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Securities and Exchange Commission
100 F St. NW
Washington, DC 20549-9303
Rule-comments@sec.gov

Re: Market Data Infrastructure

File No. S7-03-20

Dear SEC:

In summary:

On core data:

- Including depth of book as core SIP data is a great idea that will create a more level playing field.
- Given the rise of ETPs, the core data should include ETP indicative values (.IVs) so retail investors can check whether the ETP is trading close to the indicative values.

¹ All opinions are strictly my own and do not necessarily represent those of Georgetown University or anyone else. Over the years I have served as a Visiting Academic Fellow at the NASD, served on the boards of the EDGX and EDGA exchanges, served as Chair of the Nasdaq Economic Advisory Board, and performed consulting work for brokerage firms, stock exchanges, market makers, and law firms. I've also visited over 75 stock and derivative exchanges around the world. As a finance professor, I practice what I preach in terms of diversification and own modest holdings in most public companies, including brokers, market makers, and exchanges.

- The core data update should fix the symbology mess by mandating a common symbology for equity suffixes across listing venues.

On the round lot:

- Widely available depth-of-book data makes the round lot obsolete.
- If any orders are “protected” against trade-throughs, all of them should be. Better to drop the obsolete “protected” quote category and simplify market structure.
- Retail execution quality should be measured against the Effective Best Bid or Offer (EBBO) based on the actual shares available for a customer’s order size.
- The NBBO should be replaced with an Indicative Best Bid or Offer (IBBO) good for a trade of \$10,000.

On “competing” consolidators:

- Competing consolidators WON’T end the market data wars! The SEC will always be stuck refereeing market data prices.
- Competition sounds nice in theory, but the standard “free markets are groovy” notions don’t hold for oligopolistic data markets in complementary goods.
- Conspiring consolidators will compete expensively on speed, driving up costs.
- Competition has so far failed in the EU to provide a consolidated tape.

On the pricing of market data:

- Exchanges produce joint goods of data and order matching, like sheep produce wool and meat. Allocating fixed overhead costs to the joint products is an imperfect exercise that make “cost-based” prices an illusion.
- Congress explicitly allows discriminatory pricing as long as it is “not unreasonable.”
- Competition in trade fees offsets rents in market data.
- Retail gets a good deal under the current regime. The SEC should insure that this continues.

Otherwise:

- Incomprehensible repetitive 597-page rule filings hurt the SEC’s chances of defending rules in court as well as obtaining badly needed additional resources from Congress.

I. Introduction

Market participants have been arguing over market data for more than a century.² Our grandchildren will be arguing over market data as there is no perfect solution. Every few years, the Commission responds to complaints and looks into the matter. Once it realizes what a can of worm it has opened up, it usually recoils as if from a hot flame. It then brokers some compromise and kicks the can down the road to future Commissions. I commend the current Commission and its staff for having the courage to address the issues and contemplate a relatively bold solution.

The Commission has proposed to include depth-of-book data as part of the core consolidated data, to tinker with the size of the round lot, and to introduce competing consolidators for market data. Including depth-of-book data in core consolidated data is a good idea. This has implications for the concept of the round lot that makes the round lot as obsolete as a paper stock certificate. A better solution is to just get rid of the round lot. Alas, the competing consolidator plan will not end the endless bickering over market data. Just look at the lack of success the EU has had in introducing competing data consolidators.

In the beginning, market data were considered to be the intellectual property of the exchanges that produced the data. Alas, the NYSE refused to sell its data to entities it deemed competitors, setting up a regulatory and legislative backlash.³ In 1975 Congress passed the National Market System amendments to the Securities Exchange Act.⁴ Congress explicitly realized the importance of market data, and called for a competitive national market system in which exchanges competed with off-exchange entities in a market linked together with good information. This set in force a process that created the Stalinist collectives we know and love as the CTA and UTP plans.⁵ The exchanges were forced to pool their top-of-book quotes and last sale data together. My understanding is that when the CTA was set up, the last

² See Mulherin, J. Harold, Netter, Jeffrey M. and Overdahl, James (1991), 'Prices Are Property: The Organization of Financial Exchanges from a Transaction Cost Perspective', *34 Journal of Law and Economics*, 591-644.

³ For a first-hand account, Don Weeden's memoirs are highly worth reading. *Weeden & Co.: The New York Stock Exchange and the Struggle Over a National Securities Market* <https://www.amazon.com/Weeden-Co-Exchange-Struggle-Securities/dp/097277890X>

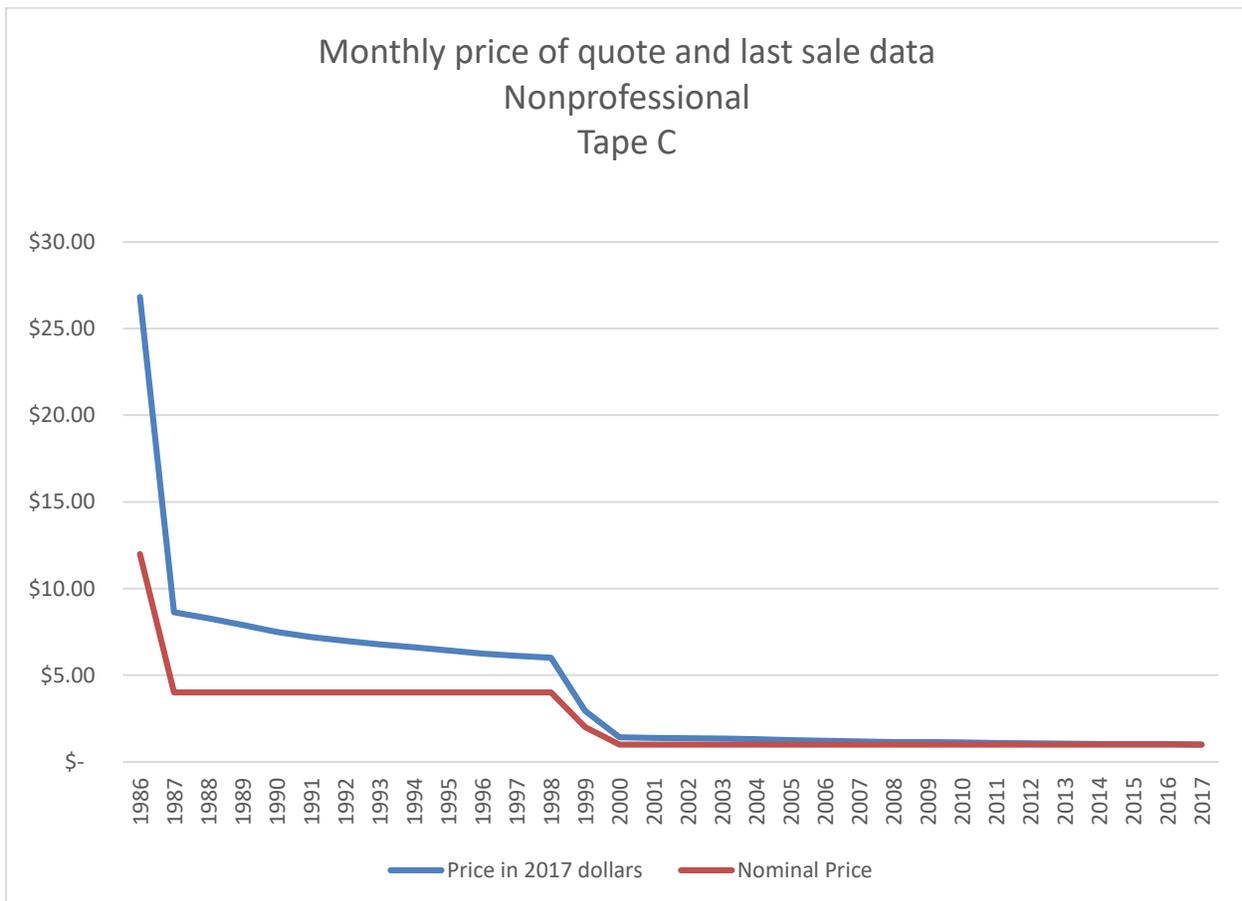
⁴ Section 11A was added in 1975. The 1975 Amendments created the regulatory category of Securities Information Processor (SIP). The consolidated data distributed through the CTA and UTP plans are commonly referred to as SIP data and the plans are commonly referred to as the SIPs.

⁵ The top of book, last sale, volume, and related data are disseminated through the UTP Plan for Nasdaq-listed stocks. (UTP stands for Unlisted Trading Privileges, www.utpplan.com.) This is known as Tape C. The data for other stocks are disseminated through the CTA Plan. (Consolidated Tape Association, www.ctaplan.com) Tape A is for NYSE-listed shares and Tape B for other exchanges including NYSE-Arca and IEX.

sale, volume, and top of book were the only trading data being sold by the NYSE. In other words, all of the available listed trading data that were then being disseminated were collectivized into the CTA.⁶

The production of market data involves a high fixed cost and a very low marginal cost. The value of the data varies greatly for different market participants. Accordingly, the SIPs engage in a form of price discrimination that charges low prices for data provided to nonprofessional retail investors and much higher prices for various classes of professional investors.

Over the years, the real price of nonprofessional data has fallen dramatically. The following graph displays the real monthly cost of Tape C (Nasdaq) nonprofessional data, which has fallen 96.3% since 1986.⁷



⁶ Nasdaq at that time was a dealer market. It provided “Level II” data which was a montage of all the dealer quotes, but not true depth-of-book data.

⁷ This graph is from my 2018 study of market data which can be found at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3268916

Retail investors get the data for free from their brokers. The exchanges have been more or less free to treat all of their other data as private intellectual property and do whatever they want with it. When trading became automated, this gave rise to fast proprietary data feeds containing more extensive depth-of-book data. As the proprietary feeds do not have to go through the consolidator, they are inherently faster than the consolidated data. This has led to a situation where many market participants claim that they are effectively forced to purchase the proprietary data feeds at prices they claim are unreasonable.

Some interesting data comes from Greenwich Associates' survey on market data.⁸ They found that “the majority of fees are not spent with the exchanges.” In addition, they found that for every dollar spent on market data, their buy-side respondents spent \$0.46 and their sell-side respondents spent \$0.53 on maintenance of the data.

One important policy decision is to decide which data elements should be nationalized. The traditional demarcation line is as follows: The top of book and last sale are nationalized (consolidated) and sold at regulated prices. Brokerage firms are effectively forced to purchase this consolidated data for the data they present to customers in the context of trades by the Vendor Display Rule.⁹ All other data have been treated as the intellectual property of the exchanges and they can do whatever they want with it. They sell expensive fast direct feeds at high prices with some data, and at the same time they sell cheaper data in competition with the SIPs.

The Commission has ordered the exchanges to come up with a new governance structure for the market data plans.¹⁰ This was long overdue. In the current matter, the Commission has released an insanely repetitive 597-page proposal that calls for three major changes to U.S. equity market structure: Expanding the market data disseminated by the Securities Information Processors (SIPs) to include depth of book, introducing duplicative data consolidators, and reducing the “round lot” for higher priced shares.¹¹

Market data is intellectual property and should only be expropriated if there is an overwhelming public interest.

We live in a world that is increasingly aware of the importance of intellectual property. Indeed, our US trade representatives spend a lot of their time beating on foreign countries to respect US copyrights and

⁸ <https://www.greenwich.com/market-structure-technology/market-data-budgets-spending-trends-and-outlook>

⁹ SEC Rule 603(c). The data are also important for compliance with other rules, including the short sale restriction in Regulation SHO and the execution quality statistics in Rule 605.

¹⁰ Order Directing the Exchanges and the Financial Industry Regulatory Authority to Submit a New National Market System Plan Regarding Consolidated Equity Market Data, SEC Release No. 34-88827; File No. 4-757 (May 6, 2020), available at <https://www.sec.gov/rules/sro/nms/2020/34-88827.pdf>.

¹¹ The Proposing Release can be found at <https://www.sec.gov/rules/proposed/2020/34-88216.pdf>.

patents. We as a society create property rights in real and intellectual property in order to create incentives to create and improve the property. The rights of ownership include the right to build upon property, the right to sell or lease the property, and the right to exclude others from use of the property. However, none of these rights are absolute. I may own my property in fee simple, but I don't have the right to construct a public nuisance on it. Similarly, the government has the right of eminent domain to take the property for a public purpose as long the owner is properly compensated.

This brings up three important questions: 1) How do we define property rights in market data? 2) What market data elements are so necessary for the fair and orderly functioning of our markets that the government should exercise its sovereign powers to redefine property rights or even expropriate the data? And 3) How much should the aggregators of this data be compensated for their efforts?

Notice that I say aggregators instead of owners to side-step the question of "who owns the quote." Brokers and traders claim ownership as it is their orders and trades that are the raw material for the data sold by the exchanges. Exchanges claim ownership because they expend considerable resources to gather and transform the data. Note that both brokers and exchanges claim ownership rights to the data. This has important implications for the never-ending battle over the pricing of market data.

II. Criteria for public core data

Market participants cannot make good investment or trading decisions without good information about the current price and liquidity of investment opportunities. Note that I mention both price and liquidity, the ability to trade in volume at or near the current price. Without good information about current market conditions, all market participants face much higher search costs. Transactions costs go up for everyone, and the dispersion of prices will increase as investors trade in the dark. Even worse, the least informed retail investors get the worst executions. This happened in the ancient Nasdaq before the reforms of the 1990s and also happens today in the fixed income market.

Asymmetric information will cause some investors to leave a market they consider to be rigged. Providing data on a visibly level playing field will increase public trust in the integrity of the markets. This will make more people willing to invest and promote more job-creating investment in the markets. For this reason, the Commission should err on the side of more and level data for investors, especially retail investors.

The Commission is proposing to expand the data currently disseminated through the SIPs. Unfortunately, the Economic Analysis does not provide a coherent framework for figuring out which data elements are so important to market functioning that they must be forced by government fiat into the SIP data and which data elements are not so. Instead, the Commission is mainly relying on its intuition that more data are better data.

One utilitarian approach is to ask what property rights regime in market data leads to the greatest net output of goods and services. We can safely assume that market data is useful in that it enhances market liquidity while reducing costs for analyzing portfolios and implementing trading decisions.

In addition, market data have a high entertainment value to society. It is no secret that financial markets appeal to the gaming instinct in some people. Just look at how many people watch CNBC and Fox Business. While critics may complain about the market becoming a casino, the gamers bring capital and liquidity, as well as information, to the market. This is far more socially beneficial than restricting the gamers to playing casino games. Making more, not less, data available to retail investors will promote more investor activity in the markets.

Clearly, market participants need information about the price and quantity of recent trades, as well as information about current quotes. Let us examine the needs of various market participants.

Most market participants will benefit from more detailed market data.

Self-directed retail investors.

As a small low-frequency retail investor, I rarely trade more than a round lot. Indeed, I usually trade less than a round lot. For active stocks with minimal spreads, the current NBBO provides useful information about the price at which I can trade. What more could I want?

However, I also trade weird little obscure stocks with ultra-wide spreads, of which there are many. This is an area where retail investors like me can have an advantage as such stocks are often too illiquid for institutions to mess with. This means that there are more potential bargains to be found. For these stocks, it would be extremely useful to be able to see the entire book, not just the market for a round lot. This would be especially true for trading less than a round lot. There may be hidden liquidity somewhere in the market, but I can't see it and have a lot of trouble finding it.

Furthermore, if I want to add liquidity by putting in a patient limit order, I need to know the depth of book outside the NBBO so I can figure out the length of the queue of orders in front of me. Implication: Depth-of-book data will help retail investors make better informed trading decisions. This will allow us to reduce our transactions costs. Furthermore, it will facilitate our placing liquidity-enhancing limit orders. As individual investors are a larger part of the market for smaller companies, this will increase the liquidity of smaller companies, an increase which is badly needed.

A significant fraction of US equity volume occurs in the opening and closing auctions. Retail investors should be properly informed with appropriate information about the indicative auction price and the trading imbalance. Otherwise, we will be at a serious disadvantage to other better informed players. This is especially true for IPOs which have a large retail interest.

Freely available information about the entire market, including orders inside the spread and the depth of book, will reduce the asymmetry of information in the market between small retail investors and larger players. This added transparency will reduce the notion that markets are "rigged" in favor of larger players. Such added information is likely to induce more retail activity, which will both bring in more information and more liquidity to the market.

Market makers

Market makers provide extremely important liquidity to the market. They need to be very fast to avoid being picked off by faster traders when markets move. They thus need to make sure that their data feeds are at least as fast as those available to anyone else. They are locked into an expensive arms race with each other and with other so-called "high-frequency traders." They feel compelled to buy the fastest data feeds available, knowing that, if they don't, their predators will.

Having a standard SIP feed with all of the data necessary for market making, and with no faster data available, can reduce the arms race for ever faster data by putting all the market makers on a level playing field. Indeed, one approach to reducing the arms race for speed and to create a more level playing field is to embargo the exchanges from releasing any data until the consolidators have had sufficient time to process the data. In that way, no one would be forced to purchase proprietary data feeds just for a speed

advantage. This will go a long way to buttress the notion that our markets are fair as well as orderly, as all market participants can get the same data on the same terms and conditions, including latency.¹²

Institutional investors

Institutional investors and their brokers typically use sophisticated software (“algorithms”) to place their trades. These algorithms scan the market environment to find liquidity and determine optimal execution strategies. They also need depth-of-book data. Even though their algorithms sometimes chop large orders into a stream of 100-share “child” orders, depth of book is still useful for determining the size, timing, and location of those child orders.

In short, most market participants benefit from more detailed information about the state of the market than is currently delivered by the SIP data feeds. Since most market participants need the data, it should be provided on a level playing field. Such a level playing field will ameliorate the wasteful arms race forcing market participants to spend ever more on the fastest technology.

However, the value the different classes of investors place on that information (and its speed of delivery) is vastly different. Small retail investors can afford to pay much less than large professional traders. We also don’t care about a few (or even many) milliseconds of latency in the data. This is one reason why the current SIP pricing scheme differentiates between professional and non-professional users. This distinction should be retained in the new world order.

Intraday indicative value (.IV) data on ETPs must be included in the SIP feeds.

Like many retail investors, I sometimes purchase exchange-traded products (ETPs). Under our current regime, ETPs purportedly release their “indicative values” (IVs). These are very important for retail investors like me to see whether the ETP is trading near the value of its underlying assets. However, the .IV data are NOT disseminated over the regular SIP quote feeds. Instead, market participants need to get this data from separate feeds. Many broker dealers do not provide these data feeds to their customers. Those that do often do not provide all of them to their clients. I challenge all who are reading this to pick five ETPs and look for their .IV values on three different financial web sites. You will find it is not as easy as it looks.

As ETPs are basket products, their prices can and do deviate from the prices of the constituent assets. This can be particularly troublesome during times of market volatility. For example, recently the market prices of the USO oil ETP deviated substantially from the underlying NAV of the fund. As of June 2,

¹² For more on fairness in financial markets, see footnote 30, below that references my paper on the subject. Don’t you hate obscure footnotes that do nothing more than refer you to other footnotes? I do too. Yet the Proposing Release is full of them.

USO closed at \$27.07, a 1.4% premium over its NAV of \$26.70. Investors who bought at a that time were paying more than the underlying value of USO.

It would be extremely helpful to retail investors if the standard SIP feeds contained the .IV data. This would make it easier for brokerage firms and web sites to display the data to their clients. Again, this will help retail investors make better trading decisions, especially in times of stressed markets. It will also reduce the asymmetry of information between retail investors and professional investors, and thus reduce the notion that markets are rigged.

Some market participants poo poo the .IV data as it is only updated every 15 seconds. They also point out situations where the .IV may be based on stale prices, such as when the underlying market is closed.¹³ In such cases the ETP is where the price discovery is happening. Despite these drawbacks, the .IV data are still very important for retail investors and should be made more easily available.

It is not all that rare for ETPs to suspend the creation of new shares. When this happens, as the NYSE warns, there is additional "...potential for the market price to deviate from the fund's Net Asset Value..." Yet it is extremely difficult, if not impossible, for retail investors to get intraday .IV data as most brokers don't carry all of the .IV data. Here is a recent list of ETPs that have suspended creations.

PRODUCTS

Exchange Traded Products

Below is a list of all U.S. Exchange Traded Products that have suspended the issuance of new shares. Funds that are closed to creations pose additional risks such as the potential for the market price to deviate from the fund's Net Asset Value (NAV), as well as increased volatility. For questions regarding funds closed to creations please contact us.

ETP Name	Symbol	Issuer	Press Release
Claymore CEF Index Linked GS Connect ETN Index-Linked Notes due 2037	GCE	GS Finance Corp.	View
Morgan Stanley Cushing MLP High Income Index ETN	MLPY	Morgan Stanley	View
Market Vectors Double Short Euro ETN	DRR	Morgan Stanley	View
C-Tracks Exchange-Traded Notes Based on the Performance of the Miller/Howard MLP Fundamental Index	MLPC	Citigroup Inc.	View
GS Connect S&P GSCI Enhanced Commodity Total Return Strategy Index ETN	GSC	Goldman Sachs	View
C-Tracks Exchange-Traded Notes Miller/Howard Strategic Dividend Reinvestor	DIVC	Citigroup Inc.	View
JPMorgan Alerian MLP Index ETN	AMJ	JPMorgan Chase & Co.	View
Market Vectors Double Long Euro ETN	URR	Morgan Stanley	View
DB Crude Oil Double Short ETN	DTO	Deutsche Bank AG	View
DB Gold Double Long ETN	DGP	Deutsche Bank AG	View
DB Gold Double Short ETN	DZZ	Deutsche Bank AG	View
DB Gold Short ETN	DGZ	Deutsche Bank AG	View
United States Oil Fund, LP	USO	United States Oil Fund, LP	View

Source: <https://www.nyse.com/products/etp-closed-creation>

This is yet another reason why the .IV data are essential to retail investors and must be made more readily available.

¹³ This has also been an issue with fixed-income ETPs, as many constituent bonds trade infrequently.

Level the playing field with standard data.

By making all of the essential data available to all market participants on the same terms and conditions, expanded core data will help to level the playing field. This will increase the public's trust in the markets. Obviously, it will be costly to include a larger amount of core data. These costs need to be covered. In particular, the exchanges will need to be compensated for the cost of producing the depth-of-book and other data.

Retail investors get a sweet deal under the current system. We should make it sweeter with better data.

Under the current system, we retail “nonprofessional” investors get a really sweet deal. We pay almost nothing in direct fees for market data, yet we get real-time data. The days when we paid extra for real-time data are long gone, along with most commissions. Most of the data costs are picked up by “professional” users. This is a result of the good price discrimination in the current system that favors retail investors.

This price discrimination in favor of retail investors should be retained in the new world order. Providing depth-of-book, auction, and .IV data for almost free to retail investors (albeit with a few milliseconds of delay) will help to restore public trust in the integrity of our markets.

The additional data for retail investors will add to the entertainment value of the market. This will attract more individual investors who will bring more liquidity and information to the market. This added liquidity will be especially helpful for the smaller companies that struggle to attract investor attention. There has been much discussion lately about how to reverse the shrinking number of public companies, and being nicer to the individual stock investor is one thing that can help.

Core data needs to be standardized. Fix the symbology mess!

Core data needs to be standardized. Alas, there is an appalling lack of standardization in equity data feeds in the United States. Nasdaq and the NYSE use different suffixes for various securities such as preferred shares, rights, warrants, and units.¹⁴ Here is a brief excerpt from a table showing differences from various systems.¹⁵

¹⁴ See <https://www.nasdaqtrader.com/Trader.aspx?id=CQSSymbolConvention> and https://www.nyse.com/publicdocs/nyse/data/NYSE_Symbology_Spec_v1.0c.pdf.

¹⁵ <https://www.nasdaqtrader.com/Trader.aspx?id=CQSSymbolConvention>

Ticker Symbol Convention

Security Categorization	CQS Suffix	CMS Suffix	NASDAQ Integrated Platform Suffix	NASDAQ ACT/CTCI Suffixes
Preferred	p	PR	-	\$
Preferred Class "A"*	pA	PRA	-A	\$A
Preferred Class "B"*	pB	PRB	-B	\$B

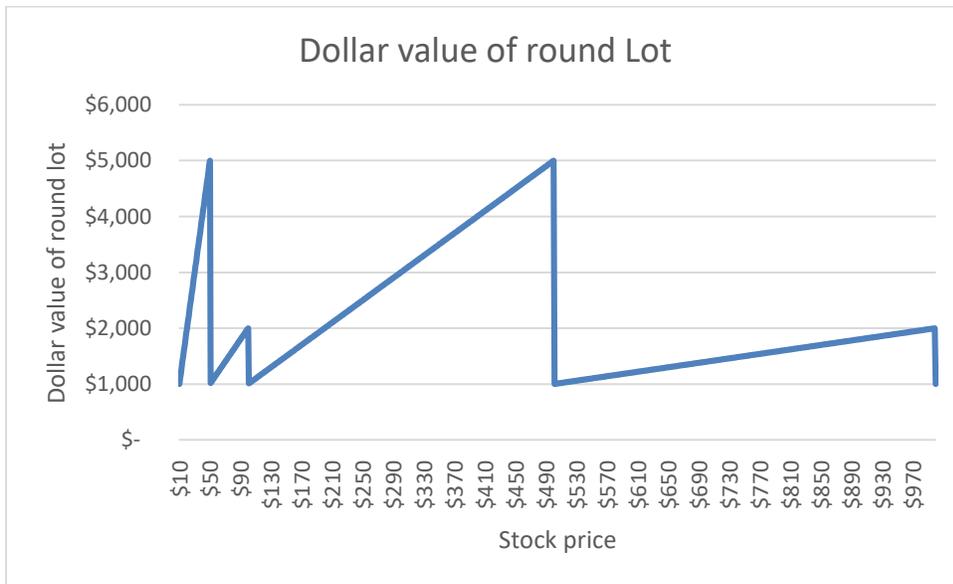
This causes a great deal of confusion for investors and increases the risk of costly trading mistakes. It also makes it hard for investors to get information on some of these securities. What good is information if you can't find it?

To make matters worse, various data vendors use different delimiters to separate the root symbol from the suffix. They may use a ".", "-", space, or "/" as a delimiter. For example, to get the IIV for the SPDR Trust, Yahoo requires ^SPY-IV. Interactive Brokers merely requires SPY.IV. Thus, the IIV for SPY could be SPY.IV, SPY-IV, SPY^IV or SPY IV, depending on the broker or data vendor, if they have it at all. This is confusing to consumers and a cause of errors in the back office.

III. The round lot is obsolete. Just drop it. Retail best execution should be based on actual order size.

The proposal also would also modify the definition of a round lot, which is usually 100 shares and specified by the exchanges, not the Commission. A few companies such as Berkshire Hathaway have round lots less than 100 shares. However, the Commission is proposing to override the judgement of the exchanges on these stocks and substitute its own formula. In the current world, many companies with Buffett envy do not split their stocks even though their nominal share prices are far above the traditional range. This results in many frictions in trading and higher bid-ask spreads for investors.¹⁶ Round lots for higher priced shares thus become prohibitively expensive, and this leads to more odd-lot trading.

The SEC has proposed to override the judgment of the exchanges and impose a schedule in which the round lot is based on the price of the stock. So much for the concept of an SRO. The round lot would remain at 100 shares for stocks less than \$50. Thus, a \$1 stock has a round lot size of \$100 while a \$50 stock has a round lot size of \$5,000. For stocks from \$10 to \$1000, the dollar value of a round lot oscillates from \$1000 all the way to \$5000, as seen in the following graph:



¹⁶ See <https://www.nasdaq.com/articles/looking-for-the-perfect-stock-price-2019-09-19>

The Commission appears to have done little in the way of substantive economic analysis to determine the optimal round lot size as a dollar value. If it had, the proposed dollar value would not be oscillating between \$100 and \$5,000. Indeed, the Commission admits over and over again its uncertainty of the impact in the Proposing Release.

The concept of a round lot is an artifact of the days when stock trading was a manual process. Manual trading meant that it was not cost effective to handle small transactions. It was so costly that the NYSE actually charged \$1/8 more per share for trading odd lots, known as the odd-lot differential. That went away long ago. On top of that, the NYSE mandated that brokers charge a minimum commission, which worked to discourage the trading of small quantities of shares. In the modern world, electronic trading is so cheap that brokerage commissions have disappeared for retail investors. In addition, many brokerage firms now offer fractional share trading.

“Protect” all orders or better yet drop the costly order “protection” rule.

The round lot has been important for regulatory purposes because of the protected quote, which means that market centers must have “... procedures that are reasonably designed to prevent trade-throughs on that trading center of protected quotations...”¹⁷ In practice, this means that exchanges generally route out orders when a competing exchange displays a better price.

Only quotes equal to or larger than a round lot have been protected. However, the current proposal would not protect all of the new round lots, only 100 share quotes. This would add yet another degree of complexity to our overly complex National Market System by creating additional categories of orders. We will now have some round lots protected and some not.

I am not a fan of the trade-through rule, as I believe it to be unnecessary and it adds unneeded complexity to the market.¹⁸ The broker’s obligation to achieve best execution should be sufficient to assure that investors receive the best price. The Commission itself has such high confidence in today’s markets that it thinks “protection” is unnecessary for many orders. In particular, the Commission has stated

“Further, the Commission preliminarily believes that competition among broker-dealers, improvements in trading and order routing technology, and the continued applicability of best execution requirements to sub-100 share orders of these stocks would provide sufficient incentives for the attainment of high-quality executions of such orders even in the absence of trade-through protection pursuant to Rule 611.”¹⁹

¹⁷ NMS Rule 611

¹⁸ See, for example, <http://www.sec.gov/rules/proposed/s71004/jjangel012505.pdf>

¹⁹ Proposing Release, page 93

If it is OK for those orders, why not all of them? If you are going to have such a rule, you should protect all orders. It makes no sense to require protection of a 100-share order in Bed Bath and Beyond (BBBY), a \$9 stock for which a round lot is \$900, and not protect a 10-share order in Alphabet (GOOG) that is worth \$14,000! Indeed, for Berkshire Hathaway Class A shares (at \$285,000 each), there would essentially be no protected orders as 100-share lot would be \$28,500,000.

Why protect only the big orders? This discriminates against smaller orders from small retail investors like me. With widely available depth-of-book data, every smart order router can easily see even one share orders. With widely available depth-of-book data, there is no longer any excuse for not protecting one share orders if any orders are protected. Protecting all orders will be simpler and less costly operationally than protecting only some.

Better yet, just drop the obsolete rule. I agree with the Commission that “competition among broker-dealers, improvements in trading and order routing technology, and the continued applicability of best execution requirements to ... orders of these stocks would provide sufficient incentives for the attainment of high-quality executions of such orders even in the absence of trade-through protection pursuant to Rule 611.” Properly applied best-execution rules, along with appropriate broker disclosures of execution quality in an improved Rule 606 are all that are necessary.²⁰ The rule adds cost and unnecessary complexity and basically does no good. On a cost-benefit basis it should be dropped.

Just get rid of the round lot. It is an anachronism.

With widely available depth-of-book data as part of the SIP feed, market participants can easily calculate in real time the cost to buy or sell a given number of shares at the displayed prices. Modern computer processing power is up to the task. There is no need for a “round lot.” It is as obsolete as a paper stock certificate.

Odd-lots are mentioned only seven times in the Securities Exchange Act, mostly in relation to odd-lot dealers. The Commission thus has significant regulatory flexibility to junk this obsolete concept. There is no need to add further complexity to the rule book and to market computer systems to update this ancient artifact.

If the updating of the round lot is not going to affect protected quotes, then why bother changing it? The round lot affects the calculation of the National Best Bid or Offer (NBBO) and execution quality statistics. Again, we should use this as an opportunity to rethink what we are doing. The NBBO gives

²⁰ Rule 606 requires brokerage firms to display information about where they route customer orders. It is a complement to Rule 605 which requires market centers to display execution quality. Execution quality is really a joint function of the order routing policies of brokers as well as the market centers. The current disclosure regime is pretty useless for letting retail investors understand the execution quality we are getting. As a retail investor, I would like to see standardized reporting of the execution quality achieved by the brokers. See <https://www.sec.gov/comments/s7-14-16/s71416-1.pdf> for a better way.

the nationwide best displayed bid and offer for a standard unit, the round lot. Better prices for smaller quantities may be available inside, but these are not visible to the typical retail investor using a typical retail brokerage platform.

Execution quality should be measured against the EBBO: Effective Best Bid or Offer.

The concept of the NBBO, and hence the round lot, has been important for Rule 605, which requires the reporting of execution quality statistics. Calculations of execution quality should be done using the depth of book available at the time an order is placed. When an order is placed, one can calculate and store the Effective Best Bid or Offer (EBBO) for the exact number of shares in the order. Here is an example of the calculation of the EBBO for the following consolidated display:

Bids				Offers		
Cumulative dollar amount	Cumulative shares to buy	Shares to buy	Price	Shares to sell	Cumulative shares to sell	Cumulative dollar amount to sell
			\$50.05	100	410	\$20,513.60
			\$50.04	100	310	\$15,508.60
			\$50.03	100	210	\$10,504.60
			\$50.02	50	110	\$5,501.60
			\$50.01	60	60	\$3,000.60
\$3,000.00	60	60	\$50.00			
\$5,499.50	110	50	\$49.99			
\$10,497.50	210	100	\$49.98			
\$15,494.50	310	100	\$49.97			
\$20,490.50	410	100	\$49.96			

Suppose that an investor placed a market order to purchase 100 shares. The buy order would walk the book and would execute 60 shares at \$50.01 and the remaining 40 shares would execute at \$50.02. The average fill price would be \$50.014, which is the Effective Best Offer. Similarly, for a 100 share sell order, the Effective Best Bid is \$49.996. Thus, the EBBO for 100 shares is \$49.996 bid and \$50.014 offered. Notice that this is a narrower spread than the traditional 100 share NBBO, which would be \$49.98 bid and \$50.03 offered.

Suppose that a market order to buy in this example executed against hidden interest at \$50.01. As the Effective Best Offer was \$50.014, there would be \$0.004 of price improvement.

Replace the NBBO with an IBBO: Indicative Best Bid and Offer to trade \$10,000

Even though there is no longer a need for a round lot, it is useful to see what the quotes are for a standard dollar value trading. The SIP can easily calculate what the bid and offer would be for a given dollar value. For a quick and indicative snapshot of the liquidity available, the SIP should disseminate an Indicative Best Bid or Offer (IBBO) that would show the cost to buy or sell a fixed dollar amount of a stock. As the median trade size is roughly \$10,000, displaying how much it would cost to trade that amount would provide a quick snapshot of the liquidity available for a typical transaction.

In the previous example, the IBBO to trade \$10,000 would be \$49.988 bid and \$50.021 offered.²¹

As the NBBO is important in the Regulation SHO short sale restriction and in other areas, the NBBO should be replaced with the more representative IBBO in those areas.²²

Monthly updating of the round lot list may be messier than updating on the fly

Another part of the proposal is to calculate the round lot sizes on a monthly basis. While I recommend eliminating the round lot altogether, it seems problematic from an operational perspective to do it once a month. I suspect that it might be operationally simpler to do it automatically in real time based on the bid price. This would eliminate the need for a manual once-a-month process to update everyone's security masters. I suggest that the Commission listen carefully to the brokerage ops people about which is the best way to update.

²¹ The Indicative Best Bid would be based on displayed buy orders to sell 60 shares at \$50.00, 50 shares at \$49.99, and 90.046 at \$49.98 for a weighted average price of \$49.988. The Indicative Best Offer would be based on displayed sell orders for 60 shares at \$50.01, 50 shares at \$50.02, and 89.91 at \$50.03 for a weighted average price of \$50.021.

²² See SEC Rule 201, 17 CFR § 242.201

IV. Competing duplicative consolidators will add complexity and cost without ending the wars over market data.

In its 597-page release, the Commission is proposing to replace the current NMS plans with a system of competing and duplicative data consolidators. The goal is to let competition drive the price of data down. The current system was designed back in the days when exchanges were not-for-profit entities owned by their users. This internalized the conflict over market data pricing. As the exchanges were not-for-profit entities owned by their users, they did not have an incentive to charge prices that would maximize profits for the exchanges.

The transition to for-profit exchanges has now created an incentive for the exchanges to maximize shareholder value, and this translates to charging whatever the market will bear for market data. The Commission is now stuck refereeing an ongoing battle over the prices for market data. Unfortunately, competing consolidators will not end the war because the Commission will still have to referee the prices the exchanges can charge *to* the consolidators.

Multiple consolidators increase market complexity.

The proposal envisions a world where multiple competing consolidators operate out of multiple data centers. There are currently three major equity players, ICE, Nasdaq, and CBOE, each operating out of a different data center.²³ It is possible that each of these entities will operate consolidators out of their primary data centers. They may also operate consolidators out of all major data centers. It is also possible that there will be more than one consolidator in a data center. Or there may be none. Indeed, the whole premise of the proposal is that competition will arise and will restrain prices.²⁴

Due to geographic latency as well as operational latency, these competing yet duplicative consolidators will have different prices numerous times a day. Presumably each consolidator in each data center will have its own set of best quotes, an apparent attempt to solve the latency problem across geographically diverse market centers. But there is also operational latency, the amount of time it takes a consolidator to consolidate the data. This will be a function of its hardware speed, but even this latency will be variable based on trading volume and operational complexities such as hardware failures. Given variable operational latency, the competing consolidators (if there are any) will sometimes have different prices within the same data center. Which, then, is the correct one? Indeed, even the same consolidator could have multiple feeds with different prices as it could be consolidating in different data centers. Users of

²³ The data centers are geographically separated. ICE is in Mahwah, NJ, Nasdaq is in Carteret, NJ, and CBOE is in Secaucus, NJ. The backup data centers are in Chicago, IL.

²⁴ From page 429 of the Proposing Release: “The economic analysis of the effects of the decentralized consolidation model assumes that upon the introduction of the model, a sufficient number of competing consolidators would enter the market so that competitive market forces would have a significant effect on their behavior.”

market data will be expected to have written policies and procedures in place to deal with the situation, and to be able to document that they have such policies, and to document that they have trained all personnel in those policies and to document that they actually follow those policies. Market makers will be expected to subscribe to every consolidator (as well as to be an internal consolidator themselves) and will be fined if they rely upon the wrong one at the wrong time.

Furthermore, not every market participant is located in the three main data centers. Which, then, is the right NBBO for purposes of judging execution quality for a broker or dark pool located in a data center that is not one of the primary exchange data centers?

Competing consolidators will create a costly arms race in speed.

The Commission sees reductions in latency differentials as one of the potential benefits of competing consolidators.²⁵ Even if all of the consolidators get the raw data from the exchanges at exactly the same time, they will then race to consolidate and provide the data faster than all of their competitors. Note that one of the commentators expressing interest in being a consolidator, the McKay Brothers LLC, is one of the most notorious arms dealers in the latency arms race.²⁶ If the competing consolidators model is implemented, soon the major players in the industry will be wailing that they have to pay for the fastest and most expensive consolidator who can shave a few nanoseconds off of the speed of consolidation. I strongly doubt whether there is any value to the investing public of shaving 10 nanoseconds off the time it takes to consolidate market data.

Multiple duplicative consolidators increase total cost to the industry and thus the investor.

Data businesses have a high fixed cost to gather data and a low variable cost of data transmission. Multiple consolidators will all have to incur the high fixed costs to enter the game and become Regulation SCI-compliant entities. Their oligopolistic prices, constrained only by the “not unreasonably discriminatory” standard of the Exchange Act, must cover their additional costs. This could well increase total costs to the industry, all of which get passed through to consumers. The Economic Analysis does not appear to quantify the additional fixed costs that duplicative competing consolidators will incur and pass on to the investing public.

²⁵ Proposing Release, page 451.

²⁶ <https://www.sec.gov/comments/s7-03-20/s70320-7253887-217548.pdf>. They sell fast high speed data connections. Of course, their interest is highly conditional on the regulatory costs and other fees that will be imposed on the consolidators.

Market participants will soon complain that they are forced to pay for multiple consolidators.

Major players will have to subscribe to a local consolidator product in each data center, or at least three consolidators, further driving up their costs.

SIP data are essential for market operations. Market participants will feel forced to subscribe to the local consolidator in each data center, driving up their costs. In a world of multiple consolidators, business continuity concerns will force many market participants to subscribe to more than one consolidator as a backup. The Commission will soon hear complaints that market participants are forced to subscribe to at least two consolidators in each of three major data centers and that they charge too much, and that they must monitor them both and decide which one is right when they disagree. Indeed, just as the industry complains that it has to pay for too many exchanges, it will complain about having to pay for too many consolidators.

Designing a competing consolidator model is harder than it looks. Just ask the EU.

The proposal believes that multiple consolidators will jump at the chance to sell market data. Indeed, the Proposing Release states “...the Commission believes that the risk of few or zero competing consolidators is low.”²⁷ Of course, any entrants into the market will face heavy regulation as SCI entities. They will pay huge fines to the SEC when the inevitable technical problems occur.²⁸ Who would want to bear this risk? One possibility is that only two consolidators will emerge (the current operators of the CTA and UTP plans) and they will charge oligopolistic prices that meet the legal requirement of “not unreasonably discriminatory” but still draw complaints that the fees are too high.

The European Union is still attempting to come up with a consolidated tape like we have here in the US. Having a single authoritative tape that serves as a public record of trading activity and benchmark for execution quality is one of the things that makes the US equity market the global leader that it is. The EU has attempted in MiFID2 to lay the groundwork for a consolidated tape with competing consolidators. So far, no consolidators have signed up.²⁹ By declaring that the risk of few or zero consolidators is low, the Commission appears to be signaling ignorance of the experience of other countries.

²⁷ Proposing Release, page 429.

²⁸ For example, the NYSE was fined \$5 million for delays in its SIP. <https://www.sec.gov/news/press-release/2012-2012-189htm>

²⁹ The European Securities and Markets Authority (ESMA) cites four major reasons for the lack of a consolidator: limited commercial rewards, strict regulatory restrictions, competition from non-regulated data vendors, and poor quality data. See MiFID II/MiFIR Review Report No. 1: On the development in prices for pre- and post-trade data and on the consolidated tape for equity instruments, https://www.esma.europa.eu/sites/default/files/library/mifid_ii_mifir_review_report_no_1_on_prices_for_market_data_and_the_equity_ct.pdf

By the way, the 597-page proposing release does not mention even once the European attempts for a consolidated tape or even the Canadian regime. Such neglect of the experience of other jurisdictions shows a potential violation of the Administrative Procedures Act (APA) by not considering alternative approaches. This will hamper any attempt to defend these rules in court, as it should. SEC rule proposals are notorious for neglecting to consider the experience of other jurisdictions handling similar problems.

Competition will not drive prices down to competitive levels.

In the Proposing Release, the Commission states: “Based on the discussion above, the Commission preliminarily believes that entry into the competing consolidator market space will continue until competing consolidators’ profits decrease to competitive levels.”³⁰ This logic is flawed as it ignores the impact of high fixed costs in an oligopolistic market. In an oligopoly with high fixed costs and low variable costs, the incumbent players will opt for prices above the competitive level but low enough to deter new entrants from incurring the high fixed costs of entry. In other words, they will still charge as much as they can at prices low enough to keep the competition out.³¹

Alleged fee reductions don’t require competing duplicative consolidators. They can be achieved through expanding the core data at regulated prices.

A large part of the Commission’s motivation stems from its belief that competition will drive data prices down, despite its admission that it “lacks the necessary information to ascertain these impacts.”³² However, the real price will be determined by what the SEC allows the exchanges to charge for their data to the consolidators. The additional markups from consolidators, whether competing or not, will be a small fraction of the total amount paid for data fees.

It is true that providing one-stop-shopping for market data will indeed create cost efficiencies. This is another reason to include depth-of-book data in the standard core data feeds that are available to everyone on the same fair and reasonable terms. Again, this can be done without the need for duplicative conspiring consolidators.

³⁰ Proposing Release, page 438

³¹ This is well known in economics. See https://en.wikipedia.org/wiki/Strategic_entry_deterrence . This is another reason why you should let economists, not lawyers, write the Economic Analysis.

³² Proposing Release, page 444

Multiple consolidators won't solve the market data wars!

Part of the motivation for the competing consolidator proposal is the notion that competing consolidators will arrive at a competitive outcome that will end the market data wars. Just let competition figure out the price of market data! The dream is that this would relieve regulators of the burden of determining whether rates are fair and reasonable or not unduly discriminatory. This will not happen. The SEC is stuck with this burden and oligopolistic consolidators will make it worse.

One problem is that each competing consolidator still has to buy data from the venues that produce the quotes and trades. Right now, the exchanges give this data to the tape plans, and the tape plans then rebate part of the revenue back to the exchanges according to a formula. With competing consolidators, the exchanges would sell the data to the consolidators. But at what price? The consolidators, by definition, have to buy the data. The exchanges would thus have an incentive to charge as much as possible for the data. The SEC will inevitably be drawn into conflicts on how much the exchanges are charging the consolidators for the data.

Speaking of pricing, it is useful to revisit the marching orders Congress provided to the SEC in this area: Section 11A of the Securities Exchange Act reads (with ***emphasis added***):

*(C) assure that all securities information processors may, for purposes of distribution and publication, obtain on **fair and reasonable terms** such information with respect to quotations for and transactions in such securities as is collected, processed, or prepared for distribution or publication **by any exclusive processor** of such information acting in such capacity;*

*(D) assure that all exchange members, brokers, dealers, securities information processors, and, subject to such limitations as the Commission, by rule, may impose as necessary or appropriate for the protection of investors or maintenance of fair and orderly markets, all other persons may obtain on terms which are **not unreasonably discriminatory** such information with respect to quotations for and transactions in such securities as is published or distributed by any self-regulatory organization or securities information processor;*

In short, paragraph (C) states that the *consolidators* can buy the data from the exchanges on “fair and reasonable terms” and paragraph (D) states that *everyone else* can get the data on “terms which are not unreasonably discriminatory.” Once again, Congress was amazingly prescient when they enacted these paragraphs in 1975. They understood that each exchange was a monopolist on its own data and specified that the exchanges must be required to sell data to the consolidators on terms that are “fair and reasonable.”³³ Congress realized that there was a holdup problem such that the producers of data could

³³ Alas, there is no clear definition of “fair and reasonable” in the '34 Act. This leaves it up to the interpretation of the Commission with lots of second guessing by the courts. For more on fairness, see Angel, James J., and Douglas McCabe. "Fairness in financial markets: The case of high frequency trading." *Journal of Business Ethics* 112.4 (2013): 585-595, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1737887.

charge exorbitant amounts to the consolidators. For example, in a world of competitive exchanges, one exchange could, if not for paragraph (C), charge a near infinite amount to a consolidator for the data.³⁴

Note that Congress very explicitly did NOT impose a “fair and reasonable” standard on the consolidators themselves in paragraph (D). Congress only imposed “not unreasonably discriminatory.” That is a very different standard than “fair and reasonable.” Congress explicitly recognized that price discrimination -- charging different prices to different customers – could be reasonable.

To summarize, Congress directed that the prices the consolidators have to *pay* must be “fair and reasonable.” The prices that the consolidators *charge to others* do not have the legal standard of “fair and reasonable”—they only have to be “not unreasonably discriminatory.”

Competition can sometimes increase prices.

The premise behind the competing consolidators model is based on a simplistic Economics 001 notion that competition always lowers prices. Alas, this is not always the case. More advanced economic analysis has identified situations in which competition can increase prices. Chen and Riordan (1978) demonstrate that when product differentiation is possible, introducing competition can actually increase prices.³⁵ The intuition is that demand for the differentiated products can be more inelastic than demand for the non-differentiated products, leading to higher overall prices.

Unfortunately, the market structure envisioned by the Commission looks similar to a Chen and Riordan world, as the Commission explicitly expects the consolidators to offer differentiated products:

“However, the Commission preliminarily believes that the competing consolidators would be able to differentiate among themselves by product customization; by focusing on different segments of demand; and/or by offering varying levels of other services such as customer service, ease of user interface, analytics, data reformatting and normalization services, and latency rates.”³⁶

Thus, the fastest consolidators will face inelastic demand for the fastest products and end up charging accordingly.

³⁴ Professor Larry Glosten has made this point very clearly. Since any consolidator has to buy data from all of the exchanges, the data from the exchanges are complementary goods sold by oligopolists. The natural outcome in such a setting is a price above the competitive price. See Glosten, Lawrence R., *Economics of the Stock Exchange Business: Proprietary Market Data* (January 10, 2020). Available at SSRN: <https://ssrn.com/abstract=3533525> or <http://dx.doi.org/10.2139/ssrn.3533525>

³⁵ See Chen, Yongmin, and Michael H. Riordan. “Price-Increasing Competition.” *The RAND Journal of Economics*, vol. 39, no. 4, 2008, pp. 1042–1058. <http://www.columbia.edu/~mhr21/papers/Price.pdf>

³⁶ Proposing Release, page 430

The oligopolistic nature of exchange data exacerbates the problem.

There are three large exchange operators, ICE, Nasdaq, and CBOE. They are shareholder-driven organizations, as they should be. If given completely free reign over market data, they will naturally attempt to do what is best for their shareholders. It is likely that a small number of consolidators will emerge, and they will take into consideration what their competitors are charging. Given the oligopolistic nature of the market, this will result in prices that are too high.

For these reasons, the Proposing Release contemplates that an NMS plan approved by the Commission will set the prices at which the exchanges sell their data to the consolidators. The SEC is stuck with refereeing the rate battle whether it likes it or not.

Competitive pricing for consolidators will make retail pay more.

Under the current regime, we retail investors get our data essentially for free. This encourages retail participation in the market. Profit-maximizing oligopolistic consolidators will have no incentive to continue the cross-subsidization of retail data. Indeed, competitive pressures from their shareholders will force them to charge as much as they can. This means that retail customers, through our brokers, will be charged more. Our brokers, faced with the economic pressures of a zero-commission world, will do whatever they can to cut their data costs and thus cut back wherever possible on what they provide to retail customers.

Again, the transparency improvements from making high quality depth of book, .IV, and auction data readily available to all current and potential retail customers will help to improve the public's perception of the integrity of the market. This alone is worth the cost of the cross-subsidization of retail market data as it will reduce calls for stupid public policies such as a financial transaction tax. By improving the experience for retail investors, we will bring in more retail investors. This means that there will be more availability of public capital for smaller growing enterprises as well as more information and more liquidity.

V. The pricing of consolidated data

So, how should the prices of market data be regulated, if at all? The revenues from the consolidated data are currently distributed among the participating exchanges under a complex formula that only an economist would love. Critics allege that data prices for proprietary feeds are far in excess of “cost” and that data prices should be somehow related to some measure of “cost.” They should be careful what they wish for, as attempts to calculate the “cost” inevitably devolve into long political battles.

Utility ratemaking provides an imperfect model for cost-based analysis.

Before I switched to finance, I worked in the Rate Department of a major electric utility where I prepared cost studies that were used for regulatory ratemaking purposes. As such, I am intimately familiar with traditional utility ratemaking for utilities. The process basically works as follows:

- 1) Calculate the revenue requirements for providing utility services. This includes:
 - a. Estimate the capital needed to provide the services.
 - b. Estimate the required rate of return appropriate for the capital employed.
 - c. Estimate operating costs for operation, maintenance, depreciation, taxes, etc.
- 2) Allocate costs to different classes of service.
- 3) Estimate projected usage for each class of service.
- 4) Calculate rates needed to collect the needed revenues from each class of service.
- 5) Submit proposed rates to regulators.

The proposed rates are then put out for public comment and hearings are held. Interveners submit self-serving studies to show why their rates should be lower. The regulators are subject to intense political pressure on behalf of various classes of customers. Finally, the regulators figure something out.

The joint product nature of market data and transaction services makes cost allocation difficult. Ratemaking devolves into an intensely political process.

Calculating the cost of market data becomes even more difficult because of the intertwined nature of trade matching and market data. Exchanges invest in matching systems that match buyers with sellers as well as produce market data. Economists call this a joint product: you can’t produce one without the other. In many ways, this is similar to sheep that produce the joint products of wool and meat. This creates a serious cost allocation problem. How much does it cost to produce the wool versus producing the meat? The overhead costs of the food, veterinary care, shepherd’s time, and so forth are needed for both. Any cost allocation system is arbitrary. There are numerous methods of cost allocation, but all of them can be criticized. Thus, any “cost” based method will inherently involve intense political battles over how to allocate the shared costs of running exchange operations.

The SEC has managed to sidestep this ugly process for a long time. It was not much of a problem in the days of not-for-profit exchanges owned by the people paying for the data. The world is different now, and there is a fundamental commercial conflict between the trading platforms and the purchasers of the data. Moving to a world of oligopolistic consolidators does not provide a solution. The SEC will still be dragged into the quagmire to determine whether the fees charged by the exchanges to the consolidators are “fair and reasonable.”

As the exchanges produce joint products whose individual cost is difficult to determine, considerations of “fair and reasonable” need to look at the total profitability of the exchanges and not just the allocated “cost” of a particular data service.

Matt Levine has described the implications of this joint product very eloquently:³⁷

My simple model of how stock exchanges make money goes something like this:

- 1. You do not want to charge people a lot of money for trading on the stock exchange, because they are price sensitive to trading costs, and the cheaper the trades are the more trades they will do. (You might just not charge very much, or you might do something more complicated like charge a lot for some order types and give large rebates for other order types, but the point is that you want your overall pricing scheme to encourage trading, not discourage it.)*
- 2. You do want to charge people a lot of money for connecting to the stock exchange — for being able to trade, and for getting useful data feeds — because they are not price sensitive to those more-or-less fixed costs. As long as there is a lot of trading on your exchange — and there is, because of Point 1 — then every professional trader will need to pay you for connectivity and data, because they can't run their trading business without real-time in-depth knowledge of what is going on at your exchange.*
- 3. Between Points 1 and 2, you need to charge a large enough total amount of money to pay for your salaries and computers and electricity and buildings and executive bonuses and so forth.*

The IEX study on fees demonstrates the problems with cost allocation.

Matt Levine then states that IEX's assertion that its data and connectivity costs are much less than those charged by the other exchanges is a way of “trolling” the bigger exchanges.³⁸ This “trolling” study was cited in footnote 1,013 of the Proposing Release as justification for the assertion, absent any other data, that data fees may be too high. It is noteworthy that, despite all of the data that the SEC has on exchanges

³⁷ See Levine, Matt, The Trolling Exchange, in “If you want to buy pot, buy POT,” Bloomberg Opinion, January 30, 2019, available at <https://www.bloomberg.com/opinion/articles/2019-01-30/if-you-want-to-invest-in-pot-buy-pot>

³⁸ <https://iextrading.com/docs/The%20Cost%20of%20Exchange%20Services.pdf> . The primary thrust of the study was to compare IEX's direct costs with the fees that the other exchanges were charging IEX for connections to support the argument they were being overcharged for direct feeds and connectivity.

and its ability to demand any and all data from exchanges, the 223 pages of Economic Analysis in the Proposing Release do not even attempt to measure the “costs” of data, but merely reference IEX’s comment letter. This is not a criticism, but a sign that the Commission itself recognizes the futility of attempting to precisely measure “cost” for joint products.

IEX specifically includes only the “direct” costs of providing data as opposed to trade matching. They concede that large parts of the infrastructure are used for both trade matching and data. For example, the physical connections to the exchange both bring in orders and transmit market data. IEX then somehow attempts to allocate those joint costs. For the labor involved in the physical connections, they allocate 10.4% of the labor expense to data.

IEX also leaves out very important considerations such as the cost of capital.³⁹ I suspect that if the Commission gets serious about determining how much to reimburse the exchanges for the “cost” of the data they provide to the consolidators, then IEX will come up with a study with much higher numbers.

Marginal cost pricing does not work for high fixed-cost products like market data.

Under basic economic theory, the socially optimal price in simple competitive markets is the marginal cost. This maximizes the sum of the consumer and producer surplus, and provides producers and consumers the correct signals regarding substitutes for their production and consumption decisions. There are, however, many exceptions once one moves beyond the assumptions of simple competitive markets. Problems arise in situations where there are high fixed costs with low marginal costs: Charging only the marginal cost does not collect enough revenue to cover total costs.

There are various approaches to solving this problem. One is so-called “Ramsey pricing” that charges higher prices to the classes of customers that place the highest value on the data.⁴⁰ This justifies the traditional professional/non-professional split, as professional users place much higher value on the data than amateurs.

Congress explicitly permits price discrimination.

Ramsey pricing is a form of price discrimination, charging different prices to different classes of customers. While the word discrimination has a bad connotation in the context of racial or gender discrimination, there are times when price discrimination is socially beneficial. Indeed, some goods and services may not be possible without the ability to engage in price discrimination. The classic example is

³⁹ From the IEX report, *op cit*, page 32: “In calculating IEX’s costs to offer logical connectivity services, we have not attempted to define what would constitute an appropriate markup to produce a profit or cover the cost of unused logical port capacity.”

⁴⁰ See Ramsey, Frank, 1927, A contribution to the theory of taxation, *The Economic Journal*. 37: 47–61

that of the airline that may not have enough customers to cover the cost of flying a plane if it had to charge the same price to everyone. It can charge high prices to business travelers who must travel on short notice, but there are not enough of them to pay for the plane. Likewise, it can fill the plane with budget-conscious vacation travelers at low fares, but that would not pay for the plane either. However, if it can charge high prices to business travelers and then fill the rest of the plane with vacation travelers, the combined revenues would be enough to pay for the plane. Congress explicitly recognized that some discriminatory pricing was acceptable when it set the standard of “not unreasonably discriminatory.” However, discriminatory prices by definition are not cost-based.

Latency needs are one way to differentiate data products.

Product packages can also be designed with different latency so that market participants who need faster speed can pay for it. For example, the Retail Package would be the least expensive product. It would be a display-only data feed that would be the slowest data feed that contains depth of book, auction information, and .IV data. It would come with a delay of perhaps 300 milliseconds, or 3/10th of a second, roughly the blink of an eye. Alternatively, it could update only once or a few times second. This delay is imperceptible to most humans, yet is an eternity to modern automated traders.⁴¹ The information is still timely enough for individual investors like me to make good trading decisions, yet is so slow as to be nearly useless for HFTs.

The Professional Package would be available to professional users outside the data center of the consolidator. As such, it would inherently be a tiny amount slower than what would be available inside the data center.

The Professional Plus Package would apply to users co-located in the data centers and would thus be the fastest and most expensive package. Proprietary data products would still be permitted, but they must not deliver any data before the consolidator has had enough time to consolidate the data. This would eliminate the arms race for speed to get the fastest data feeds.

The intense competition between exchanges in trading fees competes away rents on data.

It might appear that the Commission is locked forever in the uncomfortable position of refereeing the never-ending squabbles over market data. To a certain extent this is true. Fortunately, the joint-product economics of exchanges ameliorates at least some of the problem. The 13 exchanges (with more to come soon), 31 ATSS, and numerous brokers scratch and claw for every trade. This fiercely competitive environment that has resulted in extremely low fees on trades. Indeed, there are many situations in which market participants enjoy negative fees. Market makers pay for some order flow, and exchanges sometimes pay more in rebates to one side of a trade than the trading fee charged to the other side of the

⁴¹ Note that Nasdaq’s “extended life” M-ELO order requires an extended life of 10 whole milliseconds (10/10,000 of a second). See <https://www.nasdaq.com/solutions/midpoint-extended-life-order-m-elo>.

trade. For example, Nasdaq's current pricing list displays numerous categories in which the rebate for adding liquidity is higher than the fee for taking liquidity.⁴²

Why would they do this? The answer is in the data revenue, including the sale of direct feeds and the distributions from the tape plans, which are allocated across the exchanges based on their contribution to trading volume.⁴³ In short, the fierce competition between market centers results in their losing money on trading fees but making it up in data revenue.

Thus, the net cost to society of the Commission's getting it wrong on data pricing will be offset at least in part as the exchanges compete viciously for every trade with competitive pricing of trading. Thus, we already have competition in the pricing of market data, but it is just indirect competition: The exchanges pay for trades so that they can get data revenue. This will serve to offset any excess rents on market data. However, the extent to which this occurs requires further analysis.

⁴² <http://www.nasdaqtrader.com/Trader.aspx?id=PriceListTrading2>

⁴³ Market makers, on the other hand, are willing to pay for trades as they attempt to make money by taking the other side of the trade. Their willingness to pay for order flow provides direct competition to other trading venues that employ matching engines.

VI. Other matters

The socially optimal bid-ask spread is not zero.

The proposing release appears to believe that reducing transactions costs such as the bid-ask spread is always a good thing.⁴⁴ This is not always the case. The bid-ask spread is the price of immediacy in the market. It is a fallacy to believe that the socially optimal price of immediacy, or any good for that matter, is zero. Consider other commodities such as bread. Consumers may like low bread prices, but if the price is too low then none will be produced. Immediacy and liquidity are valuable commodities that are consumed in the trading process. If the spread is pushed artificially too low, then liquidity will suffer. It is well known that more liquid assets are more valuable, so investors may suffer from lower asset values due to less liquidity. *Ceteris paribus*, a narrower spread is an unambiguous improvement only if the cost of providing that immediacy has also fallen.

The Proposing Release is an example of how not to write.

I have often bemoaned the fact that Congress does not give the SEC enough resources to do its job as well as it should be done. However, the pushback I have heard from people on The Hill is that if the SEC is given a larger budget, it will just waste it on more lawyers and bureaucracy. Rule proposals like this one are a case in point.

The 597-page Proposing Release is a classic example of how not to communicate. For one thing, it is not written in anything close to plain English. I put the summary through a readability checker and here are the results:⁴⁵

⁴⁴ See the proposing release, page 58, which describes a narrowing of the spread as an “improvement.”

⁴⁵ <https://readabilityformulas.com/freetests/six-readability-formulas.php>

Your Results:

Your text: The Securities and Exchange Commission (◆Commissio ...[\(show all text\)](#))

Flesch Reading Ease score: -8.3 (text scale)

Flesch Reading Ease scored your text: [impossible to comprehend.](#)

[\[f\]](#) | [\[a\]](#) | [\[r\]](#)

Gunning Fog: 27.5 (text scale)

Gunning Fog scored your text: [EXTREMELY difficult to read.](#)

[\[f\]](#) | [\[a\]](#) | [\[r\]](#)

Flesch-Kincaid Grade Level: 26

Grade level: [College Graduate and above.](#)

[\[f\]](#) | [\[a\]](#) | [\[r\]](#)

The Coleman-Liau Index: 15

Grade level: [college](#)

[\[f\]](#) | [\[a\]](#) | [\[r\]](#)

The SMOG Index: 20.9

Grade level: [graduate college](#)

[\[f\]](#) | [\[a\]](#) | [\[r\]](#)

Automated Readability Index: 27.8

Grade level: [College graduate](#)

[\[f\]](#) | [\[a\]](#) | [\[r\]](#)

Linsear Write Formula : 36.6

Grade level: [College Graduate and above.](#)

[\[f\]](#) | [\[a\]](#) | [\[r\]](#)

Readability Consensus

Based on (7) readability formulas, we have scored your text:

Grade Level: 25

Reading Level: [impossible to comprehend.](#)

Reader's Age: [College graduate](#)

In short, one needs to be in 25th grade to understand the summary. Law school only gets you to 19th grade. The readability consensus is “impossible to comprehend.” And that is just for the summary! The 597-page text is incredibly repetitive. It states “discussed above” 111 times and “discussed below” 41 times. No wonder so many of the commentators are begging for more time to digest this beast.

I suspect that the Commission’s lawyers think that saying the same thing over and over again, as discussed above, will somehow prove to the DC Circuit that the Commission has fulfilled its responsibilities under the Administrative Procedures Act (APA). Rather than showing due diligence, it really signals poor craftsmanship in an attempt to hide faulty logic. I doubt whether issuing an “impossible to comprehend” document, no matter how long it is, fulfills the purpose of the APA.

VII. Conclusion: More SIP data is better, nuke the round lot, and forget duplicative consolidators.

In conclusion, I again congratulate the Commission and staff for having the guts to open up this can of worms. In particular, it is time to expand the data that belongs in the core to include depth-of-book data along with the essential .IV data for ETPs and auction data. It is time to fix the symbology mess. By making depth-of-book data readily available, the round lot of 100 shares becomes obsolete and should be scrapped. For simplicity, either all orders should be “protected” or, better yet, drop the obsolete and unnecessary “order protection” rule. Unfortunately, competing consolidators won’t solve the unending battles over market data, but competition for order flow by exchanges competes away their rents in market data.

Respectfully submitted,

James J. Angel, Ph.D., CFP®, CFA
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