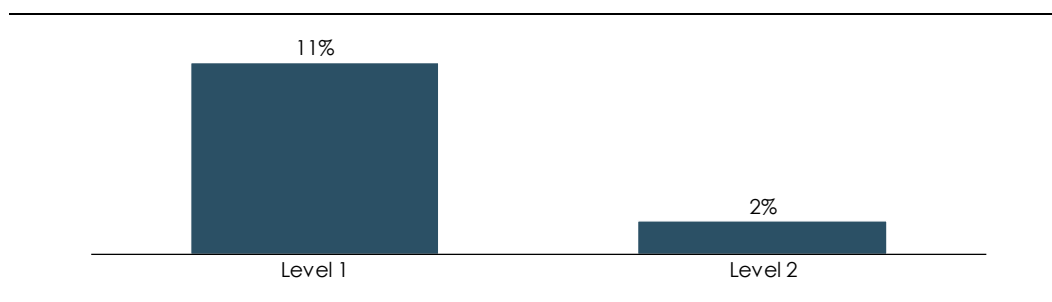
Figure 5
Development in non-display fees
Fixed prices (2018), 1,000 EUR



Note: Different observation years. The increase is deflated with Eurostat's HISP.
Source: Price list from different venues and Eurostat

Taking a broad look across the biggest European trading venues, the market data fees for individual use (end-user fees) have also increased the past decade, in particular for level 1 access, *cf. Figure 6*.

Figure 6
Average increase in price for equity data since 2004-2006 for London Stock Exchange Group plc., Nasdaq Nordic Ltd, Euronext N.V. and Deutsche Börse AG
Real growth (net of inflation)



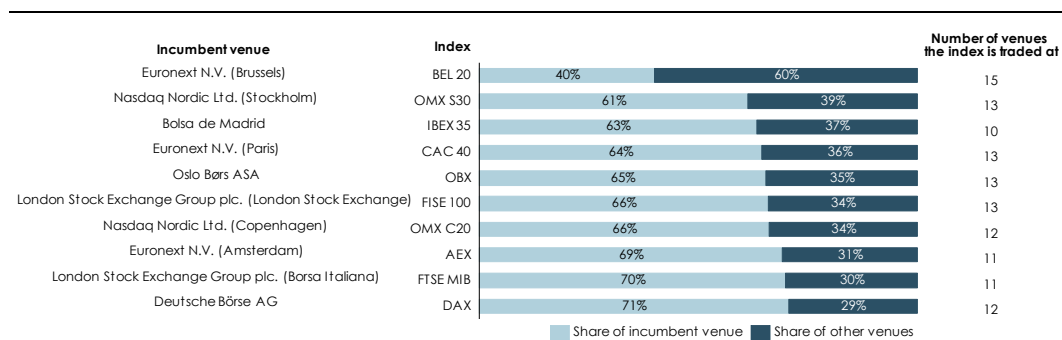
Note: The index is calculated as a simple average of the venues. The figure is deflated with Eurostat's HICP. The starting year varies from 2004-2006.
Source: Price lists from trading venues and Eurostat

Challenger trading venues are increasing market data fees

Usually, large companies (included in the equity indexes of the different countries) are traded on 10-15 different venues. Thus, even though the incumbent venue has the majority of trading in equities, security dealers need to obtain market data from a long list of venues to get the full market picture.

Figure 7
Incumbent venue's share of trading in July 2018

Share of trading of the stock index in each country



Note: The DK Blue Chip index is called OMX C25, however Fidessa refers to OMX C20.

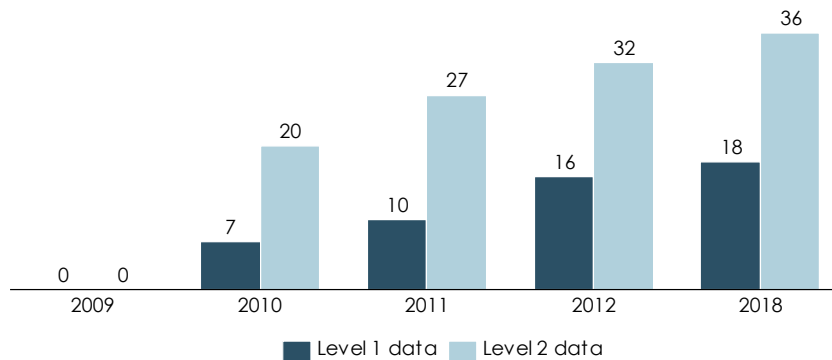
Source: Fidessa

This is the result of the first MiFID that to a certain extent has been successful in allowing new trading venues, denoted Multilateral trading facilities (MTFs) to be established to challenge the incumbent trading venues. For example, around 30% of the trading of German equities included in the DAX index is traded at other venues than the incumbent Deutsche Börse AG, *cf. Figure 7*.

These new venues, the MTFs, have increasingly raised their market data fees over the past fifteen years. Initially, the MTFs had little trading activity and therefore little market data to offer. As a result, they charged very little or not at all for their market data. However, parallel to increasing trading activity – and therefore increasing value of their market data – the MTFs have increased their market data fees, further adding to market data costs for market data users. For example, CBOE Europe Limited, which is an MTF, had no redistribution fee to begin with, meaning that security dealers could redistribute data from CBOE Europe Limited for free. In 2010, the venue introduced a distribution fee, which in 2018 has climbed to EUR 36,000 for level 2 access and EUR 18,000 for level 1, *cf. Figure 8*.

Figure 8
Annual distribution fees of CBOE Europe Limited

1,000 EUR, fixed prices (2018)



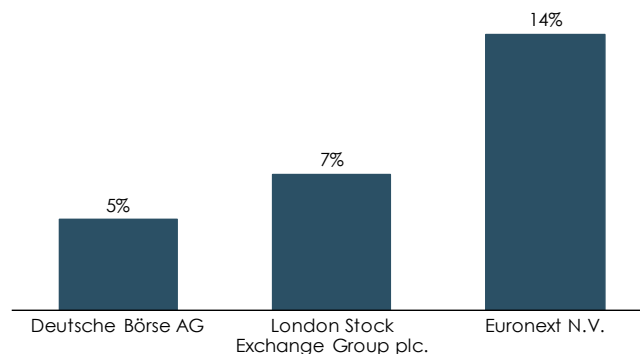
Source: Price lists from trading venue.

2.3.2 MiFID II/MiFIR has – so far – only led to increasing market data fees

As we will describe in chapter 3, MiFID II/MiFIR has an increased focus on market data, compared to MiFID I. However, so far, the regulation has not led to lower market data fees. In fact, market data fees have significantly increased in Q1 2018 after MiFIR was implemented, cf. *Figure 9*.

Figure 9
Increase in market data revenue at trading venues from Q1 2017 to Q1 2018

Real growth (net of inflation)

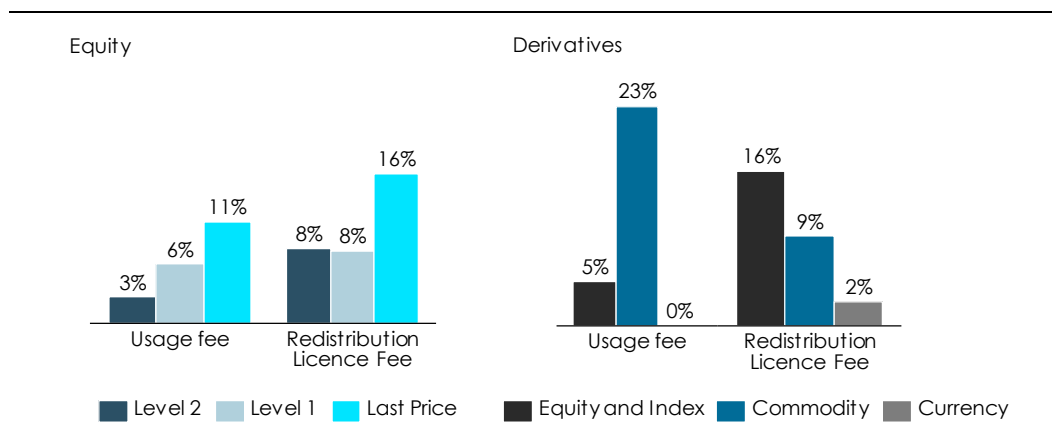


Note: For London Stock Exchange Group plc., market data revenue includes, 'real-time data' and 'other information' but excludes 'FTSE Russell Indexes'. For Deutsche Börse AG, market data consists of 'data services' and excludes 'Infrastructure services' and 'index services'. Financial statement for Nasdaq Nordic Ltd for Q1 2018 was not available.

Source: Annual reports from the trading venues.

The fee increases in 2018 cover a range of different market data products, as shown in *Figure 10* using Euronext N.V. as an example.

Figure 10
Major fee changes in 2018 at Euronext N.V.
Development in fees from 2017-2018, net of inflation



Note: Price changes are deflated with HICP.
Source: Price list from Euronext N.V.

The fact that MiFID II/MiFIR has led to increasing market data fees is also confirmed by ESMA, *cf. quote.*

”

Following the application of MiFID II, we were made aware of substantial increases in the costs of market data, reaching at times up to 400% compared to prices charged prior to 3 January 2018

- Steven Maijoor, chair of ESMA

Source: ESMA (2018): MiFID II Implementation – Achievements and Current Priorities

SI can lead to significant increases in market data costs

In fact, the trading venues have used an aspect of MiFID II/MiFIR as an occasion to increase market data fees. MiFID II/MiFIR requires all security dealers that want to sell directly to their customers (also called to “internalise” customers’ orders) to register as a so-called Systematic Internaliser (SI). Several venues have announced that they have/will charge securities dealers specific license fees for conducting SI activity.

As described in section 1.1, security dealers normally trade on behalf of their customers on trading venues. However, security dealers also have their own trading book containing different securities that they can sell directly to their customers. As such, if an investor requests a specific security, which is on the trading book of the security dealer, they can sell that security directly to the investor, without forwarding the request to the trading venue.

From a commercial perspective, this poses a threat to the venues as they will probably lose trading fees from security dealers. In response, the venues have turned to the domain, where they have leverage on the security dealers: market data. The venues argue that conducting SI is based on price information from their venue, i.e. their market data – and want to impose an additional fee for all clients that potentially could be served directly from the security dealer.

This could reduce the incentives for security dealers to take risks on their books in order to provide immediate and continuous liquidity to investors. Consequently, investors would be less willing to trade resulting in an overall reduction of market liquidity, hereby undermining the regulatory purpose of the SI regime.

2.3.3 Dense auditing procedures and increased complexity

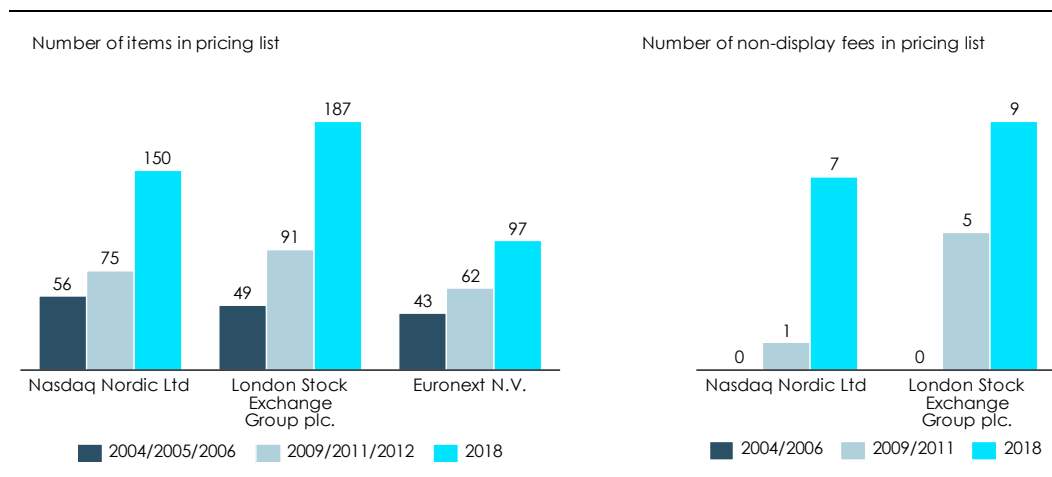
It is not only higher and new license fees that have been a cost-driver for market data users. New and more complex market data policies means that the resources needed to allocate to controlling market data access has also increased significantly in the past decade. According to our sector interviews, the number of employees solely allocated to managing market data access for a larger Nordic security dealer was 1-2 full-time staff members in the mid-2000s and has increased to around 7-8 today. In addition, it has spurred increased costs in other functions at the security dealers.

The increased resources to managing market data access have two main sources, as outlined below:

1) Increased complexity of the fee structure

Because of an increased complexity of the fee structure and the market data policies, more resources are allocated to try to understand and estimate exactly how much the security dealers should buy and how to potentially limit any excessive data access (see an example in Box 7). An indication of this is that the number of items in the price list of the venues have tripled the past decade, *cf. Figure 11*. For example, Euronext's pricelist now contains 97 different items, despite the fact that raw market data remain a fairly simple product, as displayed in *Box 1*. The resources allocated further accumulate as each venue has a different fee structure and definition of market data products, which therefore need to be managed separately. As an example of the complexity, we have provided the different definitions of non-display in appendix C.

Figure 11
Number of different fees in the fee schedule



Note: Notice different starting year. London Stock Exchange Group Plc. has different fees for different customer groups. The number of non-display fees show the number of fees for Tier 1 customers. Data was not available for all trading venues.

Source: Prices lists from trading venues

2) Complex data policies and dense auditing procedure

According to our sector interviews, the trading venues have become more firm and rigorous both in their market data policies in general and their auditing procedures during the past decade. The market data policies are complex and differs across trading venues i.e. different limitations in usage. For auditing, they aim for a charging model where each security dealer is invoiced for every possible access to their data that the security dealer *could* have had, and not just the access the security dealer de facto has. This is enforced with a policy of “reversed burden of proof” in the data access rights, where it is the responsibility of the security dealers to prove who had – and not had – access to the market data. If the security dealers cannot prove that part of its employees and customers did not have access to the market data, the security dealers will have to pay for the entire group of users. Consequently, security dealers spend a fair amount of resources making sure that no employee accidentally has access to market data they do not need, as illustrated in the case described in *Box 7*.

Box 7 Case illustrating the “reverse burden of proof” in market data auditing

To illustrate the potential costly consequences of the strict auditing of the venues, consider the following case, reported by a security dealer in our sector interview: Two employees had a certain type of market data access, which the security dealer was paying for. During an audit, it was revealed that the security dealer in a given quarter some years back was unable to prove that only those two employees had access. In theory, a large group of around 100 employees could have had access. Consequently, the security dealer had to pay for data access for the group of around 100 employees in that specific quarter, despite the fact that 1) none of the remaining 98 ever actually permissioned for the market data and 2) before and after, the security dealer was able to prove that only those two employees had access.

Source: sector interviews

Re-bundling of products increases costs

Services are being bundled, which means that security dealers could be obliged to pay for market data they do not need. For example, Nasdaq Nordic Ltd. has bundled their data feed for Denmark, Sweden and Finland securities vs. the Baltics (Lithuania, Latvia and Estonia) securities. In doing so, they have increased the fees of market data, as the receiver now gets access to more market data. The venues also sometimes bundle raw market data with different types of processed analytical data, even though the security dealers might only be interested in the raw market data.¹⁶

2.4 CONSEQUENCES OF ELEVATED MARKET DATA FEES

The elevated market data fees have several undesirable consequences, as described in the following.

2.4.1 Consumers seek to limit use of market data

The only way users can limit market data charges is by restricting the use of market data, which is exactly what they have done during the past decade.

First, security dealers are limiting data views to retail and institutional investors, hampering informed investment decisions.

Second, according to our sector interviews, security dealers seek to reduce the number of employees that have access to market data and the amount each employee has access to, beyond what can be justified from an efficiency perspective. This creates reduced ability to service clients and increases bottlenecks in the internal processing implying other costs to increase.

Third, security dealers continuously optimise the use of market data by ensuring that they use market data through as few channels as possible. Such optimisation can be quite rewarding financially, and some consultancies have even specialised in giving advice on how to “optimise” the market data use at security dealers.

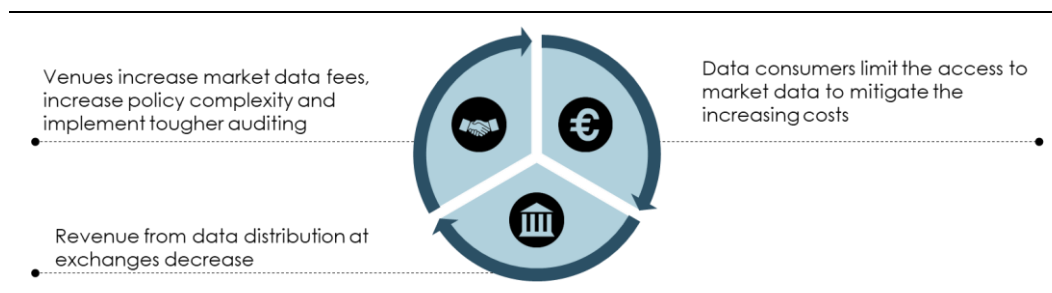
The optimisation and limitation of market data use has no real economic value, as there are virtually no costs of redistributing the market data to more employees or investors. The increased

¹⁶ For example, Nasdaq Nordic Ltd. has in their Fixed Income package bundled raw data with analytical data.

auditing is thus – from an economic point of view – unproductive. So is “optimisation” of market data use.

The limitations in market data accesses mean that trading venues – viewed in isolation – earn less on market data. This could make them further increase market data fees, which again could make users cut down their market data accesses (more restriction and optimisation). As such, the increase in market data fees and the cut-down in market data accesses can be described as a vicious circle, resulting in unproductive use of resources and less transparent financial markets.

Figure 12
Vicious circle of increasing market data fees



2.4.2 Highly priced market data entails less efficient markets

As documented in this chapter market data fees appear to be above the costs of distributing the data. The main consequence of this is that the investor either sees charges for access to market data or the charges for access market data increase.

In addition, this can also lead to negative effects on the financial market efficiency, indirectly impacting investors. This is confirmed by a relatively recent study,¹⁷ which establishes a model for analysing the impact of elevated market data fees. The study demonstrates that trading venues with monopoly on market data will indeed increase fees on market data to a point, where the security dealers will restrict their use of market data. This is confirmed by the security dealers we have interviewed in making this report.

The study goes on to show that the limitation of the access to market data has several negative consequences for the financial markets:

- **Prices are less informative:** When traders (and their supporting analysts) are less informed, they will quote the traded security less accurately, i.e. prices are less reflective of the fundamental value of the securities.
- **Higher volatility:** The less efficient pricing of securities introduces noise in the price setting of instrument, which gives rise to higher price volatility.
- **Higher cost of capital:** A less informed market (and the resulting less efficient pricing of instrument) will push traders towards more safe assets and away from more risky assets. The reason is that less efficient markets will disproportionately increase the risk of already risky assets. Risky assets, such as equity, will get a price premium. This increases

¹⁷ O'Hara et al (2013)

the funding costs for companies, especially for small and midcap companies, which are normally considered riskier.

- **Less liquidity:** Less informed traders and less informative prices will lead to less trade, as their risk on each individual transaction is greater – this will impair the liquidity on the market, especially for risky assets.

When interpreting the above-described results, it should be kept in mind that the consequences of elevated market data fees are just one of many drivers of the efficiency of financial markets.

Four takeaways from chapter 2

1. Market data revenue is typical in the range of EUR 50–200 million, which is likely to be far higher than what can be justified from costs of distributing raw market data.
2. The underlying technology should have given rise to decreasing costs of distributing market data. However, market data fees have increased some 30%-60% since 2008 for a typical small Nordic investments bank. This indicates that market data fees are not cost-based but valued according to the willingness to pay.
3. During the same time, trading venues have implemented a range of rigid auditing procedures of how and by whom, the market data are being accessed by the security dealers. This takes up significant resources at the security dealers, which is entirely unproductive as the marginal cost of distributing market data within security dealers are close to zero.
4. Economic research shows that the high fees can lead to less efficient financial markets, including less efficient pricing of securities as well as more volatile and less liquid markets.

CHAPTER 3

**CURRENT REGULATION NEEDS SUFFICIENT
IMPLEMENTATION**

In this chapter, we describe how access to market data is currently regulated in the EU and how the new regulation might not be implemented in an efficient way to address the issues described in chapter 1 and 2. First, in *section 3.1*, we outline how MiFIR do indeed intend to regulate market data to ensure reasonable pricing. In *section 3.2*, we, however, point to some issues that remain to be resolved. Finally, in *section 3.3*, we add perspective to the discussion by examining how market data is regulated in the US.

**3.1 MIFIR LAYS THE FOUNDATION FOR REASONABLY
PRICED MARKET DATA**

MiFID II/MiFIR is the main piece of EU legislation regulating financial instruments and markets. The regulation of market data is described in a delegated regulation¹⁸, supplementing MiFIR. In *Table 2* below, we go through the four most noteworthy elements regarding market data:

¹⁸ Commission Delegated Regulation (EU) 2017/567 of 18 May 2016 supplementing regulation (EU) No 600/2014 of the European Parliament and of the Council with regard to definitions, transparency, portfolio compression and supervisory measures on product intervention and positions

Table 2
Measure and possible impact of MiFIR

MEASURES IN MiFIR:	DESIRED IMPACT:
1) Market data should be provided on a “reasonable commercial basis” ¹ and fees should be set with a “reasonable relationship to the cost of producing and disseminating that data” ² , while allowing for a “reasonable margin” ² .	Trading venues must base their fees on the cost of “producing” and “disseminating” (or distributing) market data. Recall from chapter 1, “producing” is a matter of registering the raw market data as it is a by-product, and the fees should therefore primarily reflect the cost of distributing the data.
2) Venues should disclose their “cost accounting methodologies” to which “the production and dissemination of market data and other services are provided” ³ .	It should be possible for customers and regulators to check if market data fees indeed are cost-based, through disclosure of estimated cost-benchmarks.
3) It is made clear that “market data should be provided on a non-discriminatory basis”, “unbundled from other services” ⁴	The unbundling requirement should ensure that security dealers can choose only to buy the (cheap) raw data and exclude any processed data.
4) The market data should be made available according to “the use by the individual end-users” ⁵ , making sure that each cost is only charged once.	This should prevent fees that are not directly linked to individual use, e.g. distribution fee, and allow for netting when end-users have access to data from data vendors.

Note: (1) article 6, 1. (2) article 7, 1. (3) article 11, 2e. (4) article 9, 3. (5) article 9, 1

Source: The delegated regulation to MiFIR

Thus, MiFIR goes quite far in ensuring an efficient market for market data. Security dealers should be able to buy raw market data (due to the unbundling in “3”) based on cost-based fees (due to “1” and “2”) without paying any additional fee (due to user-based pricing in “4”).

As documented in chapter 2, market data fees have continued to increase during 2018, showing that the regulation on market data has yet to be sufficiently implemented. In the next section, we discuss why that might be.

3.2 WHAT DOES COST OF “PRODUCTION AND DISSEMINATION” ENTAIL?

Under MiFIR, market data fees should reflect the “production” and “dissemination” of market data. However, these terms are quite broad, and the exact definition could be very decisive for which costs are allocated to market data fees. We therefore argue that it is important to clearly define which costs can be included, and regard this as one of the most pressing regulatory challenges in the implementation of the delegated regulation.

Trading venues allocate a range of common costs to market data

Because of MiFIR, trading venues are obliged to publish “cost allocation reports”, where they document which type of costs are allocated to their market data fees. The information contained in

these reports are quite limited, however, it does appear that trading venues allocate a range of different common costs to market data, including marketing, administration, treasury functions, etc. *cf. Appendix A*. It should be noted that the trading venues do not distinguish between processed market data and raw market data.

Under the current regulation, it can be questioned whether the common costs are allocated in an accurate way. For example, how much of treasury management should be allocated to distribution of market data? The typical model is to use revenue as an allocation key. However, this will mean that the cost allocation model becomes somewhat self-fulfilling: If the trading venues charge higher market data fees, their revenue from market data will increase, and as a result, more costs can be allocated to market data.

Consequently, if common costs are allocated to market data, it would be difficult to curb market data fees at a reasonable level and it might very well be possible to reach costs reflected in the high market data revenues showed in *Figure 3* in chapter 1.

3.3 THE INCREASING COMPLEXITY AT THE DIFFERENT VENUES IS NOT REGULATED

As described, the increasingly rigorous auditing, including reversed burden of proof, also constitutes a cost driver. We therefore see it as important that this, too, is regulated in ensuring market data are provided on “*reasonable commercial basis*”.

Finally, there is currently no standardised way of accessing market data and trading venues often charge a high fixed fee for data vendors. This means that it is costly for users to set up direct market data feeds connection with each trading venues in the EU. This could give limited competition in the data vendors market: According to our research, only 2-3 data vendors offer streaming of market data from all EU venues. In this way, it could appear that there is a high barrier of entry for potential new market data vendors wanting to offer a consolidated tape to EU security dealers.

In the next chapter, we present our suggested regulatory solution on how the above issues can be addressed. First, to add some perspective to the discussion, we examine how market data access is regulated on the US markets.

3.4 COMPARISON TO US REGULATION

The Securities and Exchange Commission (SEC) is the regulatory body in charge of regulating financial markets in the US. They have taken a somewhat more active stance in regulating market data compared to the EU:

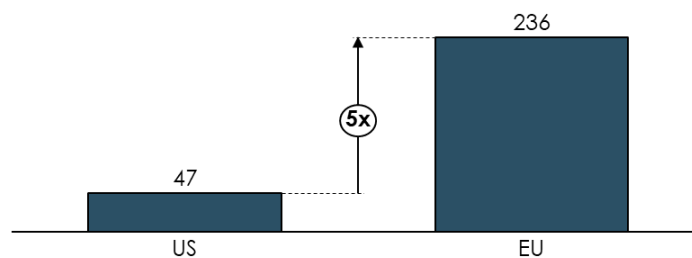
First, fee increases for market data need to be approved by the SEC (covering all types of latency), and venues need to justify the increase.¹⁹ Often this is treated as a formality, but in 2018, the SEC has for the first time rejected fee hikes from US trading venues, the reason being that SEC questioned: “whether the changes will result in fees that are fair and reasonable, not unreasonably discriminatory”.²⁰

¹⁹ See SEC: Petition for Rulemaking Concerning Market Data Fees and <https://www.law.cornell.edu/uscode/text/15/78s>

²⁰ See <https://www.reuters.com/article/us-usa-exchange-data/foes-of-market-data-fee-hikes-encouraged-by-sec-scrutiny-idUSKBN1I52GZ>

Second, the SEC has organised a consolidated tape, which provides market data users with level 1 pre and post-trade data from all major US venues (see description of a consolidated tape in section 1.3). The data can be obtained from EUR 36-58 per user (depending on the number of users). In comparison, obtaining level 1 market data from major EU venues would be around five times as expensive, cf. Figure 13.

Figure 13
Price of obtaining level 1 market data from major venues in the EU and the US in 2018
EUR



Note: The EU price is the aggregated price of level 1 market data from the following venues: London Stock Exchange Group plc., NYSE Euronext N.V., Nasdaq Nordic Ltd, Deutsche Börse AG and CBOE Europe Limited. US price is for Network A and Network B. The price of network A depends on the number of devices. EUR 36 is the lowest possible price for both networks and EUR 58 is the highest possible price. The shown price is an average of lower and higher price.

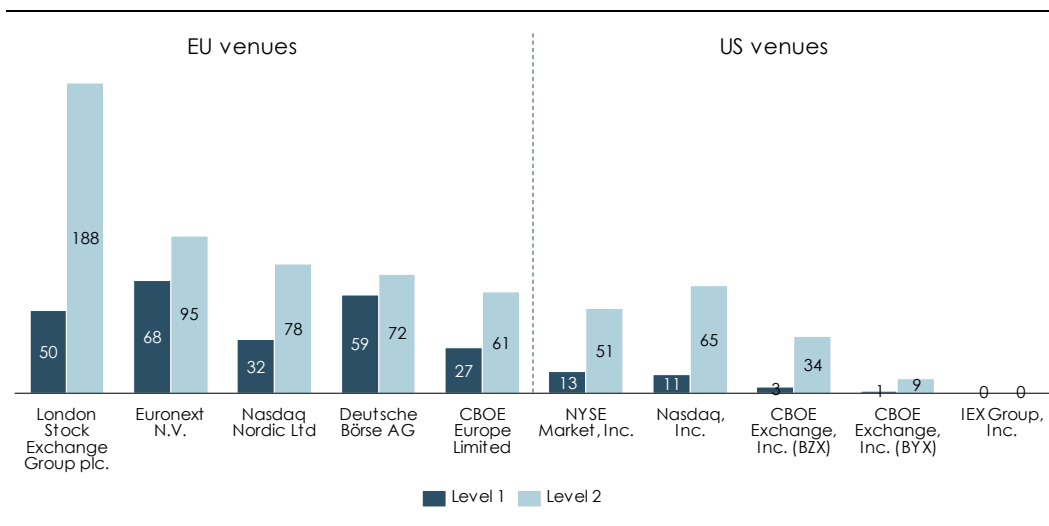
Source: Price lists from venues

The regulation does not change the fact that selling raw market data is big business for US venues, due to the following reasons:

1. **Latency:** The process of collecting market data from different venues and consolidating the market data into one stream adds latency. It is a matter of nanoseconds, but this can be decisive in electronic execution (latency A/A+).
2. **Limited depth:** The consolidated tape only provides level 1 pre-trade data, i.e. the best bid and ask. This can be sufficient for employees who need to follow the general market development, but employees actively involved in market making need the full depth of the order book.

The consolidated tape is therefore not a perfect substitute for obtaining market data directly from the trading venues, but it provides security dealers with an alternative, which can weaken the market power of trading venues in selling market data. This is clearly reflected in fees; level 1 access for an average EU venue is around seven times higher than in the US, cf. Figure 14. Furthermore, even though the consolidated tape does not cover level 2 data, the more active stance of SEC still appears to have impacted level 2 data, which on average is around twice as expensive in the EU than in the US, cf. Figure 14.

Figure 14
Market data fees are higher in the EU compared to the US (2018)
EUR



Note: Fees are taken from the most recent price list at the time of writing. Level 1 and 2 access is not identical across venues and there are variations in the exact content of the access.

Source: Price lists from trading venues

Four takeaways from chapter 3

1. MiFIR has come far in ensuring an efficient market for market data. The regulation state that consumers should be able to buy raw market data based on cost-based fees without paying any additional fees.
2. However, regulators still have some way to go to ensure efficient pricing of market data. The regulation is quite vague in defining exactly which costs can be included. If venues are permitted to use a range of common costs to justify market data fees, it is likely that fees will remain elevated.
3. The current regulation does not address the fee structure and access of market data that are important cost drivers.
4. In designing the EU regulation, one can be inspired by the US regulator, which has taken a somewhat more active stance in regulating market data. This has curbed market data fees compared to the EU; e.g. level 1 equity data access is around seven times more expensive in the EU than in the US.

CHAPTER 4

**HOW TO IMPLEMENT REASONABLY PRICED
MARKET DATA**

We will in this chapter outline how the intentions in the delegated regulation could be implemented more efficiently. First, in section 4.1, we look at how other sectors with comparable structures are regulated. Based on this, we then present three initiatives to ensure an effective implementation:

- 1) Simplification and standardisation of access to raw market data (described in section 4.2)
- 2) Cost-based pricing of raw market data (described in section 4.3)
- 3) One designated EU supervisor (described in section 4.4)

In section 4.5, we discuss under which circumstances the measures could be implemented. Finally, in section 4.6, we discuss the direct and derived impact of the measures.

**4.1 REGULATION OF SECTORS WITH SIMILAR
STRUCTURES**

The described issues on the market for market data are far from unprecedented. Especially in infrastructure sectors, there is often a situation, where the structures of the sector provide one or several actors a strong market position on part of their business. If unregulated, this will give prices exceeding costs, with further possible derived negative impact on the overall economy. There are numerous examples where authorities implemented such regulation, including: postal sector²¹, gas transmission system operators²², power grids operators²³ and telecommunications²⁴. A common characteristic of these sectors and venues is that they historically often were publicly owned entities with cost-based pricing, but now – post privatisation – often have regulatory regimes with caps on revenues and/or prices.

Trading venues can be regarded as providing financial infrastructure, facilitating trading between actors of the financial market. In a similar fashion, if the market for trading works inefficiently, it will have negative derived socioeconomic effects (as described in section 2.4). Thus, it is logical to examine infrastructure sectors with similar issues to design the regulation of market data.

Although, each regulation obviously is designed on the basis of the structures of the sector, it is possible to draw some common conclusions from the regulation of these infrastructure sectors:

First, to avoid excessive pricing, it is often the practice to implement a cap on the allowed prices or income (depending on what is most suitable). If the participating companies only have strong market power on part of their products/market, the price/income cap can be targeted to those products. For example, in telecommunications, the providers have a monopoly-like situation for certain type of calls (termination calls, see *Box 8* below), but strong competition in other parts of their business. The price/income cap are often based on a bottom-up cost benchmark estimation of

²¹ ERGP (2014)

²² ECA (2018)

²³ See EY (2013), p. 7 for different types of price/income regulation throughout EU.

²⁴ See European Commission (2009), which outlines how the product is regulated through an LRIC+ bottom-up cost benchmark estimation.

the relevant costs, plus a reasonable mark-up to compensate for capital costs.²⁵ The point being that companies should have their costs covered but not be allowed to charge monopoly mark-ups. In *Box 8* below, we describe how concretely, a cost-based price cap is implemented in the telecommunications sector.

Second, it is important that the estimation and implementation of the price cap is overseen by a designated regulator. For example, in the case of call termination in telecommunications, it is the responsibility of national business authorities to estimate and maintain a price cap, based on a bottom-up cost benchmark methodology outlined by the European Commission.²⁶

Third, regulators often implement measures to increase transparency and enforce industry standards across the sector as for example in the telecommunications sector.

Box 8 A price cap in the telecommunications

The market for providing mobile call is a two-sided market. Call origination (placing a call) is a market with presence of multiple networks competing for mobile customers. Call termination (transferring the call to a specific number) is, however, characterised by each network having a de facto monopoly. A network A subscriber seeking to call a network B subscriber creates a demand that can ultimately only be satisfied by network B in the termination market. Thus, each network holds significant market power on calls terminating on its own network.

The strong market power of the operators has made regulators impose price control obligations:

- Rates are based on the costs incurred by an efficient operator and, by implication, are equal for all operators
- Efficient costs are determined using a bottom-up cost modelling considering long-run incremental costs (a so-called LRIC+ model, which will be outlined in section 4.2)
- The cost model is based on efficient technologies available in the time frame considered by the model. If alternative technologies are available to an operator (e.g. 2G, 3G), costs can be calculated by weighing the costs of the different technologies

Source: Copenhagen Economics (2014)

Based on the experiences from other infrastructure sectors, we will in the next three sections outline how the market for market data can be regulated.

4.2 SIMPLIFICATION AND STANDARDISATION OF MARKET DATA POLICIES

As a first step to ensure that market data are provided on “*reasonable commercial basis*”, we stress the need to regulate market data policies of the trading venues, i.e. the fee structure, auditing process and access to market data.

As described in section 2.3.3, the increasing complexity of the fee structure and dense auditing process has been a significant cost driver in the past decade. We argue that this situation would

²⁵ See also Copenhagen Economics (2014), p. 24.

²⁶ See European Commission (2009).

most likely not be accepted *if* the users easily could swap to other data providers – however, this is not the case and users have no choice but to accept the terms and conditions provided by the venues.

In this way, the described issues can be seen as market errors of the monopoly position of the venues and is as such within the scope of regulation, as it deviates from “*reasonable commercial basis*”. The aim of the regulation should be to allow for a “fair” auditing, fee structure and access, which users in a competitive market would accept.

This step one is a precursor to the step two of implementing a specific model for setting pricing, but is also seen as the minimum requirement of a meaningful implementation of the present regulation

4.2.1 Standardisation of access to increase competition on the vendor market

The different technical processes of acquiring access to trading venues are problematic as it is 1) a cost driver for market data users 2) prevent sufficient competition on the market data vendor market.

Therefore, we suggest that regulation of market data also should include regulation of the technical access of market data. We specifically suggest that:

- ESMA should decide on a common practice of how users can set up streaming of market data specified for each different latency.
- ESMA should decide on a common data format of which market data should be streamed for each different latency.

Should ESMA initiate a consolidated tape?

If sufficient initiatives are implemented, we assess that it is not necessary for ESMA to initiate a standardised access of market data through a consolidated tape, as in the US (described in section 3.3). *First*, we expect that our suggested measures would be enough to ensure reasonable pricing of market data. This includes more competition on the market for private consolidated tapes, as a standardised and reasonable priced access to raw market data will lower the barriers of entry. *Second*, a consolidated tape is only a partial solution, as it does not regulate the market for very low latency streaming.

However, if market data remain largely unregulated, a public organised consolidated tape could provide a feasible second-best solution, as it diminishes the market power of venues as evidenced in US. Particularly if the pre-trade data include the full order book.

4.2.2 A simple and standardised price list

In the delegated regulation, it is stated that, “*Any differentials in prices charged to different categories of customers shall be proportionate to the value which the market data represent to those customers*”. This could be achieved through choosing some relevant split in the price list.

Concretely, the following splits could be considered:

- Pre and post-trade data, as post-trade data contain far less observation points (and could be less costly to distribute).
- Different geographical areas, e.g. 4-5 EU regions.

- Main asset classes, e.g. equity, fixed income, derivatives and commodities.

In addition, in delivering raw market data, latency is also a cost differentiator, where there could be higher costs associated low latency streaming (see section 1.1). Concretely, we expect that there could be different costs associated with:

1. A+ latency: using the same server room as the venue
2. A: Very low latency in raw format
3. B: Low latency streaming in raw format, using web-based distribution.

In particular for A+ streaming, the server needs to be located at the venue. In contrast, there should not be any difference between latency B and C (delayed data) – the venues do not save any costs by withholding the data until the end of the day. Consequently, following a cost-based logic, we expect latency C to be obsolete if prices are cost-based. In similar fashion, non-display use of data does not lead to any costs for the trading venues – again following a cost-based logic, this kind of use should therefore not entail any fee.

In this way, the option in MiFIR that trading venues can set market data fees according to the value that the market data represents to certain customer segments, allows the trading venues to implement a fair fee structure, where e.g. a user, which only has a need for post-trade data is charged less than a large security dealer with a need of very low latency pre- and post-trade data. As such, the requirement is not in contradicting to cost-based pricing of market data. Here, it is important to stress that the possibility to disaggregate the market data fees to certain customer segments, should not be a pretext to maintain the current overly complex fee structure, which adds no value to market participants.

4.2.3 Number of customers

Regulators need to decide on which level of use users should be invoiced. As mentioned, most costs are fixed, and the operational costs vary little with the number of users that access the raw market data, once the infrastructure is in place. As Oxera puts it: *“The cost of supplying data relating to a subset of securities traded is, therefore, virtually the same as the cost of providing the complete set of data, once the decision has been made to supply the relevant data at all.”*²⁷

Thus, it is necessary to find a way to fairly distribute these fixed costs among the users of raw market data. A strictly cost-based approach will tend to imply a fixed fee per customer. This will also be the simplest approach and make market data auditing obsolete. However, this could prove to be burdensome for small security dealers with only few users. Maybe, a fairer approach would be to invoice per (human) user at the security dealers, meaning that large security dealers with many users will pay an equivalent larger share of the costs.

This will incorporate the requirement in the delegated regulation that venues shall *“charge for the use of market data according to the use made by the individual end-users of the market data (‘per user basis’)*”.

²⁷ Oxera (2014), p. 41.

Free redistribution to investors

Following a cost-based logic, we see no reason to charge for redistribution of the raw market data to investors as it does not inflict any costs to the trading venues. This will give a more transparent market without any additional costs to trading venues and security dealers.

Whether redistribution to investors are free should matter little to trading venues – they will have their costs covered plus a reasonable margin, and it is merely a matter of how to divide the costs among users of raw market data.

The delegated regulation states that pricing of market data can consider its use, including “*whether it is used for the customer's own trading activities, for resale or for data aggregation*”. This implies that trading venues should be allowed to charge fees for redistribution. We recommend that this should be reconsidered when the delegated regulation is revised.

Box 9 The cost model can lead to some short-term fluctuations in fees

When the model is implemented, there can be some short-term fluctuations in market data fees:

- If the LRIC+ cost model makes trading venues lower fees on raw market data, it could stimulate demand for raw market data thereby lead to a higher number of subscribers. This will further lower the price cap and this process will go on until a new equilibrium is found.
- On the other hand, a potential consequence of free re-distribution is that more security dealers will get their raw market data from third-party operators instead of directly from the trading venue (primarily latency B and C). This will – viewed in isolation – lead to a lower number of subscribers, which in turn imply that the venue can charge higher fees per subscriber.

It is difficult to determine which of the two effects will dominate; nevertheless, the point is that the trading venues, get their costs covered plus a reasonable return (based on WACC).

4.2.4 Regulation of auditing

As described, the dense auditing process of the trading venue would hardly be accepted by customers in a competitive market. We assess that three measures could bring an auditing in line with “*reasonable commercial basis*”:

- 1. Active user:** As described in section 2.3.3, because of the “reversed burden of proof” in market data auditing, security dealers often pay for market data that they do not actively use. Consequently, we suggest imposing an “active user” principle, meaning that users of market data do not pay for every possible use of market data they *might* have, but pay for the number of active users²⁸ registered in a certain period.
- 2. Limited retroactive auditing:** If the trading venues during auditing discover a *potential* market data use back in time that has not previously been discovered, they will invoice for this use retroactively. We suggest that trading venues should restrict their auditing to one year back in time. Furthermore, we suggest that audit findings should be

²⁸ Meaning that they have used the market data to trade or that they have logged on the platform and may have seen the market data.

used in both direction – if overreporting was found it should be reimbursed, just as is the case with underreporting today.

Compulsory netting: Security dealers occasionally pay for the same end-user fee several times. This happens when the user receives data both through data vendors, e.g. Bloomberg and Refinitiv terminal and directly from the trading venue. We suggest implementing compulsory netting, meaning that the user only pays for one licence per trading venue.

4.3 COST-BASED PRICING OF RAW MARKET DATA

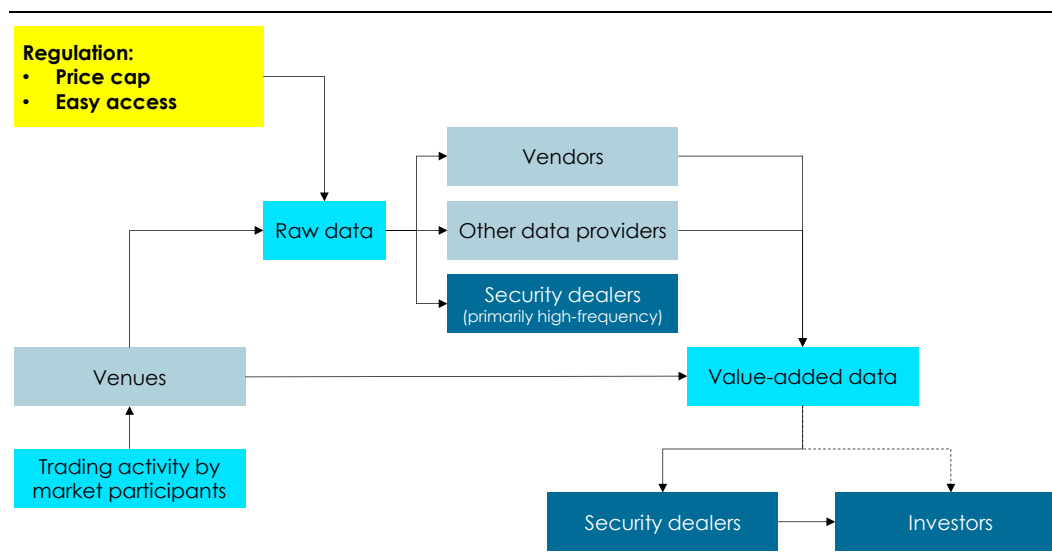
As a next step, we suggest implementing a price cap on market data to ensure that market data are provided with a “reasonable relationship to the cost of producing and disseminating that data”. Our suggestion is based on the experiences from other sectors outlined in section 4.1. Before outlining the exact design of the regulation, we below first define the scope of the regulation.

4.3.1 Only raw data should be regulated

We suggest that only raw market data are regulated. The main reason being that this is the only area, where the trading venues have monopoly, i.e. where there is a market error that calls for clear regulation.

In contrast, when raw market data is subject to a price cap, all users faces similar prices, which will increase competition on the market for processed market data – or at least, it is possible to stimulate competition indirectly through regulation; efficient pricing and easy on the market for raw market data will spill over to the secondary market and impact the entire market for market data, cf. Figure 15. That is, once the market for raw market data is regulated, the secondary market should also achieve prices on “reasonable commercial basis”.

Figure 15
Illustration of our regulatory approach



Only regulating raw market data has three further advantages:

1. It is a fairly simple product, which is easy to define, *cf. Box 1*.
2. It is possible to estimate the cost of distributing the market data, as it contains some quite explicit costs. In contrast, processed data includes costs involved with the value-added process, including intellectual property, etc, which is more difficult to estimate not least because the range of services provided may vary considerably and change over time as markets develop.
3. It will be a targeted measure leaving the entire secondary market for market data unaffected, making it easier for the authorities to regulate.

Regulation of Approved Publication Arrangements (APAs)

The main focus of this report is market data from trading venues. Nevertheless, a similar challenge in respect to cost of market data could apply for Approved Publication Arrangements (APAs), which is a new type of information providers defined in MiFID II (art. 64). They are designed to publish information on quotes from Systematic Internalisers (SI) and trades executed outside a trading venue, primarily Over The Counter (OTC). As trades conducted via SI and OTC take up a significant part of the total trading activity, the APAs provide important market data that other financial market participants need.

The APAs are also required to provide reasonable priced market data as trading venues and should thus be regulated accordingly. As these entities are new, an investigation of their compliance with the reasonable commercial basis requirement is outside the scope of this report, but we recommend regulatory authorities to monitor the development of data prices from APAs.

4.3.2 How to implement a price cap on market data

To achieve market data fees with a reasonable relationship to costs, we suggest implementing a price cap on the fees for raw market data for each trading venue. The price cap should be based on a benchmark of relevant costs associated with producing the services, including a reasonable return on capital.

Concretely, we suggest using a Long Run Incremental Cost (LRIC+) benchmark, as it has two features, which are beneficial:

1. The measure is based on Long Run average costs, acknowledging that there are one-off investments/capital costs in distributing market data, which need to be priced in.
2. The measure focuses on the Incremental Costs, i.e. cost savings that would be associated with discontinuing the distribution of market data. In this case, this would correspond to: *“How much the trading venue would have its costs reduced if the venue were not to distribute market data but continued to conduct all other services”*. This allows us to cope with the fact that trading venues provide several services and that the costs of these other services might be entangled with the distribution of raw market data, i.e. the venues are producing raw market data in the context of facilitating trading.²⁹ As such, *“the cost of producing and disseminating market data may include an appropriate share of joint costs for other services provided”*, as stated in the delegated regulation.

Cost model consists of two modules

The model consists of two modules, which we will outline in the following:

²⁹ See Oxera (2014)



1) Fixed costs: Compensation for one-off investment costs

These are costs involved in setting up the infrastructure to register and distribute the market data. The exact fixed costs will vary between venues, but could include:

- Costs associated with developing and/or buying software
- Buying and installing hardware
- For A+ latency to install servers from the security dealers at the trading venues
- Working hours spent to set up the above.

When the one-off investments costs are determined, the costs should then be transformed to an annual cost, using an interest rate that reflects relevant capital costs. Here, we suggest using a Weighted Average Cost of Capital (WACC) estimation, which is a standard to calculate capital costs. This annual compensation for investment costs will then be:

$$\text{Annual compensation for fixed costs} = \text{interest rate} * \text{fixed costs}$$

This part of the LRIC+ model allows for a “reasonable margin” as described in the delegated regulation. That is, the share of fixed costs financed with equity should have a return corresponding to the risk of the investment.

2) Operational costs

Once the infrastructure is in place, there can be some operational costs associated with maintaining the data connection (also denoted OPEX). Again, the exact costs will vary between venues, but could include:

- Staff to ensure correct billing of raw market data. These costs will be significantly reduced compared to today, as we suggest implementing a very simple price list for raw market data as described in section 4.2
- Technical maintenance of the market data connection to the trading venues
- For raw market data with latency A+: costs associated with maintaining the servers from the security dealers at the trading venue
- Depreciation of the tangible and intangible assets described in the fixed costs section.

Treatment of common costs

Part of the costs can arise from using facilities and staff, which are also used in the production of other services. For example, a group of employees could work with general technical maintenance of the venue, including the streaming of raw market data.

Nevertheless, it is important not to allow allocation of common costs to be used as a back door to inflate the market data costs. Therefore, it is important that a cost-based allocation key is used. In

the example above, an estimation of the share of hours the staff is working on maintenance market data distribution would be a suitable allocation key.

The costs should be adjusted for the expected number of units sold. For example, if a venue has costs for distributing market data of EUR 100,000 and has fifty customers, the price cap per customer will be $100,000/50=2,000$.

The number of expected subscribers going forward can be estimated based on the current subscriber base.

The above-described model implies that raw market data fees will vary between venues based on (see also *Box 10*):

- Different fixed and operational costs between the trading venues
- Different number of subscribers

Box 10 Formula for price cap

Arithmetically, the LRIC+ model can be stated as:

$$\text{Price cap} = \frac{\text{fixed costs} * r + \text{operational costs} + \text{depreciation of assets}}{\text{units sold}}$$

Coverage of the model

The point of the model is to ensure that market data in general is priced on a cost-basis. One option is to implement price-caps on each of the split of customers described in section 4.2.2. Alternatively, there could be freedom for the venues to price the different customer segments and the regulators focus will be to ensure that prices in general are set in a way, which means that the revenue on market data for the trading venues do not exceed costs. This option might be easier to implement as it rules out detailed regulation of the individual fees.

4.4 A DESIGNATED EU SUPERVISOR

With the current regulation, it is up to the National Competent Authorities (NCA) to ensure that MiFIR is correctly implemented on company level. Regarding market data, this could be problematic, as the market is very pan-European; major security dealers need market data from all major European venues. We therefore suggest that there is great value added in coping with the issues on an EU-level, i.e. compliant with the EU principle of subsidiarity.

ESMA would be the obvious choice for a single EU supervisor of market data. In implementing MiFIR, ESMA so far only has the responsibility for completing technical guidelines, providing technical advice and, overall, contributing to a smooth implementation of MiFIR but is not in charge of direct supervision of the trading venues. However, it is currently debated whether ESMA should have its role extended and participate in more direct supervision of the EU financial markets, as for example recently proposed by the European commission during a general revision of

the operations of the European Supervisory Authorities.³⁰ We see the regulation of access and pricing of market data as an obvious domain where ESMA should have its powers extended.

Concretely, ESMA should:

- Ensure that the fee structure, format and procedure of getting access to market data are standardised and consistent across venues in EU.
- Design and estimate the LRIC+ model for the major EU trading venues based on data obtained from the trading venues. This will ensure that the LRIC+ model setup and estimation methodology is consistent across the EU, which is important to ensure a level playing field. On the other hand, it could be problematic if the calibration of the LRIC+ model was delegated to each venue, since there will inherently be a conflict of interest.
- As a natural extension of implementing the LRIC+ model, we suggest that ESMA should ensure that the price cap at the venues is implemented consistently across EU.

Compared to the NCA, we see clear advantages of having a centralised EU supervisor:

- ESMA can easily benchmark and hereby quality check the reported cost data from the different trading venues. Alternatively, NCAs can have a more involved role in implementing the cost model at venues, e.g. by collecting data from venues, which is then submitted to ESMA for a coherent cross-country comparison.
- ESMA can ensure that each trading venue is regulated consistently, ensuring a level playing field across venues in EU.

4.5 IMPLEMENTATION OF MEASURES

As described, we assess that most of our suggested measures can be implemented within the framework of MiFID II/MiFIR and their delegated acts. Our measures are derived consequences of the intentions in current regulation. Therefore, we assess that they can be achieved, primarily through issuing guidelines and recommendations on the implementation of MiFIR. Using the vocabulary of the Lamfalussy architecture, this means that our measures could be implemented on level 3.³¹ The measures could then be established on level 2 in connection with the upcoming revision of MiFID II/MiFIR.

Nevertheless, we acknowledge that our measures to implement MiFIR and the delegated regulation vary in regulatory and political implications. As such, we can view our suggested initiatives in three successive steps – each step with increasing regulatory implications:

As a *first step*, we recommend implementing the standardisation of definitions and the regulation of auditing procedure. We assess that this could be done on level 3 as:

- 1) These measures are rather technical and detailed, which makes them unsuitable for the more high-level legislation at level 1 and 2.

³⁰ See: http://ec.europa.eu/info/law/better-regulation/initiatives/com-2017-536_en

³¹ The Lamfalussy architecture was introduced in 2001 and sets out guidelines on how new financial regulation should be implemented: *On level 1*, the European parliament and Council adopt a regulation that sets out framework principles for the regulation. *On level 2*, the commission implements the regulation through delegated acts and regulatory technical guidelines, with the help of relevant regulatory bodies. *On Level 3*, EU regulatory bodies provide recommendations and guidelines in order to establish consistent, efficient and effective supervisory practices in the member states and to achieve a uniform and workable interpretation of the legislation. These recommendations and guidelines are not legally binding per se, but competent national authorities need to explain the reasons if they intend not to follow the guidelines and recommendations. See https://ec.europa.eu/info/business-economy-euro/banking-and-finance/financial-reforms-and-their-progress/regulatory-process-financial-services/regulatory-process-financial-services_en

- 2) They are derived consequences of providing market data on “*reasonable commercial terms*”, i.e. they are guidance on how to implement the delegated regulation on market data.

A *second step* will be to ensure that venues indeed set fees on a cost-level. This will require defining what costs of “*production*” and “*dissemination*” of market data entails first. This can clearly be done at level 3 – this is merely a matter of elaborating in more technical terms what is already included in the delegated regulation. As described, we argue that this should entail the direct distribution costs. Next, the direct costs of distributing the data for each venue should be estimated. Here we see the LRIC+ model as the most suitable method. As argued, this is merely a matter of implementing the level 2 delegated regulation, which states that market data should be provided with a “*reasonable relationship to the cost of producing and disseminating that data*”. Consequently, we see the LRIC+ model, initially, could be introduced on level 3 through a guideline. The LRIC+ could then formally be established on level 1 or 2 in connection with the MiFID II/MiFIR review, to ensure consistent implementation and compliance across Europe.

A *third step* will be to appoint a supervisor to oversee the two steps above are implemented sufficiently and uniformly across the EU. As described, we argue that ESMA could be that supervisor. As described, this could be included in the already on-going revision of the European Supervisory Authorities.

Role of Brexit?

Brexit has the potential to significantly impact the market for market data. London is together with New York the largest financial hub in the world and market data generated from trade taking place in UK is indispensable for security dealers in EU27. Consequently, it is of utmost importance to ensure an efficient and reasonable priced flow of market data between UK and EU27 – also after Brexit. There is, at the time of writing, no clear roadmap of how the Brexit will be handled in relation to regulation of the entirely integrated financial markets of UK and EU27

4.6 IMPACT OF OUR SUGGESTED REGULATORY INITIATIVES

The main purpose of any good regulation of a market is to increase welfare for end-consumers, in this case investors. These could either be single investors investing their own funds, but more typically institutional investors managing funds on behalf of several retail customers, e.g. pension funds.

The main direct impact of the suggested initiatives is to have market data fees based on the incremental costs. As raw market data fees are currently significantly higher than distribution costs, we will expect a significant reduction in market data fees.

The lower fees will ultimately increase the effective risk-adjusted return for investors through two channels (see also *Figure 16*):

1) Increased market transparency

As discussed in section 2.4.3, the elevated market data fees lead to less efficient markets. Cost-based market data fees will remedy these inefficiencies, i.e. better priced securities, more liquid markets and generally less market volatility. This will ultimately decrease the risk associated with a given

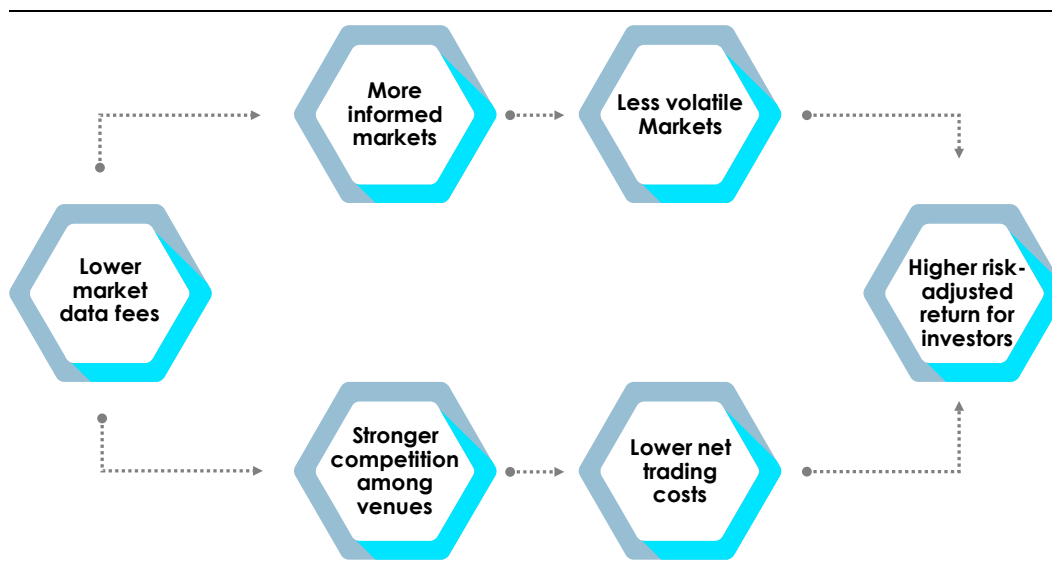
portfolio, increasing the risk-adjusted return for investors. It is also possible that it will lower the cost of capital for companies.

2) Intensified competition among trading venues

Overall, we expect the suggested measures will increase competition among venues, as venues will no longer be shielded from competition on part of their business (which is illustrated by two cases in the next section). The overall market power of the venues will decline, and consequently, we expect that net trading costs (including market data) will decline, giving raise to higher *effective* return for investors (net of fees).

Our suggested measures could – viewed in isolation – give raise to increased trading fees. As discussed in section 1.2 and chapter 2, the venues are currently pushing costs to market data fees where they have strong market power, and, in turn, accepting lower trading fees on the margin. If a price-cap is enforced on market data, such cross-subsidisation will no longer be possible. Consequently, we expect that trading fees will increase, i.e. trading activity will also start being priced according to costs.

Figure 16
Regulations impact on investors



4.6.1 Impact on different types of market participants

Looking more disaggregated, the suggested initiatives will differ in impact among different types of trading venues and security dealers/investors, as discussed below:

Security dealers and investors will split the gain of lower trading costs

The extent to which the lower net trading costs will benefit security dealers and investors respectively depends on the extent to which the lower net trading costs are passed on to investors. This, in turn, depends on the degree of competition on the market for security dealing/brokering. In

countries with a high degree of competition among security dealers, the investors will receive the biggest share of the gain.

The less volatile markets will benefit investors and small/mid-cap companies

The less volatile markets will provide a direct benefit for all investors, but particularly for investments with high yield, high risk assets to gain, as they are generally less liquid, less efficiently priced and more volatile assets. The improvement in market efficiency will therefore have a larger impact for these types of assets, which includes high-yield corporate bonds, equity, especially in the small- and mid-cap segment, and high-risk derived securities. In contrast, the lower market data fees will do little for government bonds market and other standard securities. Furthermore, companies can achieve lower funding costs because of the less volatile markets; the required return on capital for especially small- and mid-cap companies will be lower, as the assets will be less volatile and thus less risky.

Investors will be impacted depending on the kind of trading they are involved in

Finally, the measures will impact differently, depending on the type of trading the investors (and the security dealers of which they are clients) are involved in. As trading fees will increase (but not average trading costs), investors having a high trading frequency could gain a net loss from the measure. These will typically be investors involved with day trading and high frequency trading. In contrast, investors with relatively few trades stand to have a relatively large gain of the measure. These would typically be investors with trading based on fundamentals and with a long investment horizon, e.g. pension and insurance funds.

Impact on different trading venues

The measures will also likely have different impacts on the trading venues, depending on their size and competitiveness. In general, we expect that smaller and/or new trading venues will tend to gain from a price cap. Consider the following two stylized cases of how a market data price-cap will impact trading venues:

Case 1 - a large trading venue: The trading venue is well-established and has large market shares. Without a price-cap, the trading venue has a substantial revenue stream from market data as many security dealers need market data from it (because of the large market share). The trading venue is using the revenue from market data to subsidise trading activity to ensure that the trading venue keeps its market share. With a price-cap implemented, the trading venue will be forced to implement cost-based pricing on both market data and trading activity and would be forced to increase its trading fees.

Case 2 - small trading venue: The trading venue is relatively new and has a small market share. This means that security dealers are not obliged to obtain market data from the trading venue. The trading venue can therefore *not* use earnings from market data to subsidise trading and has difficulties competing against larger trading venues that are subsidising their trading activity. With a price-cap, the larger trading venues are forced to implement cost-based pricing on trading, i.e. increase trading fees. This makes the small venue more competitive and the trading venue will gain market shares.

In this way, we expect the suggested initiatives to give more equal and stronger competition between large and small trading venues. Furthermore, cost-based raw market data will stimulate

the market for processed data giving rise to a new possible stream of revenue for trading venues and data vendors, etc. on a level playing field

Three takeaways from chapter 4

1. The issues of market data are rather typical for infrastructure sectors, such as postal services, telecommunications, power grid operators, etc.
2. Examining regulation in these sectors, we suggest three initiatives that could ensure a sufficient implementation of the intention in the delegated regulation ensuring reasonable pricing of market data:
 - I. Regulate and simplify the access and fee structure of market data. We expect that this will spur stronger competition on the secondary market for processed market data and providers of consolidated tapes, which could further decrease market data costs.
 - II. Implement a price cap on raw market data based on long run incremental costs, i.e. the costs the trading venue would save if they stopped distributing raw market data.
 - III. Appoint ESMA as a designated supervisor, estimating the cost-benchmark and overseeing the implementation of the price cap.
3. Ultimately, the measures will secure investors a higher risk-adjusted return on investments through two channels:
 - I. The measures will intensify competition on the trading venues market and we therefore expect a decline in net trading costs. However – viewed in isolation – trading fees might increase, as they can no longer be subsidised from high market data earnings.
 - II. The lower market data fees will lead to less volatile markets decreasing risks for investors, especially investors with a long-time frame investment in high-yield assets.

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APPENDIX A

COSTS ALLOCATED TO MARKET DATA FOR NASDAQ NORDIC LTD

According to the cost methodology paper of Nasdaq Nordic Ltd, they, among other things, include:

- Marketing and advertising
- Provision for bad debts
- Share of “local common functions”, using revenue as an allocation key, including, “global technology, finance, legal and regulation and marketing and communication”.
- Share of the costs from the core services, such as “Global Equity and Derivatives, Global Fixed Income and Global Commodities”.
- Direct intercompany costs that are “beneficial for the Nordic or Baltic market data operations, such as sales and marketing costs”
- Intercompany costs, such as “Technology/IT related services, corporate communication, Treasury services, Management services, Corporate IT and Corporate Systems”, again using revenue as an allocation key.

Source: Nasdaq Nordic Ltd

APPENDIX B

ASSUMPTION FOR THE SMALL NORDIC INVESTMENT BANK

Terminal licenses (level 2)

	EQUITY	FIXED INCOME	DERIVATIVE DATA
Traders	10 (total view)	10	10
Sales	10	10	10
Research	5 (level 1)	5	-

Fees in both 2008 and now

EQUITY	FIXED INCOME
Business	Basic data
Delayed	Business
Nordic equity derived data	Business Derivative

New fees

EQUITY	FIXED INCOME
Internal distributor	Non-display
Non-display	Non-display trading platform
Admin fee	Fixed income derived data

External display

	EQUITY	FIXED INCOME
Business	30	30

APPENDIX C

NON-DISPLAY DEFINITION FOR NASDAQ NORDIC LTD, EURONEXT N.V. AND LONDON STOCK EXCHANGE GROUP PLC.

NASDAQ NORDIC LTD	
Overview	<p>Non-Display usage is any method of accessing Exchange Information other than Display Usage. Non-Display Usage is a means of accessing Nasdaq data that involves automated access or use by a machine, without access or the use of a Display by a natural person or persons. Devices [or servers] used in the transportation, dissemination or aggregation (collectively, "distribution") of data are not necessarily fee liable, but the Distributor should be able to identify such Devices that exist within the market data infrastructure and how many Devices are used for distribution, separate and apart from Devices that are used for other purposes, as illustrated by the examples below.</p>
US Non-Display	<p>Non-Display fees and reporting requirements vary depending upon the Nasdaq data product. Non-Display Policy and Unit of Count Policy, however, are consistent across all Nasdaq data products with respect to:</p> <ul style="list-style-type: none"> - The number of Subscribers that can modify the application in real-time; or - The number of Devices (usually servers) that receive and benefit from the information. <p>Distributors should have a quantifiable and auditable procedure in place to count Devices. For clarification purposes, the following categories of Devices should be reported as fee liable unless otherwise excluded by exchange rules or policies:</p> <ul style="list-style-type: none"> - Blade server (a type of server) - Rack server - FPGA may not necessarily be a server, but if an FPGA is run on a server that server may be fee liable. <p>For the purposes of Unit of Count, Nasdaq does not include the following types of Devices to determine whether a fee is applied for Non-Display usage:</p> <ul style="list-style-type: none"> - "Cores" – Nasdaq understands that Devices may utilise multiple cores or processors to handle market data and trading. If two or more cores sit on the same physical Device, Nasdaq would require the Distributor to report one Subscriber. - GPU, Xeon Phi cards, memory or chassis linked to a server utilising these hardware Devices that are already counted <p>Examples of fee liable Non-Display can be found at the following links: http://www.nasdaqtrader.com/TraderNews.aspx?id=dn2015-09 Provides Clarification for U.S. Non-Display Policy</p>
Nordic & Baltic Non-Display	<p>Categories applicable per asset class product:</p> <ul style="list-style-type: none"> - Category 1 Non-Display: Covers a firm's non-display trading-based activities as trading firms and for the purpose of customer business facilitation. Includes: order routing, fully automated trading, and trading with manual intervention. (Also includes Category 2 usage outlined below) - Category 2 Non-Display: Covers non-trading non-display activities for the purpose of calculation and verification such as but not limited to: portfolio valuation, administration, risk calculations, analysis, and fund management. - Trading Platform: Distributors or Recipients operating a Trading Platform (including but not limited to: Multilateral Trading Facilities (MTF), Organised Trading Facilities (OTF), dark pools, broker crossing networks, systematic internalisation systems, alternative trading systems, crossing networks are liable for the Trading Platform fee. <p>For further information and clarification: https://newsclient.omxgroup.com/cdsPublic/viewDisclosure.action?disclosureId=804123&lang=en</p>

Nordic Non-Display Use Exclusion	<p>Non-Display does not include any use of Nasdaq Nordic information that merely enables a display, and results in the output of Nasdaq Nordic information solely to a display. Examples include but are not limited to:</p> <ul style="list-style-type: none"> - An application that is updating a portfolio and exposes such information on the display is not considered Non-Display. - Calculating VWAPs or other derived information for use in a Display is not considered Non-Display
Nordic Equity Non-Display	<ul style="list-style-type: none"> - Nasdaq will review the percentage of data usage related to algorithmic trading to determine if the fee exemption per Nordic Member Rules and other relevant Non-display products will apply or not in January and July every year. This review will be based on June and December Nordic Equity Market share reports. - Liquidity Providers on the Nasdaq Helsinki Equity Market who have signed a Liquidity Provider agreement with Nasdaq Helsinki are not fee liable for Non-display uses of Finnish Equity Information received via INET ITCH when used specifically in their Liquidity providing operations.
Nordic And Baltic Fixed Income Non-Display	<p>Non-display usage of fixing is part of the Fixing Enterprise License fee and is not liable for Nordic Fixed Income Non-display fee. Nordic Fixed Income Fixing Subscriber fee and Nordic Fixed Income Total View does not include non-display usage of Fixing and are liable for Nordic Fixed Income Non-display fee. All other Non-display usage of Nordic Fixed Income Data is fee liable regardless of the source of the market data.</p>
Nordic Derivative Non-Display	<p>All Nordic Derivatives Non-display usage is fee liable. The only exception is for Market Makers and Liquidity providers as stated in the Nordic Derivatives Members section in Pricing Clarifications in this document.</p>
Commodities Non-Display	<p>All commodities Non-display usage is fee liable, regardless of the source of the market data.</p>
Other Non-Display Questions	<p>If your firm is unsure about a specific use case, please submit your use case to your Nasdaq Sales Representative for a determination at any time. For avoidance of doubt, Non-Display is fee liable regardless of whether the Order Management System, Execution Management System, or trading infrastructure is:</p> <ul style="list-style-type: none"> - A virtual system or located in the cloud; - Installed locally within a data centre; - Enterprise; or - Locally on an individual's desktop or Device. <p>If your firm utilises Nasdaq Information in accordance with the Non-Display clarification above, please contact Nasdaq</p>

EURONEXT N.V.	
Introduction	<ul style="list-style-type: none"> - This schedule sets out the Fees for Non-Display Use and CFD Use subject to the Non-Display Use Policy of the EMDDA and/or the Non-Display Use Policy of the TMA ("Non-Display Fees") and ("CFD Use Fees"). - All Fees set forth in this Fee Schedule apply on an enterprise-wide basis to the Customer and any of its holding companies and its subsidiaries as listed in the Non-Display Use Declaration. For the purposes of this schedule, a subsidiary means a company in which the Customer directly or indirectly owns 50% (fifty percent) or more of the issued share capital and over which it exercises effective control. For the purposes of this schedule, a holding company means a company that directly or indirectly owns 50% (fifty percent) or more of the issued share capital in the Customer and exercises effective control over the Customer. - All Fees set forth in this Fee Schedule are in addition to Monthly Redistribution Licence Fees, Monthly Information Usage Fees or other Fees that are otherwise payable in respect of the applicable Euronext Information products in accordance with other Euronext agreements, policies and/or fee schedules, unless otherwise indicated. - To the extent applicable, for the purposes of the "TMA" including, but not limited to, the Euronext Data License Agreement for Trading Members and its policies, references in this Non-Display Fee Schedule: <ul style="list-style-type: none"> (a) "Information" shall mean Market Data; (b) "Fees" shall mean Charges; (c) "Cash" shall mean Euronext Securities Markets; (d) "Derivatives" shall mean Euronext Derivatives Markets; and (e) "Delayed" shall mean Non-Real-Time
Non-Display Use Fees – Category 1, 2, 3 and 4	<ul style="list-style-type: none"> - Non-Display Fees are charged for the right to Use Real Time Information products in a non-display manner in accordance with the Non-Display Use Policy of the EMDDA and TMA. - No Non-Display Fees are charged for the Use of Delayed Information. - Non-Display Fees apply once per category of Non-Display Use, per Customer, per Information product. Customers subscribing to Level 2 of an Information product are not required to subscribe separately to the corresponding Level 1 or Last Price Information product. Customers subscribing to Level 1 of an Information product are not required to subscribe separately to the corresponding Last Price Information product. - The Customer either pays the Non-Display Enterprise Fee or, if available, the Non-Display Restricted Fee for the respective category of Non-Display Use and Information product. The Non-Display Enterprise Fee includes the Restricted Non-Display Use of the respective category of Non-Display Use and Information product. - The Non-Display Enterprise Fee applies to the Customer, irrespective of the Customer's Devices entitled to access the relevant Information product and enabled to engage in the relevant category of Non-Display Use at any point in time. - The Non-Display Restricted Fee applies to the Customer and solely allows for Restricted Non-Display Use and, in addition, any (unlimited) Managed Non-Display Use of Information. Restricted Non-Display Use means where the Customer has enterprise-wide (as defined in clause 1.2) entitled a maximum sum of 10 Devices to have access to the relevant Information product and enabling such Devices to engage in the relevant category of Non-Display Use at any time during the relevant calendar month. Simultaneous access on a Device is not permitted. - The Customer is solely permitted to subscribe for Restricted Non-Display Use if it can and will provide (auditable) records/ proof of its Restricted Non-Display Use to Euronext upon Euronext's request. - The monthly Fees for Non-Display Use category 1, 2, 3 and 4 (Euro excl. VAT) are as follows:
Category 5 Non-Display Fees: Index Creation for Redistribution	<ul style="list-style-type: none"> - The Category 5 Non-Display Fee is charged for the right to Use the Real Time Information, in whole or in part, in the calculation of one or more indices that will be Redistributed. Where such index is calculated on behalf of a third party and some or all of the intellectual property rights of whatsoever nature in that index will vest in that

third party or its licensors, i.e. an Index Provider Service is provided, the Category 5 Non-Display Supplemental Fee will apply in addition to the Category 5 Non-Display Fee.

- The Non-Display Use of Real Time Information in the calculation of indices for the sole purpose of the Use of such indices is categorised as Category 4 Non-Display Use and shall be subject to the respective Category 4 Non-Display Use Fees for Other Non-Display Activities.

- The Non-Display Use of Real Time Information in the calculation of the net asset value (or "NAV") and indicative net asset value (or "iNAV") is not Index Creation. Such Use is Other Derived Data Creation.

Category 6 Non-Display Fees: Creation of Original Created Works for Redistribution

- The Customer shall be liable for the applicable Other Derived Data Creation Fees for Real Time Information if the Customer Uses Real Time Information in the creation of Derived Data, other than indices, for the purpose of the Redistribution of such Derived Data. This excludes CFD Use.

- Customers subscribing to Level 2 of an Information product are not required to subscribe separately to the corresponding Level 1 or Last Price Information product. Customers subscribing to Level 1 of an Information product are not required to subscribe separately to the corresponding Last Price Information product.

- The Non-Display Use of Real Time Information for Other Derived Data Creation for the sole purpose of the Use of such Derived Data is categorised as Category 4 Non-Display Use and is subject to the respective Category 4 Non-Display Fees for Other Non-Display Activities.

- If the Customer already pays the Standard Real Time Redistribution Licence Fee for the respective Information product it will not be required to pay the Category 6 Non-Display Use Fees for such Information product in addition.

- The monthly Fees for category 6 Non-Display Use (Euro excl. VAT) are as follows:

LONDON STOCK EXCHANGE GROUP PLC.

**Non-display Tier 1
general information**

All Charges exclude VAT. The Charges quoted are in UK sterling. The Exchange reserves the right to amend any Charges at its sole discretion. Policy details and definitions in respect of these Charges are contained in notifications and also within the published Real Time Market Data Agreement. Invoicing will operate on a quarterly basis, chargeable in advance. Charges apply on an enterprise-wide basis to customers, defined as a single entity or a group of entities within the same legal entity. Charges cover usage regardless of the number of applications within the firm. Application Usage Charges are applicable to End Customers, Customers and Redistributors when acting as End Customers. Level 2 Application Usage Charges include the receipt of Level 1 data. Level 1 Application Usage Charges include the receipt of Post-trade and off book data. Entry level discount for new Tier 1 Non-Display Usage Customers. The Non-Display Usage Charges will be 50% of the applicable Non-Display Usage Charges for the first 12 months from the Effective Date of the Order for new Customers who do not have an existing Non-Display Usage licence nor previously had such licence nor paid Non-Display Usage Charges for any such usage.

**Non-display Tier 2
general information**

All Charges exclude VAT. The Charges quoted are in UK sterling. The Exchange reserves the right to amend any Charges at its sole discretion. Policy details and definitions in respect of these Charges are contained within the published Real Time Market Data Agreement. Invoicing will operate on a quarterly basis, chargeable in advance. For Tier 2, Charges apply on an enterprise-wide basis to customers, defined as a single entity or a group of entities within the same legal entity. Charges cover usage regardless of the number of applications within the firm. Level 2 Application Usage Charges include the receipt of Level 1 data. Level 1 Application Usage Charges include the receipt of Post-trade data. Entry level discount for new Tier 2 Non-Display Usage Customers. The Non-Display Usage Charges will be 50% of the applicable Non-Display Usage Charges for the first 12 months from the Effective Date of the Order for new Customers who do not have an existing Non-Display Usage licence nor previously had such licence nor paid Non-Display Usage Charges for any such usage.