

**“The Market Data Dumpster Fire on Both Sides of the Pond:
Looking for a Common Way Forward”
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Introduction

To start I would like to thank all the sponsors of this conference for asking me to speak. At IEX, we broadcast a regular podcast. A recent episode was devoted to market data, and we titled it, “Market Data Dumpster Fire,” which will give you some idea of the depth of feeling on this issue in the States.

As you will quickly see, IEX has a very skeptical view of exchange practices around market data fees. If you think it strange that an equities exchange would espouse these views, you need to understand that IEX is a very different kind of stock exchange. IEX doesn’t charge for its own market data and has been a strong supporter of efforts in the U.S. to place more limits on exchanges’ market data fees.

To be clear, we don’t believe exchanges should be prevented from charging for market data. We just think exchanges’ market power allows them to sell it on something other than a “reasonable commercial basis,” to use the MIFID phrase. In our view, exchanges should be compensated mainly based on how well they perform in matching trades. In the U.S., most exchanges now generate more revenue from selling their market data than from connecting buyers and sellers, and we think that construct is not sustainable in the long run.

Let me make several points of clarification. When I use the term “market data”, for convenience in most cases I am also talking about fees for direct connectivity, or direct access to the exchange. Traders who need fast data, and they pretty much all do, often need to get it direct from the source, so the cost of direct connections needs to be considered as part of the cost of the data itself. Also, when I

use the term “the exchanges” to refer to U.S. market operators, I am referring to all those other than IEX. Finally, when I use the term “exchange” in the context of European markets, I also include the Multilateral Trading Facilities, to the extent that they distribute their quotes, and especially to the extent that they charge for their market data.

The Fundamental Issues are the Same in the U.S. and E.U.

As a way to shed light on this issue, IEX conducted a study of its own costs to provide market data, which I will discuss in a moment, but first I would like to set the stage by talking about the common aspects of this issue on both sides of the Atlantic. There are significant differences in market structure between the two geographies, for sure, but in my view, the common features predominate. In fact, the arguments the exchanges use here to defend their practices sound like a rerun of the same tired movie playing in the U.S. As I’ll explain, I don’t think their arguments hold up any better in Europe than they do in the U.S. Plus ça change, plus c’est la meme chose.

One common feature is that exchanges are fundamentally different from other participants, historically and today. Traditionally, stock exchanges have served as a type of “public square” for securities trading. They are expected to be more broadly available to the public than other venues. As part of performing that critical role, they always have been an indispensable source of information about both pre-trade and post-trade prices, which is necessary for price formation and to facilitate capital-raising.

Another common feature today, but not historically, is that exchanges are owned by public companies. Like all public companies, they owe their primary loyalty to their own shareholders, not the people who rely on their services. In the U.S., when all exchanges were industry cooperatives, they had a natural incentive to limit costs they imposed on their members. This natural check on fee increases no longer exists.

Third, trading is highly automated and electronic in both geographies. Today, the floor of the New York Stock Exchange mainly serves as a slickly-designed TV studio. The real action is in the large data centers spread across northern New Jersey, or across the Eurozone. At the same time, the speed of electronic trading has increased in an exponential way, with trading advantages sometimes measured in the small number of feet or meters that separate one microwave tower from another.¹

The result is that exchange market data, delivered as quickly as possible, is a necessary resource for market participants, a form of fuel that powers trading in both jurisdictions. In the U.S., we have the consolidated tape feeds, but because they are slower and provide much more limited data, they are no longer realistic alternatives to proprietary data. IEX recently worked with consultant Greenwich Associates to survey a wide-spectrum of buy-side traders. One of the findings was that only 2% said they would consider using a broker that relied on data from the consolidated tape to make trading decisions.² And one global head of trading at a major institutional investor has publicly said that they will only use brokers that have direct access to proprietary data feeds from all exchanges.³ That means the price of market data is not just a source of increasing cost burden for exchange users, it can also act as an anti-competitive barrier to entry for smaller brokers.

As a result, exchanges have extraordinary power in pricing their market data products. And where there are differences between American and European markets, some of these differences mean that direct exchange data may be even more vital in Europe than in the U.S. For one thing, the absence of a consolidated tape over here means that this one limited alternative source of data is not available. Second, what are arguably even stricter requirements under MIFID around best execution and risk management increase pressure on brokers and traders to buy exchange data.

Too often, the debate becomes bogged down over questions of “who owns the data”. The firms that originate it with their orders, or the exchanges that process and redistribute the same order messages? This seems to me a false choice. No one owns it out-right. Exchanges have a vested interest

in the data that results from the way they process orders. But their members through their own activity are the source of the product in a real sense; the exchanges simply repackage it. And since exchange data is a necessary resource for trading, making data widely available at affordable prices encourages broader participation in the capital markets, a goal we should all share. To me, that means that the public interest in this topic outweighs private interests.

There is Significant Overlap in the Legal Standards that Apply

The words that are used to describe the legal and regulatory standards also sound similar. In the U.S., fees are required to be reasonable, fairly applied, and they can't cause unfair discrimination or unduly restrict competition.⁴ Exchanges are required to seek approval of each of their market data offerings. Fee changes can be implemented as soon as they are filed, but the exchange has the burden to show they meet the legal standards, and the SEC can disapprove a fee change if it concludes the exchange has not met that burden.⁵

The courts and the SEC have both said one way an exchange could show its fees are fair and reasonable is to show that they are constrained by competition – for example, by demonstrating users can substitute one exchange's data for another, or that users penalize exchanges that charge too much for data by directing more of their order flow elsewhere.⁶ For years, exchanges in their fee filings have relied on generalizations that markets are competitive because exchanges compete fiercely with each other for orders. While that may be true, they have not been able to show that competition for orders translates into lower data fees.

Exchanges also have relied on the fact that some of their members buy less market data than others, or that some obtain it from a third-party vendor. But they have never denied, because they can't, that those firms that account for most of their order flow subscribe to their most expensive direct feeds. As a federal court said in a major decision nine years ago, evidence that relatively few people buy the data "tells us little about whether the data is 'critically important' to those traders who do."⁷ Less

active participants may have more modest needs, but if fast exchange data is needed to run a trading business or act as a broker for big institutions, this fact amounts to significant market power.

For years, the SEC accepted the premise that competition constrains market prices, but its actions over the past year and a half show a change in attitude. In a high-profile decision last year, the Commission rejected fee increases by two large exchanges that were first challenged by the industry 10 years ago.⁸ At the same time, it ordered the exchanges to review 400 fee hikes that the industry has challenged over the last several years.⁹ In taking these actions, the agency said the exchanges had not shown that competition constrains market data fees, but it held out the possibility they could provide evidence that it does. Instead of trying to make that case, though, the exchanges are now challenging the SEC decisions in court. When I meet people who are confused about how IEX is different, I sometimes say, “We’re the only exchange that isn’t suing the SEC.”

The SEC and courts have also said exchanges could provide evidence of their costs to produce market data, as a way to show their fees are fair and reasonable, but no exchange except IEX has tried to do so. Instead of embracing transparency, they cling to the position that it is not possible to separate their market data costs from the other costs of running an exchange, an argument I’ll address in a moment.

Under MIFID II, the standard is that market data must be provided on a “reasonable commercial basis”. This term, like “fair and reasonable”, can be subject to wide interpretation, and much of the current focus here is on giving that standard more definition. In fleshing it out, it seems to me that the same issues of exchange competition and the cost to produce data are both highly relevant. Because of the common factors that affect both geographies, I see no reason to think competition among European exchanges is more effective in limiting market data fees here than it is in the U.S. And it seems to me that understanding the cost to produce market data is equally relevant here in Europe.

The IEX Cost Study: Understanding What Goes into Producing Market Data

All of which brings us to the IEX Cost Study, published in January, which was our effort to bring some light to this issue by detailing our own costs.¹⁰ The study starts from two main premises. The first is that the fundamental function of exchanges is to match buyers and sellers of securities at a fair price through transparent rules and processes. From this perspective, the sale of market data is a related but separate by-product of that primary function.

Exchanges argue that everything they do is related and not separable, because if no one sent orders and traded on an exchange, there would be no market data to distribute. While that may be true, all kinds of businesses create by-products that result from their main business; they still keep track of costs and revenues for each business line. When I posed this question to an ex-Nasdaq employee who had responsibility for market data, his reaction was, “Of course they know exactly what the costs are...practically down to the penny.” It is also telling that exchanges, when they speak as public companies to analysts or their own investors, often tout the profitability of their data business. But, when responding to industry complaints about data fees, their story is they can barely squeeze out any profit at all.

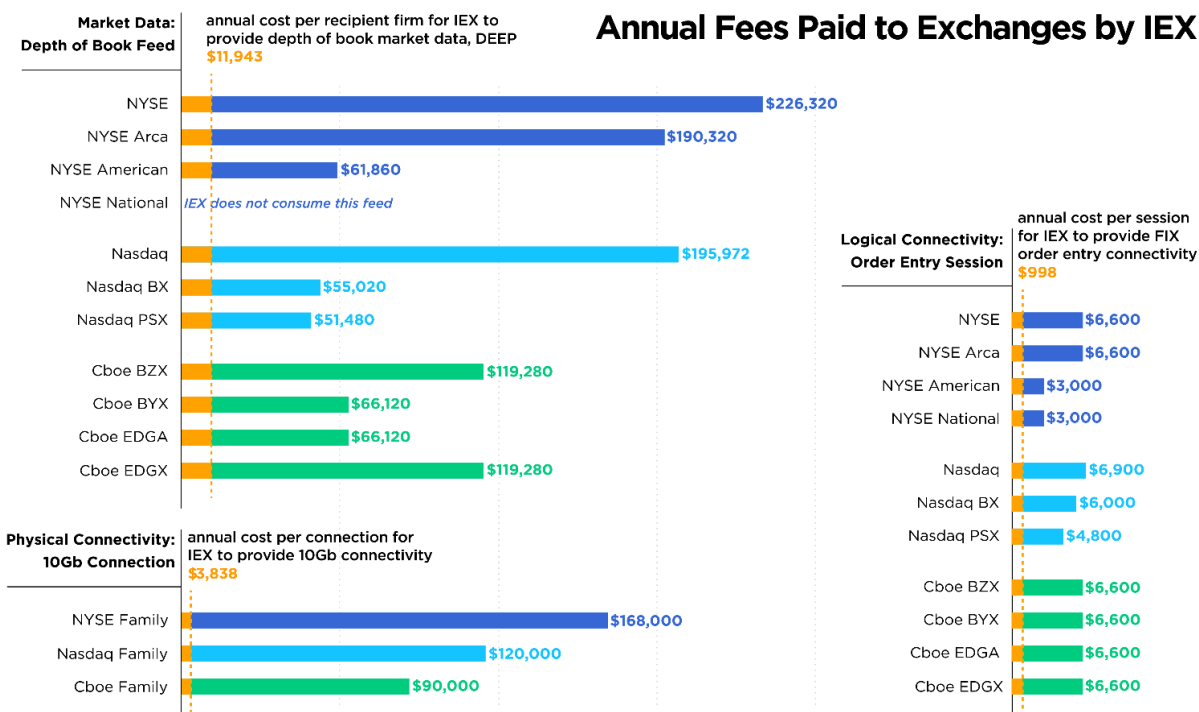
Another main premise of our study is that the basic technology of all electronic exchanges is highly similar. This is based on the simple fact that the state-of-the-art technology involved in collecting and matching orders, as well as transmitting data in high volumes, is well-established. The hardware and other physical components are available from a variety of vendors at known prices. There is also a defined market for employees who have the needed skills.

Given this backdrop, we had three objectives in conducting our study. First, we tried to explain as clearly as possible the processes that are involved in operating an electronic exchange and how the production of market data and connectivity flows from those processes.

Second, we estimated IEX’s own annual costs to deliver data and connectivity, considering both physical assets and personnel. To give an idea of the cost per user, we divided the total cost by the number of users.

Finally, we compared our per user cost estimate to the fees that IEX pays each year to the three major U.S. exchange groups – NYSE, Nasdaq, and Cboe – to give a rough sense of the potential profits they can make from selling these products. We used the fees we pay to other exchanges as a reference point for two main reasons. We obviously know exactly what we pay, which eliminates guesswork. Also, what we pay serves as a good proxy for what many trading firms pay, because in running our exchange business we have much the same needs as they do for detailed market data that is as current as possible.

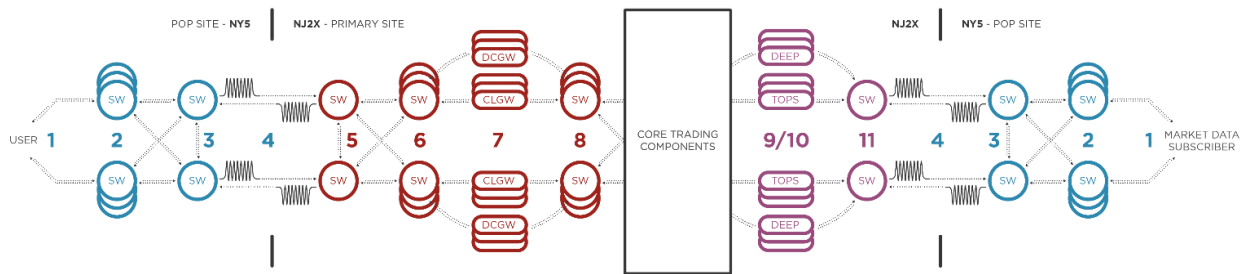
This chart shows a summary of our findings:



The short orange bar on the left reflects IEX’s estimate of its per user annual costs to produce its depth of book data feed, a basic data product of the type that all exchanges sell. We estimated the per user cost for last year was about \$12,000. The long bars on the right show, for each large exchange

group, how much IEX pays for similar depth-of-book feeds from other markets. These range from about \$50,000 annually for the smallest exchange to over \$220,000 for NYSE’s OpenBook product. Here is how we reached these conclusions.

First, we explained how market data is produced in the context of overall exchange operations. The following diagram describes IEX’s basic technology architecture, which as I noted before is similar to that of other exchanges.¹¹



The left side of the chart reflects the first point where users first connect to IEX’s systems through a series of “access switches”. Messages travel through these entry points and arrive at so-called “client gateways”, which receive and validate each user message, translate it into IEX’s protocol, and then send each message on to the systems that are responsible for matching orders. These systems, sometimes called the “matching engine”, are represented by the large vertical box in the center of the diagram. As shown on the right side of the diagram, the market data systems take the processed order messages, transform them into a specified format, and then send the reformatted data to subscribers, after passing through additional hardware.

The main takeaway is that market data is a byproduct of the same processes involved in matching orders, but one that involves separately identifiable systems. In making our cost estimates, we looked at these separate costs to produce market data. For physical assets that were purchased, we amortized the cost over three years, and for licensed and leased assets, we included the annual cost of payments to arrive at an annual cost estimate.

We also made an allocation for personnel, which was the largest cost element. We looked at each employee's activities, and we determined that 33 employees directly impacted the production and delivery of market data in some way. Because each of those 33 employees spends less than all his or her time on market data, we made an allocation for each employee based on the amount of time that each devotes to developing, delivering, or maintaining those products.

This chart summarizes the result:¹²

Annual IEX Market Data Infrastructure	(\$1,791,403)
9. Top of Book Servers (TOPS) (5)	(\$12,833)
10. Depth of Book Servers (DEEP) (5)	(\$12,833)
11. Market Data Feeds Switches (2 x 24 port)	(\$13,333)
ITF Market Data	(\$7,333)
Data Center Space, Power, Security	(\$10,605)
Administrative Access	(\$33,333)
Monitoring	(\$596,135)
Personnel	(\$1,104,998)
Total Users (Trailing 6 months)	150
Annual Cost per Data Recipient / Subscriber for TOPS	(\$11,943)
Annual Cost per Data Recipient / Subscriber for DEEP	(\$11,943)

As you can see, we calculated our annualized costs to offer our two market data feeds at about \$1.8 million, with the lion's share of that owing to personnel expenses. This figure was then divided by the total number of subscribers for those products, to arrive at the per user cost of about \$12,000.

Finally, we compared our per user cost estimate to what the large exchanges charge to a single customer – in this case, us. By comparing our production costs to what we pay them, we were able to provide a sense of how much profit exchanges can make from selling these products. This is what that looked like:¹³

Exchange Family	Exchange	IEX Purchased Feed	Depth Type	Annual Fees	Analogous Annual IEX Cost	Markup Over IEX Cost
NYSE	NYSE	NYSE OpenBook	Aggregated	\$226,320	\$11,943	1,795%
	NYSE Arca	NYSE ArcaBook	Order-by-Order	\$190,320	\$11,943	1,494%
	NYSE American	NYSE American OpenBook	Aggregated	\$61,860	\$11,943	418%
NYSE Total				\$478,500		
NASDAQ	Nasdaq	Nasdaq TotalView (ITCH)	Order-by-Order	\$195,972	\$11,943	1,541%
	Nasdaq BX	Nasdaq BX TotalView (ITCH)	Order-by-Order	\$55,020	\$11,943	361%
	Nasdaq PSX	Nasdaq PSX TotalView (ITCH)	Order-by-Order	\$51,480	\$11,943	331%
Nasdaq Total				\$302,472		
CBOE	Cboe BZX	BZX Depth (PITCH)	Order-by-Order	\$119,280	\$11,943	899%
	Cboe BYX	BYX Depth (PITCH)	Order-by-Order	\$66,120	\$11,943	454%
	Cboe EDGA	EDGA Depth (PITCH)	Order-by-Order	\$66,120	\$11,943	454%
	Cboe EDGX	EDGX Depth (PITCH)	Order-by-Order	\$119,280	\$11,943	899%
Cboe Total				\$370,800		

As you can see, the estimate of potential mark-up over IEX's cost ranged from a little over 300% for the smallest Nasdaq exchange to about 1,800% for NYSE's OpenBook product.

How the Results Translate to Other Exchanges

How have the other exchanges responded to our estimates? Mostly, they have chosen to ignore the study, and to stick to the position that all exchange operations are inextricably connected, and therefore any effort to estimate the cost to produce data is not practical. As I implied earlier, I think that position is both self-serving and ignores business reality.¹⁴

I can imagine several other objections they might raise. They might reject the comparison of IEX data to their own data feeds, on the basis that data from larger exchanges is more valuable. Though it is true that data from the largest markets may be more necessary to traders, that doesn't have anything to do with the cost to produce it. Here is one interesting illustration of this point: Exchanges often sell both aggregated depth feeds, which shows the total number of shares bid or offered at each different price level, and also order-by-order feeds, which show the size and price for each individual order. Aggregated depth feeds require more processing because the exchange must continually combine

orders at each price level to show the total trading interest at each price. Order-by-order feeds, in contrast, require less work because all the exchange needs to do is pass through each order as it comes through the system. And yet, exchanges charge much more for the simpler order-by-order feeds, because they can be delivered faster, and they give information to traders about their priority in an exchange's order book, relative to orders by other firms at the same price. The fact they can charge more does not result from any additional value the exchanges have created – it results simply from the fact that many traders believe they need data in this form to be competitive.¹⁵

The exchanges may also say that larger exchanges have higher costs – bigger facilities, more personnel, higher “sunk” costs in general – than smaller markets. While this is undoubtedly true, it is beside the point. As we point out in the study, the process of producing market data by its nature allows the exchange to extract significantly more revenue on a per user basis for very little incremental cost. For example, an access switch, a basic piece of hardware, may come with 18 usable physical port connections. So, adding a single switch could increase the capacity to distribute an existing market data product to an additional 18 users.¹⁶ This piece of hardware may cost around \$30,000. As I just showed, one market data feed, NYSE OpenBook, may cost one subscriber over \$225,00 per year. You get the point.

In fairness, I think there is a reasonable argument to be had on which cost items should be allocated to market data. Our estimates used a very conservative set of assumptions by counting only those physical assets and employee time that touch market data in a very direct way. We did not account for general administrative expenses, sales and marketing, general system upgrades, or the costs of running the exchange's matching engine. We did this to show that the proximate, “but for” costs of producing data are actually quite low. But could an exchange reasonably include other costs? For example, since some market data consists of reports of trades that emerge from the matching engine, could some of the costs of operating trading systems be included?

The simple answer is: sure. There is no single answer to the question of what part of an exchange's less direct costs might be allocated to market data, or connectivity. But just because there is not one single methodology does not mean that it is not possible to make a reasonable allocation, in the way that all businesses with multiple sources of revenue have to allocate common costs across their business lines.

Charting a Path Forward

In my view, it is not necessary at this point, or maybe even desirable, to agree on a single cost methodology. It would be enough simply to require exchanges to be transparent about both direct and less direct costs that may be relevant. For example, an exchange could publish an estimate of its costs to produce market data that includes direct costs of the type we included in our study and other indirect costs as long as it is explicit in explaining how and why it believes those less direct items affect the production of market data. Different exchanges may make different assumptions about what to include. It could be instructive to understand the different decisions exchanges make, and how they justify the differences. Perhaps, the dialogue that results from this transparency may lead to a consistent standard that could be applied across exchanges.

Another approach to transparency is to require exchanges that make public statements about the revenues and profitability of their data businesses to be more specific about how they derive those figures. When a public company that operates in this space points to its data business as a source of profit or growth, it must have a basis for those statements.

It would also be hugely helpful and instructive if exchanges were also required to disclose much more about their revenues from market data. Exchanges routinely defend their data fees by alleging that revenue increases have been modest over time. In my experience, they provide those numbers selectively. There is no way for the industry or public to know what is being counted, and more important, what is not.

Uniform disclosure of revenues would require no decisions about allocation. Exchanges know how much they earn, for each data product, how many subscribers there are for each, and how those revenues break down by the type of subscriber or type of use. All this detail would be easy to furnish, and it would certainly be more illuminating than cherry-picked numbers. It would be especially useful to know how many paying subscribers there are for each product. If the number of subscribers declines over time, the burden per user may increase substantially even if overall exchange revenues grow more slowly.

It seems clear to me that heightened transparency about both costs and revenues is critical to making progress how to approach market data pricing – under either the fair and reasonable SEC standard, or the reasonable commercial basis standard. Exchanges no doubt will object that this would amount to an overly intrusive reach into their internal business affairs that other companies don't have to endure. My answer to that, and I really don't mean to sound flippant about it, is: Too bad. Most other companies are not able to be exclusive suppliers of a resource that their customers need to viably compete. Exchanges are highly regulated because they perform a vital function in the capital markets, and that role comes with both benefits and obligations.

Conclusion

To sum up my thoughts:

- There are significant similarities between the U.S. and the E.U. in terms of how market structure and the role of exchanges impact the demand for and pricing of exchange market data.
- The arguments on both sides are also highly similar and raise the same basic questions.
- Legal standards are analogous in seeking to ensure that exchanges do not take undue advantage of their unique status.
- In determining whether exchange pricing meets these standards, the cost to produce market data is an important consideration.

- The IEX Cost Study offers a way of understanding how market data is produced and delivered in the context of overall exchange operations.
- Progress in both jurisdictions cries out for much more transparency, applied to all exchanges in the same way, about both costs and revenues.

The main thought I hope you will take away is that efforts to address this issue need to move forward on parallel paths on both sides of the ocean. IEX has tried to play a unique and constructive role in framing the issue and making progress in the U.S., and if we can be helpful in your efforts here, we would be pleased to do so. Let's stay in touch.

¹ For a description of recent plans by the New York Stock Exchange to exclusively provide access through microwave dishes and antenna on the rooftop of its data center, see Letter from Thomas M. Merritt, Deputy General Counsel, Virtu Financial, Inc., to Brett Redfearn, Director of Trading and Markets, SEC, dated June 25, 2019, avail. at <https://www.sec.gov/comments/4-729/4729-5880550-188760.pdf>.

² For a copy of the report, see <https://www.greenwich.com/peak-performance-what-buyside-expects-their-algos-report-download>.

³ SEC Roundtable on Market Data Products, Market Data Services, and Their Associated Fees (October 25, 2018), statement of Mehmet Kinak, Global Head of Systematic Trading and Market Structure, T. Rowe Price, at 65-66, avail. at <https://www.sec.gov/spotlight/equity-market-structure-roundtables/roundtable-market-data-market-access-102518-transcript.pdf>.

⁴ Section 6 of the Securities Exchange Act of 1934 ("Exchange Act"), 15 U.S.C. §78f.

⁵ Section 19(b)(3) of the Exchange Act, 15 U.S.C. §78s(b)(3).

⁶ See *NetCoalition v. SEC*, 615 F.3d 526, 537-540 (D.C. Cir. 2010).

⁷ *Id.* at 543.

⁸ Securities Exchange Act Release No. 84432 (October 16, 2018), avail. at <https://www.sec.gov/litigation/opinions/2018/34-84432.pdf>.

⁹ Securities Exchange Act Release No. 84433 (October 16, 2018), avail. at <https://www.sec.gov/litigation/opinions/2018/34-84433.pdf>.

¹⁰ "The Cost of Exchange Services – Disclosing the Cost of Offering Market Data and Connectivity as a National Securities Exchange (January 2019) ("IEX Cost Study"), avail. at <https://iextrading.com/docs/The%20Cost%20of%20Exchange%20Services.pdf>.

¹¹ IEX Cost Study, at 3.

¹² *Id.*, at 18.

¹³ *Id.*, at 19.

¹⁴ For a response by IEX to the argument that exchanges compete on the basis of "all-in-costs" to trade, including transaction and market data fees, see <https://medium.com/@John.Ramsay/iex-is-all-in-on-pricing-transparency-d1405877b0fc>.

¹⁵ *Id.*, at 14-15.

¹⁶ *Id.*, at 33-34.