An Analysis of Market Data Sales in U.S. Equity Exchanges

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Abstract

Once created as not-for-profit regulatory authorities, today’s stock markets in the United States now earn millions of dollars in profits each year. Twelve of the thirteen active equity exchanges in the U.S. are owned by only three large, publicly-owned corporations, and some argue this concentration has hurt investors who have to pay increasing fees to use exchange services. This paper examines the sales of market data – real time price and volume information sold to high speed traders – and the regulatory framework that has recently began to challenge these fees. Using publicly available data, I find that increases in market data prices are not sufficiently justified, and that the market for market data is likely anticompetitive. Improved data reporting is needed to help regulatory bodies assess the effects of increases in prices for proprietary market data feeds.
Introduction

The United States stock markets are widely considered the best in the world. Stock exchanges have helped connect investors with entrepreneurs for most of American history. The first stock market was created, maybe unknown to them at the time, by the Dutch East India Company through promising investors shares of the future profits earned on their voyages at sea. These loosely formed agreements have turned into the technologically advanced stock exchanges we use today. But what started as a space to connect investors and businesses has turned into something much larger and more powerful.

The New York Stock Exchange (NYSE), the largest stock exchange in the world by total market capitalization, acquired its first traded securities in 1792 and has facilitated trillions of trades since. Stock exchanges today maintain their original purpose: to facilitate buy and sell orders for stocks and connect investors with capital to those who need it. However, today’s stock exchanges look a lot different since primary trading functions have been mostly automated and the goals of exchanges have changed. Stock exchanges invest heavily in technological infrastructure that can automate a large number of transactions at high speeds. Rather than shouting back and forth on the trading floors of Wall Street skyscrapers, modern traders face computer screens and monitor advanced computer programs that route information through large data centers in New Jersey to trade automatically. This drastic change can be attributed to the availability of new technologies and also the regulation of the industry over time.

In addition to dramatic changes in the technology used by stock exchanges, the space has seen a shift in the expected role of exchanges. Stock exchanges were originally intended to act as

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2 https://bebusinessed.com/history/history-of-the-stock-market/
4 Bloomberg - Inside Equinix's NY4 Data Center Where Wall Street Trades
regulatory authorities but have now become profit seeking corporations – the SEC began to approve exchanges’ requests to turn profits in the 2000s. The space has also seen rapid consolidation of stock exchanges that have teamed up to share their technological infrastructure, clients, listed companies, and data. The result is a very concentrated industry.

Twelve of the thirteen active equity exchanges in the United States are owned by only three corporations: International Continental Exchange (ICE), Nasdaq, Inc., and Cboe Global Markets. Investors Exchange (IEX) is the only independent, privately-owned stock exchange remaining and this is no accident. Brad Katsuyama, who is followed in Michael Lewis’ famed book *Flash Boys*, created the Investors Exchange to try to stand up to these giants. IEX offers the same services as any competitive stock exchange at lower fees and facilitates transactions at slightly delayed speeds to eliminate unfair advantages abused by high frequency traders in other exchanges. IEX actively advocates for investor rights, bringing attention to unfair practices in the stock market and creating transparent reports on their experience as a new stock market in an attempt to position themselves as the only socially responsible exchange. While IEX, along with the SEC, tries to address many concerns of inequity in stock exchange practices, this paper focuses on one in particular: market data.

In addition to facilitating transactions of an always growing list of different securities that can be traded, stock exchanges today also offer valuable market information services including the dissemination of trading data. By facilitating many trades of various financial instruments between various parties, stock exchanges accumulate a lot of data that investors, companies, and scholars alike find valuable. Feeds of this market data offer real time snapshots of the economy. These data feeds report the supply and demand for different securities, the amount traded, and

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5 Unfair Exchange: The State of America’s Stock Markets  
6 Flash Boys: A Wall Street Revolt
the prices at which the securities are traded. These information streams feed directly into traders’ algorithms almost instantaneously so that trades can be requested back to the exchange almost automatically. The technology needed to make this rapid back and forth transfer of information is impressive – stock exchanges invest heavily in data centers, cabling, servers, etc. to make automated trading more efficient. The end result of high frequency trading companies rapidly making many trades is that market data becomes more robust – with more trading activity comes more data to report.

The global economy – including multinational corporations, governments, and investors among others – has become largely dependent on these data feeds to stay updated on market activity. The problem is that not all market data feeds are equal. There are two basic categories for market data feeds: consolidated and proprietary. The Consolidated Tape Plan was introduced by the SEC to help protect investors and ensure trades are made at the best available price. All stock exchanges must send their data to the (SIP) where the information is then sent out in a single consolidated feed that is delayed about 15 minutes or more. Luckily companies like Google and Yahoo pay for the right to display these consolidated feeds for free so anyone with an internet connection can have access to only slightly delayed market data. The other type of market data feed is a real time proprietary feed. Exchanges sell their real time unique feeds to any investors interested in the advantages gained by receiving market data with no delays. These two feeds are comparable to many long-term, passive investors, but in the world of rapid, automated trading where a microsecond can make a difference, 15 minutes is actually a very large delay. Real time proprietary data is only available to those who are willing to pay a price – and market data fees are on the rise.8

7 https://www.ctaplan.com/
8 Expand and SIFMA - An Analysis of Market Data Fees
High speed investors’ willingness to pay for these real time data subscriptions signifies the value of the trading advantage gained through these connections. At least in comparison to investors that are trading on delayed data from consolidated feeds, traders in possession of real time proprietary market data can make better informed trades. This means some amount of profits to be made in trading are only accessible to those with the ability to pay large upstart costs for the software needed to make automated trades and the data itself that is fed into these algorithms. Already successful high speed traders and banks can continue to gain advantages as ordinary retail investors that cannot afford data products are potentially left out.

The SEC has put pressure on the fees exchanges charge for market data in the last few years which has raised new questions about the role of stock exchanges and appropriate regulatory response to their market power. It was not long ago that exchanges did not earn profits and trades were made on paper. Many issues can arise from the current two-tiered system for market data. First, market data fees can price out retail investors from valuable trading information thus creating an uneven playing field in trading. Second, the SEC may not be effectively addressing changes in the industry. Third, stock exchanges may display anticompetitive behavior which raises prices for market data that is commonly paid for by consumers in the form of broker fees.

In the following sections, this paper will explore the current popular viewpoints held on the issues surrounding market data sales and draw from publicly available data to analyze the competition faced by stock exchanges and the effect of IEX on the industry.
Literature Review

The debate around market data fees can generally be broken down into two views: one held by the SEC and IEX in favor of the reduction of market data profits and that of the stock exchanges themselves, the group that supports the sales of market data: ICE, Nasdaq, and Cboe.

The first viewpoint, that stock exchanges should earn reduced profits from market data sales is held by the SEC and IEX, but also by stock brokers – the market makers that need to access real time market data in order to best inform their clients and operate within the regulatory guidelines set forth by the SEC. This section will first identify the unique claims made by each party and then hypothesize the incentives these groups have to challenge the sales of market data based on available literature.

First, the SEC holds the view that market data pricing is anticompetitive and that stock exchanges abuse market power to make purchases of their data products worse off. SEC Commissioner Robert J. Jackson Jr. delivered a speech in September 2018 to George Mason University that clearly outlines some of the views that oppose increasing prices for market data and rationale behind updating the SEC’s hands-off approach to market data sales: “we at the SEC have far too often continued to treat the exchanges with the same kid gloves we applied to their not-for-profit ancestors.” Market power has become concentrated so that a few powerful players control the markets and hurt investors. In reference to the two-tiered system, Jackson Jr. says, “It’s like letting Barnes & Noble run our public libraries. Nobody should be surprised to find that our libraries don’t have enough books.”9 It is clear that people at the SEC want to make changes to the system they have created.

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9 Unfair Exchange: The State of America’s Stock Markets
The SEC mandated through the Securities Acts Amendments of 1975 that a public feed of stock exchange prices be created and made available to all investors. This National Market System (NMS) governs the activity of all national securities exchanges (including Nasdaq who controls it) to facilitate the fair distribution of information. To further update these rules in the face of changing technology, the SEC introduced Regulation National Market System (Reg NMS). These updates help investors get the best price at the execution of their order through the Order Protection Rule and require brokers to route their orders to the venues offering the best-displayed offers through the National Best Bid and Offer (NBBO) requirement. This NBBO requirement was designed to protect investors from the NYSE-Nasdaq duopoly and ensure investors traded at the best prices available, but this requirement has also pushed brokers to connect to all exchanges to meet this requirement. In order to process trade orders in real time, brokers need real time data, and in order to ensure a trade is executed at the best available price, brokers need to connect to every relevant exchange to guarantee the possession of complete pricing information. Brokers are pressured by the SEC to purchase proprietary real time data products from stock exchanges and these costs can be passed on to consumers in the form of brokerage fees. Brokers, represented by Securities Industry and Financial Markets Association (SIFMA) have thus challenged the increasing prices of market data.

SIFMA released in 2018 a report outlining their view of market data fees. The report expresses their concern of increasing prices for data products that they are effectively forced into purchasing. They find both retail and institutional firms have continued to buy both proprietary and consolidated data despite cost increases which has resulted in significant cost increases for firms and their clients. The report outlines their current obligation required by Reg NMS to buy

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10 Regulation NMS, SEC Release No. 34-51808; File No. S7-10-04
into this system and provides data to support significant increases in prices of data. “For individual firms, depending on their business models, the price increases anywhere from 967% to 2,916% (or more) just to get the same data in 2019 they were getting in 2010.” These egregious price increases may reflect the increased value attributed to this data due to improvements in trading strategies or more simply a profit-seeking unilateral increase. Either way, SIFMA calls for a new National Market System to be re-regulated to be built to new standards: fair and level playing field, incentivized competition, elimination of conflicts of interest, among others.11 Another organization to create a similar report is IEX.

Investors Exchange (IEX) was created to try to shake up the stock exchange landscape. IEX prices its services to closely resemble the direct costs associated with running the exchange. In order to stand out from other equity exchanges who have been accused of being withholding of the costs associated with providing their market data products, IEX published a report that gives an exclusive look into the costs of running a stock exchange in the United States. This report compares prices of various types of market data products offered by NYSE, Nasdaq, and CBOE to prices IEX charges for similar data products. For example, for depth of book data products, this report finds that other exchanges charge fees 900%-1,800% over IEX’s cost to offer a comparable product. IEX justifies using their own costs to compare to competitors’ prices because they have similar technological requirements to provide the same exchange services and if costs were to differ at larger exchanges, they should be lower than those of IEX due to economies of scale.12 These egregious margins earned above cost on these market data products may very well be conservative estimates.

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11 Expand and SIFMA - An Analysis of Market Data Fees
12 IEX – The Cost of Exchange Services
In addition to the report outlining costs, IEX features on its website an amicus curia in relation to the ongoing court dispute between the SEC and Nasdaq/NYSE Arca. In 2018 the SEC, in response to challenges by SIFMA, blocked an attempt by stock exchanges to further increase market data fees because the exchanges had not justified the price increases. This was the first time the SEC has rejected fee increases for market data and may represent a precedent for future regulatory pressure. In addition to those that were outright rejected by the SEC, 400 other market data fee increases were effectively put into limbo and NYSE and Nasdaq were given a year to review brokers’ complaints that fee increases hurt competition.13

IEX submitted this letter to the court to support the SEC in its ruling that the stock exchanges in question failed to demonstrate competitive constraints on the pricing of their data products. IEX uses its own experience in offering market data to support this conclusion, “The only plausible explanation for exchanges being able to increase the overall fees for market data feeds, even as another exchange is offering such data for free, is that exchange data feeds are not competing with one another as substitutes.” IEX, like SIFMA would like to see changes made to the exchange system to better align the incentives of market participants. Going public meant that in addition to serving their members and users, stock exchanges now have an obligation to their shareholders, and IEX argues this is a sign of misaligned incentives in the market.14

Many groups are clearly spending a lot of effort to curb increased profits earned from sales of market data, and it will be interesting to see how exchanges respond to SEC requests in 2019 because the issue may not be as black and white as it seems.

The SEC has incentives as a regulatory authority to protect investors through policy. Policies that limit market data prices can help offer a more level playing field for all types of

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13 WSJ - SEC Ruling Takes Aim at Stock-Exchange Profits
14 IEX – The Cost of Exchange Services
investors and more accessible information for all. The SEC generally examines whether fees charged for critical market data services are fair and reasonable, not discriminatory and subject to competitive forces. ¹⁵ SIFMA represents securities firms, banks, and asset managers in their desire to reduce market data prices, because in order to always execute trades within NBBO guidelines, these entities need to connect to all exchange data feeds and pay large sums for these services. IEX joins SIFMA in these claims as well as their proposal for changes to the current National Market System to better support a level playing field in investing and align the incentives of all stock market participants including brokers.

The collective view against increasing market data fees held by these groups can be summarized by the following points: 1) market data prices have been increasing and stock exchanges have not justified these increases by providing information on the costs associated with providing these services, 2) there is heavy concentration in stock exchanges and competition for trade orders does not translate to competitive forces that influence market data prices, 3) stock exchanges should be required to report more specific information on not only the costs associated with providing data products, but also the revenues earned from different types of market information services, 4) regulatory intervention is required to protect investors by either limiting the role of exchanges or modifying the National Market System.

Should the SEC concern itself with the costs of organizations associated with SIFMA in the name of investor protection when these asset managers and banks report their profits in billions of dollars? Should IEX be trusted when they have strategic incentive to lobby for limiting the reach of their competitors? The second viewpoint, that held by the stock exchanges

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¹⁵ SEC - Report of the Advisory Committee On Market Information: A Blueprint For Responsible Change
earning profits from the sales of market data, also has credible support. Support for sales of
market data is championed by the corporations that own all but one stock exchange in the US but
also by various academics that take a different approach to these issues.

Charles M. Jones of Columbia University lists rebuttals to those concerned about the
sales of market data in his paper, *Understanding the Market for U.S. Equity Market Data*. He
uses data from 10-K forms and other publicly available information, including newly released
market data rebate figures, to measure the scope of the problem; he finds market data fees are
modest and stable over time. He argues exchange equity market data fees are a small cost for the
industry and are orders of magnitude smaller than investment bank earnings from equity trading
and broker-dealer commissions, in comparison. Additionally, exchanges face robust competition
for their data products business because exchanges will offer free data feed subscriptions on a
trial basis in order to build market share in trading. This competitive market for data products has
led to innovation in the product line with a wide variety of features at different price levels, and
the “resulting transparency concerning stock equity trading activity is likely one of the reasons
that U.S. equity market quality is the best in the world.”

*Understand the Market for U.S. Equity Market Data*  

Another paper introduces a new idea to the discussion on market data – that financial
exchanges create markets and produce prices. Taking the pricing of securities as a given will
naturally lead to the conclusion that exchanges have monopoly power. But accurate real time
pricing is only possible if stock exchanges are operating effectively. These writers believe the
monopoly treatment of exchanges is unfair, and they encourage those concerned with market data to view the problem differently.17

While buyers, sellers, and brokers are needed for transactions to be possible, the exchanges must execute each transaction effectively to be able to create the price information seen in data feeds. Some argue exchanges should not be able to earn large profits from selling market data because they rely on the activity of investors to create the data.18 After all, when no trades are made on its platform, an exchange cannot offer any proprietary data to sell, let alone contribute to the consolidated feed. Exchanges and investors are both necessary actors in the creation of prices, so it may be difficult to assign property rights to one group and not the other. Why should exchanges not earn a return on their investment into price making? Why should investors pay for feeds of data made using investor data?

The second view, that in defense of market data sales represented by the exchanges themselves (not including IEX), many financial professionals, and academics can be summarized by the following: 1) market data fees are not very large compared to revenues earned in other areas of the industry, and the valuable services stock exchanges provide should be sold at a price, 2) stock exchanges should earn a return on their investment into price discovery as any other company earns profits from selling products, 3) large investment vehicles need not be protected from these fees (typically measured in thousands annually) when investment banks and asset managers report their revenues in billions, 4) stock exchanges face fierce competition for data products and have incentives to lower prices of market data feeds in order to maintain market shares.

17 Prices Are Property: The Organization of Financial Exchanges from a Transaction Cost Perspective
18 IEX Amicus Brief - THE NASDAQ STOCK MARKET LLC AND NYSE ARCA, INC. v. SEC
These two views primarily express the extreme polar sides in recent court cases involving the exchanges and the SEC. It is possible the truth about market data fees is that maybe they are neither very big nor very small. It should be no surprise that regulations can be made to make the stock market a more level playing field, but also use of advanced technological infrastructure should not come free. Middle ground can be found here by recognizing stock exchanges as natural monopolies. Like electric utilities or large infrastructure projects, the stock market could likely benefit from lowest costs under a monopoly. Stock exchanges require very large fixed costs to build data centers, cabling, and other infrastructure, yet each trade executed has a low marginal cost. Once the technology is in place, stock exchanges can handle a large quantity demanded because average costs should decrease in quantity:

If the entire demand within a relevant market can be satisfied at lowest cost by one firm rather than by two or more, the market is a natural monopoly, whatever the actual number of firms in it. If such a market contains more than one firm, either the firms will quickly shake down to one through mergers or failures, or production will continue to consume more resources than necessary.\(^{19}\)

And beside costs structures, stock exchanges have another characteristic in common with other natural monopolies.

Social media sites like Facebook fight for total users from similar platforms, and with each new member, the social media platform can deliver a stronger product. This can be explained by externalities: each additional member creating a Facebook account provides one more reason why another user should choose Facebook over Google Plus or Myspace. With better market share comes better connectivity between users. When it comes to interactive

\(^{19}\) *Natural Monopoly and its Regulation*
communication technologies, network externalities tell us that people are not likely to adopt unless a sizable number of the people they communicate with are already using the platform.\textsuperscript{20} The same is true of stock exchanges in the context of market data. The value of proprietary market data increases for investors as this data becomes more robust through increased trading market share. As stock exchanges convince more investors to execute trades on their platform, they will accumulate more data and more incentives for investors to sign up to see this exclusive data in real time, similar to externalities creating value for existing users with each new social media subscription to the platform. Both cost structures and externalities create arguments to view stock exchanges as natural monopolies and regulate them as such.

Maybe the equity stock exchanges owned by INE, Nasdaq, and Cboe are neither firms facing fierce competition for their proprietary data products nor monopolistic powers with full control over the pricing of market data and deterrence of new entrants such as IEX.

\textsuperscript{20} NYT - It’s a Matter of Network Externalities
Data

Data pertinent to the revenues earned from market data and the direct costs associated with the dissemination of data products is notoriously sparse. This paper draws from publicly available data using 10-K reports for the corporations that own a majority of the equity exchanges in the United States. Corporations must report annually to the U.S. Securities and Exchange Commission through 10-K forms that give a comprehensive summary of financial performance. In addition to reporting on a company’s business and financial condition, form 10-K includes audited financial statements. This paper uses annual financial information found in these financial statements in the form of revenues, expenses, operating income, and net income. 10-K forms date back to 2005 for Intercontinental Exchange (ICE), 2001 for Nasdaq, and annual reports for Cboe Global Markets date back to 2000. Also useful in these reports are qualitative breakdowns defining each line item of revenues. The data is expressed in annual totals, but since these three corporations own most equity exchanges, these forms offer a comprehensive yearly view of the stock exchange industry. Because these parent companies also own options exchanges for example, the total figures found in these forms include financial contributions from more than simply equity exchanges.

Trading volume data used in this paper comes from the Securities Industry and Financial Markets (SIFMA) research website. The US Equity Issuance and Trading Volumes site offers annual U.S stock market average daily trading volume by tape. This data has been consolidated into the 3 corporation groups in addition to other tapes that include IEX and smaller exchanges owned by these companies. The primary exchanges of these corporations should be reasonably representative of trading volumes for each corporation in total: NYSE for ICE, Nasdaq for Nasdaq Inc., and Bats and Direct Edge are included in Cboe Global Markets totals. This average
daily trading volume data gives some idea of the total activity in U.S. equity markets though it does not offer a complete picture. The data is intended in this paper to represent a rough measure of total activity that stock exchanges need to handle, and is used as a measure of market trends. For example, a year to year increase in average daily trading volume for equities may justify an increase in revenues (or costs) over the same time period because stock exchanges earn revenues for each trade through transaction fees.

Compiling annual totals into cohesive tables becomes difficult when these companies change how they report different line items due to acquisitions, development of new products, or regulatory constraints. This section breaks down qualitative definitions of market data revenues offered in corporation 10-K and annual reports to shareholders.

NSYE market data revenues have been reported in 10-K forms since 2005 in one of three forms:

1) Exchange Data and Feeds Revenue: Our exchange data primarily represents subscription fees for the provision of our market data that is created from activity in our Trading and Clearing segment.

2) Data Services Fees: We generate revenues from the dissemination of our market data to a variety of users. Subscribers can obtain access to our market data services either directly or through third-party distributors.

3) Market Data Fees: We generate revenues from the dissemination of our market data to a variety of users.

Nasdaq market data revenues are reported in 10-K forms or annual reports to shareholders in two ways:

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21 Intercontinental Exchange 10-K Reports
1) Market Information Services: As a market operator, Nasdaq collects and disseminates price quotations and information regarding price and volume of executed trades. Market participants in The Nasdaq Stock Market have real-time access to quote and trade data. Interested parties that are not direct market participants in The Nasdaq Stock Market also can receive real-time information through a number of market information services products.

2) U.S. Market Data Products: Our market data products enhance transparency and provide critical information to professional and non-professional investors. We collect, process and create information and earn revenues as a distributor of our market data. We provide varying levels of quote and trade information to market participants and to data distributors, who in turn provide subscriptions for this information. Our systems enable distributors to gain direct access to our market depth, index values, mutual fund valuation, order imbalances, market sentiment and other analytical data. We earn revenues primarily based on the number of data subscribers and distributors of our data.

3) Data Products Revenues: are earned from U.S. and European proprietary data products and index data products. In the U.S., we also earn revenues from U.S. tape plans.\(^22\)

Cboe market data revenues are reported in the following ways:

1) Market Data Fees (1): represent income derived from the sale of our transaction information through the Options Price Reporting Authority ("OPRA") and primarily through our subsidiary, Market Data Express, LLC ("MDX"). Through MDX, we sell

\(^22\) Nasdaq, Inc. 10-K Reports
historical options data, as well as real-time data for certain proprietary products and indexes. It also provides market data through CBOE Streaming Markets, a high-availability, low latency streaming data feed.

2) Market Data Fees (2): Market data fees represent the fees from the U.S. tape plans and fees from customers for proprietary market data. Fees from the U.S. tape plans are collected monthly based on published fee schedules and distributed quarterly to the U.S. exchanges based on a known formula using trading and/or quoting activity. A contract for proprietary market data is entered into and charged on a monthly basis in accordance with the Company’s published fee schedules as the service is provided. Both types of market data are satisfied over time, and revenue is recognized on a monthly basis as the customer receives and consumes the benefit as the Company provides the data.  

Cboe has the most consistent reports on how market data revenues are defined.

Investors Exchange (IEX) no longer charges market data fees and thus does not report on such revenues. The IEX report, The Costs of Exchange Services provides an inside look at the costs required to run a stock exchange and the costs directly associated with offering market data products. This report contains useful qualitative data about the technology used by stock exchanges and specific costs for the purchase, installment, and servicing of pertinent equipment. IEX compares costs needed to offer its own data products to the fees charged by competing exchanges in order to calculate margins charged over cost for each market data product type.

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23 Cboe Global Markets 10-K Reports
Analysis

Causal relationships are difficult to establish using the data available. Because three corporations own twelve of the thirteen active U.S. equity exchanges, and IEX is a privately held company with separate reporting standards, there are three data points to examine each month reported by companies reluctant to share any more information. Because monthly data is not available for older years in the 10-K reports, this analysis examines annual data to examine trends over time. Firm level data is also not available as investment firms may not want to disclose their strategies, though it is likely each large investment bank and asset manager is connected to most if not all feeds. With limited data and changes in reported definitions of market data over time, the following analysis focuses on general trends to compare market data revenues to other yearly, publicly available metrics.

10-K Data Analysis

To confirm findings of the SEX, IEX, and SIFMA reports of the last two years and general sentiment among major news outlets, market data revenues are on the rise. ICE (primarily from NYSE) saw total market data revenues increase from $446 million in 2014 to $670 million in 2018. Nasdaq saw gains in market data revenues from $198.5 million in 2006 to $454 million in 2017. Cboe has seen a drastic increase from about $8 million in market data revenues to $204 million in 2018. However, these increases in revenues cannot be taken at face value. While these three companies now dominate the landscape, this was not always the case. Changes in market technology and strategies, acquisitions and sell-offs, and many other factors influence these figures. It is found in other reports (SIFMA) that the fees charged for market data
product subscriptions are on the rise, corroborating increases seen in total revenues, but the revenue trends alone do not tell the full story.

In order to draw conclusions from trends in total revenues, figures in the Appendix section compare revenues to other available metrics. Figure 1 shows Intercontinental Exchange total revenues compared to average daily trading volume at NYSE. As by far the largest exchange of ICE, NYSE market revenues should represent a majority of market data revenue totals and trends, though this specific data is not available. The figure shows market data revenues steadily increasing over time while average daily trading volume for each year mostly stays constant. NYSE has not made major changes in this time frame (it has dominated the U.S. stock market for most of its history) and should not see increased revenues as a result of market data revenues unless either the price of the service has increased or the quantity of subscriptions to NYSE proprietary data feeds has increased. Unfortunately, information on number subscriptions is unavailable.

To examine these market data revenues in relation to total company revenue trends, Figure 2 shows market data revenues as a percentage of total revenues for each year. As this percentage is increasing over time, there seems to be an increase in market data revenues earned compared to other business sectors at ICE-owned exchanges. Because volume and market share (Figure 3) are steady over time, price rather than quantity is the likely source of increase in revenues. It makes sense then that other reports have found increases in the prices charged for these products. Market data price increases that are not justified in costs directly associated with the services offered or proportional increases in volume, market share, or total revenues are deemed unreasonable by the SEC.
Studying changes in market data revenues as a fraction of total revenues over time can raise important questions. Figure 4 shows Nasdaq market data revenues as a proportion of total revenues increasing over time as this becomes an increasingly profitable business segment. While Nasdaq, Inc. has seen many changes as a company since 2007 including the acquisition of BATS exchange, market data revenues alone are not useful to study. Even the breakdown of total revenues into business segments may not useful given the company has seen so many structural changes over this time period. In general, increasing proportions of market data to total revenues over time suggests the sale of market data is seeing higher percentage gains than other business segments. Organizations like IEX of SIFMA may want to highlight these increases on their own, but Figure 5 complicates the analysis. Figure 5 shows an increase in the costs of total revenues which under SEC guidelines can justify price increases for market data services if the cost of providing market data products is also increasing. There is not enough data available to isolate the causes for increases in market data revenues. What we know for sure is that these products are more expensive than they used to be and competitive forces have kept marginal transaction costs low. What is not known is the relationship between market data revenues and the costs directly associated with market data revenues.

Figure 6 shows drastic increases in Cboe Global Markets market data revenues in 2017 and 2018, but this can likely be attributed to the acquisition of BATS exchange. Figure 7 shows there is not an increase in market data revenues as a percentage of total revenues which complicates the hypothesis that exchanges’ increase in prices is unfair in some way.

Altogether, analysis of these three corporations’ market data revenues in relation to other publicly available annual metrics shows that revenues earned from market data connection and subscription fees are increasing over time, but the cause for these increases is unclear. It cannot
be determined with available data whether increases in market data prices can be attributed to
corporate greed and the exercise of market power or the justifying increases in costs related to
providing these services. What is more clear is that the introduction of IEX in 2016, which has
today accumulated about 3% of trade orders from these three corporations, did not have a
noticeable effect on the increase in prices of market data.

As IEX claims, how could decreases in market share for trade orders caused by the
introduction of a competitor with lower prices correspond to an increase in market data prices
unless there is not fierce competition for existing market data products? This analysis primarily
leads to the conclusion that these companies should address these price increases and release
more data in their reports to prove their price increases are justified. These companies, given
their stranglehold on the market for trade orders, have little to lose by releasing more specific
financial data unless they are hiding malicious activity.

**Herfindahl-Hirschman Analysis**

The Herfindahl-Hirschman index is a popular measure of concentration in an industry. It
is calculated by squaring the market share of each firm and summing the resulting numbers. The
U.S. Department of Justice considers a market with an HHI of less than 1,500 to be a competitive
marketplace, an HHI of 1,500 to 2,500 to be a moderately concentrated marketplace, and an HHI
of 2,500 or greater to be a highly concentrated marketplace.²⁴ Taking stock exchanges as firms
that some say should be rewarded a return for their investment in price discovery allows the use
of total revenues of the three corporations and IEX, to measure a Herfindahl-Hirschman index
for U.S. securities exchanges. Figure 8 details the calculation. If market data is to be considered a

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²⁴ https://www.justice.gov/atr/herfindahl-hirschman-index
product just like a can of soda or a baseball glove, the industry for U.S. equity exchanges would be considered very concentrated by the Department of Justice. There is a disconnection between the competition for trade volume and competition that could keep market data prices low. While it is obvious that few superpowers control most securities markets in the U.S., it is also clear that the market for market data is extremely concentrated with a Herfindahl-Hirschman index score of 3,479, well above the threshold of 2,500 for very concentrated markets.
Conclusion

It has been shown that better reporting is required to make sound judgements on the best way to regulate stock exchanges in the U.S. Without more transparency from securities exchanges explaining the costs directly associated with disseminating market data, industry professionals are right to be skeptical of increasing market data prices. If the current equity exchange oligopoly made up of Intercontinental Exchange, Nasdaq, Inc., and Cboe Global Markets, would like to eliminate the assumption that they exercise market power to adversely affect investors through raised prices or market data, then it is well within their power to come forward with information disproving this notion. Until other exchanges become as transparent in their reporting as IEX has been, the exchange superpowers will deservedly see themselves in future battles with the SEC.

The true scope of the problem is hard to measure – brokers should not fight market data price increases in court for investors’ sake when they report their revenues in billions of dollars. But since the costs brokers face to stay connected within SEC guidelines can be passed on to investors through brokerage fees, no amount of unjust price increases should be considered too small. It is up to regulatory bodies like the SEC to look out for investors’ rights to not pay any more into the system than necessary to benefit from a fair and level playing field.

It is clear that stock exchanges have evolved to become something other than originally intended. Large changes in the competitive landscape, technological advances, and the rise of automation for stock exchanges has not been met with an appropriate amount of regulation from the SEC, and a serious review of the intended role of securities exchanges needs to continue to protect investors and prevent further overreach from stock exchanges - organizations originally created as regulatory authorities.
Appendix

Figure 1

Description: NYSE exchange market data revenues are measures in millions of U.S. dollars, and are represented by blue columns. Average daily trading volume for each year shown is measured in millions of trades and is represented by an orange line.

Figure 2

Description: NYSE market data revenue is expressed in this figure as a percentage of total revenue reported in the same year. This data is found in ICE 10-K forms.
Figure 3

Description: NYSE market data revenues are measured in millions of U.S. dollars and are represented by blue columns. NYSE market share, as a percentage of total trading volumes, is represented by the orange line.

Figure 4

Description: Nasdaq market data revenue is expressed in this figure as a percentage of total revenue reported in the same year. This data is found in Nasdaq, Inc. 10-K forms.
Figure 5

Description: Nasdaq, Inc. total costs of total revenues is represented in red while data product revenues are represented in green. Both figures are measured in millions of U.S. dollars.

Figure 6

Description: Cboe Global Markets total market data revenues are measured in millions of U.S. dollars and are represented in blue columns.
Figure 7

![Cboe Market Data Revenues](image)

Description: Cboe market data revenue is expressed in this figure as a percentage of total revenue reported in the same year. This data is found in Cboe Global Markets 10-K forms.

Figure 8

<table>
<thead>
<tr>
<th>2018 Revenue (millions)</th>
<th>Revenue Market Share</th>
<th>Market Share Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICE</td>
<td>4,979.0</td>
<td>41%</td>
</tr>
<tr>
<td>Nasdaq, Inc.</td>
<td>4,277.0</td>
<td>35%</td>
</tr>
<tr>
<td>Cboe Global Markets</td>
<td>2,768.8</td>
<td>23%</td>
</tr>
<tr>
<td>IEX Group</td>
<td>54.1</td>
<td>0%</td>
</tr>
<tr>
<td>Total Revenue</td>
<td>12,078.9</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th></th>
<th>HH Index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.347858</td>
<td>3479</td>
</tr>
</tbody>
</table>

Description: this table shows the breakdown of a Herfindahl-Hirschman Index, using total yearly revenues to calculate market share for companies that own national securities exchanges in the U.S. The sum of squares of market shares is multiplied by 10,000 to reach the final HH index score of 3479.
Bibliography


