

THE UNITED STATES SECURITIES AND EXCHANGE COMMISSION

ROUNDTABLE ON MARKET DATA PRODUCTS,
MARKET ACCESS SERVICES, AND THEIR ASSOCIATED FEES

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10:30 a.m.

U.S. Securities and Exchange Commission

100 F Street, NE

Washington, D.C.

1	PARTICIPANTS:
2	
3	Jay Clayton, Chairman
4	Kara Stein, Commissioner
5	Robert Jackson, Jr., Commissioner
6	Elad Roisman, Commissioner
7	Hester Peirce, Commissioner
8	Brett Redfearn
9	John Roeser
10	Mark Donohue
11	David Shillman
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15	Panel One
16	Doug Cifu
17	Chris Concannon
18	Stacey Cunningham
19	Brad Katsuyama
20	Mehmet Kinak
21	Hal Scott
22	Tom Wittman
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24	
25	

1	PARTICIPANTS(CONT.):
2	Panel Two
3	Oliver Albers
4	Matt Billings
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6	Jeff Brown
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12	Panel Three
13	James Brooks
14	Michael Friedman
15	Chris Isaacson
16	Vlad Khandros
17	Jamil Nazarali
18	Ronan Ryan
19	Joseph Wald
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1	P R O C E E D I N G S
2	MR. REDFEARN: Good morning. Welcome to the
3	Securities and Exchange Commission Staff's Roundtable on
4	Market Data and Market Access. I'm Brett Redfearn,
5	Director of the Division of Trading and Markets and I
6	will be moderating the first panel today.
7	We very much appreciate the willingness of such
8	a thoughtful and diverse representation of market
9	participants to join us here today so that, together, we
10	can address the important and challenging set of issues.
11	I am confident that the discussions we will have over
12	the next two days will allow us all to consider, in a
13	rigorous and comprehensive way, how we might bring
14	greater transparency and clarity to our critical market
15	data and connectivity infrastructure.
16	I also want to introduce my colleagues and
17	panel moderators here with me. David Shillman and John
18	Roeser, Associate Directors in the Office of Market
19	Supervision; Dan Gray, Senior Special Counsel, also in
20	the Office of Market Supervision; Mark Donohue, Senior
21	Policy Adviser in the Office of Analytics and Research;
22	and Hans Heidle from the Division of Economic and Risk
23	Analysis.
24	I would also like to thank my staff in the
25	Division of Trading and Markets for putting this all

1 together, especially Arisa Kettig.
2 So now I would like to welcome Chairman Clayton
3 and Commissioners Stein, Jackson, Peirce and Roisman, our
4 panelists and our audience members who are here in person
5 or tuning in remotely.

6 So with that, I would like to begin by asking
7 Chairman Clayton to make his opening remarks. Chairman
8 Clayton.

9 CHAIRMAN CLAYTON: Thank you, Brett. Good
10 morning, everyone.

11 I want to thank the Division of Trading and
12 Markets for organizing this Roundtable on Market Data and
13 Market Access. This roundtable is an important step in
14 what will be a broad and open-minded review of a set of
15 issues that people have been raising for some time. I am
16 delighted at the level of participation we have. We have
17 very broad and diverse perspectives, including those of
18 investors, exchanges, brokers and other market
19 participants. And the caliber and experience of our
20 panelists is really all we could ask for, so I thank you
21 all for being here.

22 I want to actually be quite brief here. It's
23 funny, when people say my remarks are going to be brief,
24 then everyone is thinking, oh, my God, I can't believe
25 how long this is going on. I know there are diverse

1 views. I know these views are emotionally held.

2 I encourage you to state your views with vigor
3 -- excuse me -- maybe not that much vigor --
4 (Laughter.)

5 CHAIRMAN CLAYTON: -- state with vigor and
6 support. But I also ask all participants to think about
7 what will best serve our Main Street investors who are in
8 the market for the long term.

9 As I have often said, and I am speaking for
10 myself, not the Commission or any of my colleagues, if
11 you want to appeal to me, explain to me why what you want
12 is in the interests of people who are in the market for
13 the long term.

14 I look forward to an insightful and
15 constructive discussion. Thank you.

16 MR. REDFEARN: Thank you, Chairman.
17 Commissioner Stein.

18 COMMISSIONER STEIN: I also want to welcome
19 everyone to today's roundtable. And I want to thank the
20 Chairman, and join the Chairman in thanking the Staff for
21 organizing it.

22 I think my remarks are medium length, given
23 Jay's length. But I was just going to briefly frame some
24 of the issues.

25 The central market system was born 40 years

1 ago. Technology and communications at the time were not
2 as fast or as data rich as they are today. In the 1970s,
3 mainframes were at the nexus of information processing.
4 And a state-of-the-art mainframe took up an entire room
5 and could store only a small portion of the data stored
6 on my smartphone. And that mainframe was also 1,000
7 times slower and it cost 10 times more. As technology
8 has developed over the last 40 years, so too has the
9 market's use of data. Today, our major financial
10 institutions are, in effect, tech companies.

11 The issue before us today is has securities
12 market regulation kept up or do we need to adapt it to
13 better work in a computerized marketplace?

14 To understand where we are today, I think we
15 need to understand why the current regulatory system was
16 enacted in the first place. At the time the central
17 market system was created, the Commission was concerned
18 that, quote, there is no way that an investor can be
19 certain the investment process is working for him or her
20 all the time, end of quote. The solution was to create a
21 communications and regulatory system that would, quote,
22 give the investor's order constant protection and
23 representation in all markets at the same time, end of
24 quote.

25 In authorizing the creation of such a system,

1 Congress had two goals. The first was the centralization
2 of all buying and selling interests. The second was the
3 protection of the priority of public orders, so that each
4 investor would receive the best possible execution of his
5 or her order, regardless of where in the system it
6 originated. In other words, the goals were to update the
7 market system to reflect the realities of increased data.

8 As then-Chairman Bradford Cook said, the public investor
9 is, quote, looking at a goldfish bowl while really living
10 in the middle of an aquarium, end of quote. While I
11 would say today, the public investor is looking at an
12 aquarium, when we are really living in an ocean.

13 Have our rules withstood the test of time?
14 Have we achieved Congress's goals? Were there any
15 unintended consequences? I'm interested in hearing
16 everyone's thoughts on these issues. And I am also
17 interested in hearing everyone's thoughts on other issues
18 related to market data.

19 Does market data need to be nearly
20 instantaneous to be relevant? What system should we
21 develop to ensure today's investors receive the best
22 possible execution of their order? And how much should
23 that system cost and who should pay for it? And what
24 incentives should be in place to ensure that market data
25 is relevant and reliable?

1 Sometimes we defer these simple but difficult
2 questions. And that often means that new issues or
3 conflicts may arise. For example, the NMS planned
4 governance committees oversee the National Market System.
5 But can they be inherently conflicted because they work
6 for the exchanges?

7 So I encourage you all to tackle these simple
8 but difficult questions and I look forward to the
9 discussion. Thank you.

10 MR. REDFEARN: Thank you, Commissioner.
11 Commissioner Jackson.

12 COMMISSIONER JACKSON: Well, thank you so much,
13 Director Redfearn. I am delighted to be here, and
14 delighted that all of us here at the SEC are having a
15 critical conversation about how to ensure our investors
16 have all the information and access they need to our
17 capital markets.

18 And to me, folks, that's the start and the end
19 point of today's conversation, how this affects ordinary
20 investors. Data and access pricing is not a zero-sum
21 game between exchanges and brokers. When fair access to
22 our markets is expensive or inefficient, those costs are
23 passed straight along to investors.

24 So when we're talking about fairness today,
25 it's important to remember who we're talking about. What

1 of data on the exchanges are a key element of the market
2 data story.

3 A competitive market won't permit you to charge
4 much more than it costs a product to be produced. But I
5 can tell you it's an area where we have little to no
6 information. So one of the things I hope to learn about
7 today and what I want to see going forward is real
8 transparency and disclosure into how much it costs to
9 produce these data to connect participants and to provide
10 colocation services. I think the time for transparency
11 into those markets is long overdue.

12 And so I am hoping we can make progress today
13 on some of the issues that afflict our stock markets. I
14 am grateful to all of you that you're here today to help
15 us figure this out. And I look forward to the
16 conversation and all that you'll do to help protect
17 American investors.

18 MR. REDFEARN: Thank you, Commissioner.
19 Commissioner Peirce.

20 COMMISSIONER PEIRCE: Thank you, Brett. So
21 when we were preparing for this Market Data Roundtable,
22 Brett told me that I had to dress in market data themed
23 outfit. I thought -- I had to scratch my head. So I
24 settled on this jacket, my ink-spot jacket, as a sign of
25 all the ink that's been spilt on market data issues over

1 we're talking about is what's fair to ordinary investors.
2 And I'm hoping today we are going to hear about the
3 effects data and access prices have on ordinary American
4 families saving for retirement.

5 That's why it was so troubling to see that, on
6 a conference call with analysts yesterday, the president
7 and CEO of Nasdaq told the markets that, quote, Main
8 Street investors pay nothing for data, and, quote, this
9 debate is really a commercial dispute between exchanges
10 and broker-dealers. That's exactly the wrong way to
11 think about today's conversation.

12 Today is about ordinary investors and making
13 sure that our stock markets, the symbol of capitalism
14 around the world, are structured in a way that gives
15 access to our economic growth to ordinary mom and pop
16 investors. Regulating these areas is among the
17 Commission's core duties. The Exchange Act tasks us with
18 ensuring that exchange actions do not unduly burden
19 competition and are fair and reasonable.

20 Our challenge is deepened by the exponentially
21 increasing complexity of our markets, leaving regulators
22 fighting to see the full picture from exchange rule
23 filings. I'm thrilled that we at the SEC are taking
24 those obligations seriously. And one point that I want
25 to emphasize is that, in order for us to do that, costs

1 the years.

2 (Laughter.)

3 COMMISSIONER PEIRCE: So the wonderful thing
4 about today is -- today and tomorrow is that we have all
5 of these people with such expertise in the room together
6 to talk about these issues. These issues are often very
7 contentious. But I think having everyone in the same
8 place to discuss them is tremendously important.

9 I do hope -- I know that there are specific
10 issues that you all are going to be addressing. But I do
11 hope that you will take a step back, too, and think more
12 broadly. Commissioner Stein mentioned the mandate that
13 the SEC was given. And we have proceeded with that
14 mandate to facilitate the establishment of a National
15 Market System and then oversee the provision of data
16 related to trades in that system.

17 And I contend that technology and time would
18 have, on its own, brought together a National Market
19 System. And certainly the core function of markets, one
20 of the core functions of markets, is to produce data.
21 Markets produce information about prices and they do it
22 very well. And typically, inserting the government into
23 that relationship and trying to have a government overlay
24 actually impedes the flow of information. So I hope that
25 we can think about these issues in the context of sort of

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1 some of those broader principles.
 2 So thank you all for being here today.
 3 Although I won't be able to be here for all of today's
 4 and tomorrow's roundtable, I will be watching at home
 5 later. So thanks very much.
 6 MR. REDFEARN: Thank you, Commissioner.
 7 Commissioner Roisman.
 8 COMMISSIONER ROISMAN: It's still weird to be
 9 last, because all the good points have been made. But I
 10 want to thank again Brett and the Division and our
 11 panelists for coming today and contributing your time and
 12 energy to this discussion.
 13 Looking at the agenda and at those seated
 14 around the room, it is clear that we have very
 15 knowledgeable participants who will not hesitate to
 16 engage in robust discussions over the next two days.
 17 From these discussions, I hope to gain a more granular
 18 understanding of the forces that motivate various
 19 customers' demand for SIP data versus the different types
 20 of proprietary data and levels of access that exchanges
 21 provide.
 22 In this regard, I have several specific
 23 questions on which we need more information as the
 24 Commission considers policymaking in this area, and
 25 others that are intimately related. As an initial

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1 matter, how are regulatory requirements imposed on market
 2 participants influencing this demand?
 3 I have already voiced my concern about the
 4 Order Protection Rule and asked the Commission to review
 5 its effects in today's marketplace. But I would be very
 6 interested to hear about other rules, such as the Vendor
 7 Display Rule, or obligations to achieve best execution to
 8 maybe pushing market participants towards products or
 9 services that they would not otherwise demand for
 10 themselves or their customers. I believe a starting
 11 point for the Commission should be to review any such
 12 rules to see how we can tailor the requirements to
 13 achieve their objectives and limit any unintended
 14 consequences.
 15 Next, to what extent do participants demand
 16 premium data products or access from exchanges in order
 17 to provide their own products or services that compete
 18 with the same exchanges? In this regard, I am thinking
 19 of entities like internalizers and crossing platforms,
 20 ATSS, dark pools and ECNs that may utilize exchange data
 21 to provide quotes and facilitate off-exchange trading in
 22 real time. We need to bear in mind that these types of
 23 market participants, while providing their own value in
 24 the marketplace, are doing so on top of fundamental
 25 services that we currently rely on exchanges to provide,

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1 such as facilitating capital formation and price
 2 discovery. And while we heavily regulate exchanges,
 3 these market participants operate with much less
 4 regulatory scrutiny and lower cost. So as we understand
 5 how such market participants capitalize on the functions
 6 of exchanges, we should consider the extent to which they
 7 are bearing their share of those costs.
 8 As for exchanges, Regulation NMS contemplated
 9 that certain market data fees would be used to bolster
 10 SRO funding. In Regulation NMS, the Commission
 11 explicitly stated that many commenters recommended that
 12 the level of market data fees should be reviewed and
 13 that, in particular, greater transparency concerning the
 14 costs of market data and the fee-setting process is
 15 needed. While the Commission agreed, it directed
 16 commenters to voice their concerns in a separate concept
 17 release relating to SRO structure. Considering the
 18 issues we are discussing today, is it time for us to
 19 revisit the 2004 SRO concept release?
 20 With respect to market participants who pay
 21 premiums to exchanges for data and access to optimize
 22 their own trading, what prevents a broker-dealer from
 23 unsubscribing to proprietary fees if fees get too high?
 24 What alternatives could meet its objectives and what
 25 forces of friction prevent switching? Also, how could

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1 the SIP products be improved to fulfill this demand?
 2 Finally, we need to ask how retail investors
 3 are affected by the issues we are discussing at this
 4 roundtable, a notion that I think all of the
 5 commissioners agree with. What level of price
 6 improvement is achieved when broker-dealers trading on
 7 behalf of institutional investors and ultimately retail
 8 investors rely on these higher-cost products or services
 9 rather than the SIP? If costs for market data and access
 10 were reduced, how much of that savings would be passed on
 11 to retail investors and investors in general?
 12 So sum up, I believe it's important for the
 13 Commission to discern where market forces versus
 14 regulation are driving demand for premium products and
 15 services versus SIP products, as well as how retail
 16 investors are benefitting from our regulation in this
 17 area. Any change in the Commission's approach to market
 18 data and access will inevitably affect today's market
 19 dynamics. As regulators, it's incumbent on us to
 20 understand as fully as possible the incentives our
 21 actions generate and, on this basis, decide whether the
 22 benefits we aim for are worth the consequences that will
 23 ensue.
 24 Before I close, I think it's important to step
 25 back and put some context around these discussions. As

1 we debate the merits of shaving micro- and nanoseconds of
2 latency in our equities trading, we have yet to achieve
3 reliable pretrade transparency in our fixed income
4 markets. And in fixed income, posttrade transparency is
5 debated in terms of minutes and hours. The U.S. fixed
6 income market is much larger than our equities market and
7 yet we have not discussed that market in as fine a detail
8 as we are addressing the equity market at this
9 roundtable.

10 While I look forward to learning as much as I
11 can over the next two days, I am also eager for the
12 Commission to consider how we can make the U.S. fixed
13 income markets as robust and favorable to investors as
14 our equity markets.

15 I know the Chairman has created the FIMSAC and
16 I am very thankful for that, and for the work that the
17 Division and the participants on that committee put into
18 it. So thank you very much.

19 CHAIRMAN CLAYTON: Brett, if I may?

20 I'm going to take back some of the time I
21 ceded.

22 (Laughter.)

23 CHAIRMAN CLAYTON: I want to -- I just want to
24 try and put this in a much broader picture for a moment.

25 I just returned from IOSCO with the international

1 for distributing market data with an eye to ensuring that
2 we are fulfilling our mission to protect investors,
3 maintain fair, orderly and efficient markets and
4 facilitate capital formation. More specifically, to meet
5 our obligations under the Exchange Act, we need to ensure
6 that the fees that are being charged for such important
7 market data services are fair and reasonable, not
8 unreasonably discriminatory and do not impose an undue or
9 inappropriate burden on competition.

10 These are words that you've read or heard a
11 hundred times with respect to the mandate of the
12 Commission. However, these are words that require
13 significant thought and consideration by both regulators
14 and market participants alike. This is especially true
15 in today's market environment, given the remarkable
16 evolution of market technology, market infrastructure and
17 the corporate structure of today's stock exchanges.

18 Today and tomorrow, we plan to discuss what our
19 panelists think is working well with our market
20 infrastructure and where there are areas that may be in
21 need of improvement. And if there are areas that warrant
22 a new or improved approach, we are encouraging our
23 panelists to give us their thoughts about how to proceed
24 in the right direction.

25 Throughout our discussions today and tomorrow,

1 securities regulators and FSB with the central bankers
2 and securities regulators who are responsible for
3 financial stability. And I want to let everybody here
4 know that it's not just people in America who are
5 watching how we are handling these issues but regulators
6 around the world, they take our lead on many of these
7 things. And that's, you know, an important perspective.

8 We are setting the standards by which the rest of the
9 world will adopt.

10 Leads to the second point, which is only in
11 America could you have a roundtable like this to discuss
12 issues like this, where people are willing to come
13 forward and put forth their wares and tell you what they
14 think. And I just can't emphasize enough how much I
15 appreciate the willingness of our first panelists and all
16 our panelists to do that. So thank you.

17 MR. REDFEARN: Thank you, Chairman, and thank
18 you all very much for your remarks. Very quickly, I am
19 going to make a few comments.

20 First, let me say that the views that the Staff
21 and I express today are our own and do not necessarily
22 reflect the views of the Commission, the Chairman or
23 other Commissioners or other members of the Staff.

24 Our goals for this roundtable are
25 straightforward. We want to examine our infrastructure

1 first and foremost we are here for individual investors,
2 Main Street investors, as Chairman Clayton often calls
3 them. We are not here to benefit any one business model
4 over another. And we continue to be focused on how
5 individual investors may be affected from any potential
6 changes being discussed.

7 As most of you know, we currently have a two-
8 tiered system of market data and market access in U.S.
9 equity markets. There are the consolidated data feeds
10 distributed pursuant to joint SRO National Market System
11 plans and there are the proprietary data products and
12 access services that are provided directly by the
13 exchanges. One set of products is faster, more content
14 rich and more costly than the other.

15 It's unclear whether the landscape that we have
16 today was what was envisioned or expected when related
17 policy decisions were made in the past. So how did we
18 get here? To answer that, we need to go back to the
19 1970s, when Congress directed the establishment of a
20 National Market System, or NMS. The primary objective of
21 the NMS was to promote fair and efficient markets and
22 Congress emphasized its belief that market data systems
23 would, quote, form the heart of the National Market
24 System. The joint SRO market data plans then were
25 created to implement this statutory directive and the

1 plans began distributing consolidated data stream through
2 a central processor or SIP.

3 By 1999, the Commission concluded the
4 consolidated data had been an essential element in the
5 success of U.S. securities markets. It stated the
6 consolidated data had been, quote, the principal tool for
7 enhancing the transparency of buying and selling
8 interests in a security and for facilitating the best
9 execution of customer orders by their broker-dealers.

10 The Commission again addressed market data
11 concerns when it adopted Reg NMS in 2005. Although many
12 commenters at the time recommended that the Commission
13 adopt a competing consolidator model to replace the SIP
14 model, the Commission decided not to adopt such a model
15 but did remove any restrictions that would prevent
16 exchanges from distributing their own information
17 directly. The Commission's rationale for these
18 Regulation NMS decisions has important implications for
19 our discussions today and going forward.

20 At the time, the Commission was concerned that
21 moving away from the SIP model toward a competing
22 consolidator model might undercut the benefits of core
23 data. The reason for this concern is telling. The
24 Commission noted that, quote, if the benefits of a fully
25 consolidated data stream are to be preserved for

1 still qualify as core data, or have we inadvertently
2 evolved to a model in which the purchase of an additional
3 set of proprietary data and access products is mandatory
4 for core data?

5 I very much look forward to our panelists today
6 as we discuss these and many other questions of
7 importance to investors and the health of the U.S. equity
8 markets.

9 So let's move on to our panel discussions.
10 Thank you again, all, for being here today. While other
11 panels are going to be focused on more specific issues,
12 the first panel is going to be addressing sort of the
13 full spectrum of products and services related to the SIP
14 and prop data and connectivity. And so with that, I
15 would like to first thank our panelists for being here
16 and note that, given the opening remarks, it's possible
17 that this goes a little longer than planned. So just
18 keep in mind when we get to the end of this and it's
19 lunchtime that there's going to be a little time required
20 to get out and get back in through security, so just keep
21 that in mind, as we will be starting promptly after that.

22 So with that, I'd like to ask our panelists to
23 introduce themselves. And before getting into other
24 questions, take five minutes to share their high-level
25 views on the evolution of SIP data products, exchange

1 investors, every consolidator would need to purchase the
2 data of each SRO. Under these circumstances, the
3 Commission concluded that, quote, as a practical matter,
4 payment of every SRO's fees would be mandatory, thereby
5 affording little room for competitive forces to influence
6 the level of fees. It noted that some exchanges might
7 well propose higher fees to increase their revenues,
8 particularly those with dominant market shares, whose
9 information is most vital for investors.

10 Today, a key overarching issue for this
11 roundtable is whether, despite the Commission's belief in
12 2005 that retaining the existing SIP model would uphold
13 the integrity and affordability of core data, a series of
14 factors including significant technological advances and
15 new proprietary data offerings has led to the result that
16 the Commission hoped to avoid.

17 Technology has greatly transformed our markets.
18 This transformation raises fundamental questions for our
19 two-tiered system of market data and market access,
20 including does SIP data with its latencies in content
21 differentials compared to proprietary data meet the basic
22 needs of market participants in today's algorithmic
23 markets? Or are the exchanges' proprietary data products
24 and access services necessary to satisfy competitive
25 forces and regulatory duties? And does SIP data alone

1 proprietary data products and market connectivity
2 services, including what works well and what could be
3 improved. So, Doug, why don't you start us off?

4 MR. CIFU: Thank you. Thank you, Brett.

5 Good morning. My name is Doug Cifu and I am
6 the cofounder and chief executive officer of Virtu
7 Financial. Virtu is a global market making and
8 institutional agency firm that provides competitive two-
9 sided bids and offers in over 25,000 unique financial
10 instruments in 235 markets in 36 countries around the
11 world. Given the breadth and scope of our trading
12 activities, we are uniquely positioned to provide a
13 perspective on the topics being discussed at today's
14 roundtable. Simply put, we purchase market data and pay
15 for connectivity to nearly every exchange in the world.

16 In the United States equity market, our various
17 activities as a market maker and broker means that on
18 many days, we execute nearly 20 percent of the
19 consolidated volume in the market. We also act as an
20 important and valued business partner for nearly every
21 retail broker and wealth manager in the U.S. equity
22 market, handling approximately 30 percent of orders in
23 the U.S. retail market. As a part of this service, we
24 provide real price improvement or prices that are better
25 than the national best bid or best offer to nearly 90

1 percent of the retail orders we receive. To be a hundred
2 percent clear, these are not rebates or payments to
3 brokers but real dollars, an average of \$1.7 million per
4 day this year and a total of more than \$300 million last
5 year provided to real Main Street investors who are the
6 customers of our clients. This service is highly
7 competitive, as we compete on price improvement with a
8 half dozen other fabulous firms.

9 As a result, as our CEO, I need to be
10 maniacally focused on our costs so that we can continue
11 to provide that service to Mr. and Mrs. 401(k) in a
12 sustainable and efficient manner as all costs go into our
13 bid and offer spreads and reduce the price improvement
14 that we are able to provide. Every dollar we pay for
15 overpriced market data or connectivity is one less dollar
16 available for price improvement. Virtu's customers have
17 choices and they choose to trade with us because of the
18 value, transparency and the service we provide.

19 Today, we will be discussing the very important
20 and timely topic of market data and connectivity costs.
21 Yesterday, I submitted a full comment letter outlining
22 our concerns which, given the time constraints, I will
23 not repeat. But as a major customer of the three
24 exchange conglomerates to which we paid nearly \$34
25 million in 2017 for market data connectivity and colo

1 the mandates of Reg NMS. Many of these charges are
2 simply unconscionable.

3 Let me explain exchange connectivity very
4 clearly. The exchanges charge my firm a total of \$1.188
5 million per year each and every year for six cross-
6 connects. A cross-connect is simply a cable that plugs
7 into an exchange. This is literally the cable that they
8 use. It is provided by a vendor in Hicksville, Long
9 Island, right near where I grew up. We contacted them
10 and purchased this spool for \$189. It's literally the
11 Nasdaq cable. It is 328 feet of wire. Because we are
12 Virtu, we shopped around and found the exact same spool
13 cheaper on Amazon for \$88.

14 (Laughter.)

15 MR. CIFU: If you need six of these, one
16 primary and one backup, to connect to the Nasdaq, New
17 York and Bats, the exchange costs around \$1,300,
18 purchasing from the expensive vendor in Hicksville.

19 We don't get new cable every year for our
20 money. It's the same cable. We just keep paying for it
21 over and over every year. If we spent one year's worth
22 of cross-connects on Amazon, we'd have enough fiber to
23 string from Carteret, New Jersey, to the CME's data
24 center in Aurora, Illinois. That's 733 miles of cable.
25 This is literally the \$600 hammer that the Department of

1 costs, let me be direct and clear. We, as an industry,
2 have jumped the shark. Incredibly, on a per venue basis,
3 we pay the three U.S. exchange operators for market data
4 connectivity and colo costs more than five times what we
5 pay the nearly 225 other exchange operators in the other
6 35 countries in which we operate.

7 Given the realities of the modern electronic
8 market, no market participant that desires to route an
9 order effectively and consistent with its best execution
10 obligations either as a principal or an agent can do so
11 without paying for full depth of book market data from 11
12 exchanges and connectivity from them all. While the SIP
13 is useful and necessary for some parts of our business,
14 we and every other modern market participant are
15 compelled to purchase proprietary data feeds and exchange
16 connectivity. Virtu's clients take their fiduciary
17 responsibility seriously and hold all of their brokers to
18 the highest standards available, including using publicly
19 available information when routing orders.

20 There is a reason for this heightened focus on
21 market data and connectivity fees. The access fee cap
22 has limited the exchanges' ability to charge us more for
23 transactions so, in response, the exchanges created
24 synthetic access fees by ratcheting up market data and
25 connectivity charges over the last decade, circumventing

1 Defense was criticized for so severely in the 1980s. We
2 have no way to negotiate this price. This is in no way
3 fair and reasonable.

4 We ask that the Commission examine and require
5 the exchanges to publish their costs of providing these
6 services. With respect to market data, we humbly request
7 that there be real competition so that firms like Virtu
8 could produce our own SIP and market data feeds at a
9 fraction of the cost.

10 We are not anti-exchange. We believe the
11 exchanges play a valuable and critical role in the
12 financial ecosystem. We just believe in free and fair
13 competition, transparency and efficient markets. We do
14 not have that at all today.

15 I look forward to today's discussions. Thank
16 you again to Brett Redfearn and his staff and the
17 Commissioners for sponsoring this timely two-day
18 roundtable. Thank you very much.

19 MR. REDFEARN: Thank you, Doug. Chris.

20 MR. CONCANNON: Thanks. Here's your cable
21 back.

22 I'm Chris Concannon, president and COO of Cboe
23 Global Markets. I want to thank Chairman Clayton and the
24 other Commissioners and I want to thank the Staff for
25 organizing this roundtable.

1 When I first heard about the roundtable several
2 months ago, I was hopeful. I thought, great, this would
3 be an opportunity to make some real changes to the SIP,
4 that we would come here with some productive proposals
5 and offer our help. Brett, as you know, we worked with
6 you in your prior life, we worked with you and SIFMA on
7 several SIP proposals that I think were real compromises.

8 However, in light of the recent unprecedented
9 and unwarranted public assaults on exchanges, we now have
10 less appetite for compromise. So I come here with no
11 proposal on hand and little willingness to suggest
12 compromise. We are here and willing to listen but we
13 would like to listen to real facts, not unsupported
14 claims.

15 The evidence is clear. Trading costs for
16 retail investors continues to decline. Commissions are
17 driving towards zero. Execution quality remains
18 exceptionally high and retail investors are executing at
19 or inside the market spread. Retail investors have never
20 had it better.

21 I can go on my phone today, get realtime market
22 data for free, execute an order for \$4.95 or, in some
23 brokerages, free and get executed at or inside the
24 spread. There is no other market in the world that
25 performs that way. Now, my order may get sold for

1 payment for order flow. That could be another roundtable
2 idea in the future.

3 But let's turn to the institutional investor.
4 According to a recent Morningstar study, in 2017 mutual
5 fund and ETF investors on average saved around 4 billion
6 in fund expenses, compared to 2016. Investors in mutual
7 funds and exchange-traded funds experienced an 8 percent
8 decline in their fees from 2016 to 2017. The facts are
9 clear. Investors' costs continue to go down while their
10 execution quality goes up.

11 So I ask you what is this debate about? It's
12 not about Main Street versus Wall Street. It's literally
13 a debate between Wall Street and the regulated exchanges.

14 You have the investment banks, also known as SIFMA, and
15 the HFTs in one corner and the exchanges in the other
16 corner. This is not about mom and pop investors, this is
17 not about hotdogs and apple pie. This is about BMWs and
18 Range Rovers.

19 Unfortunately, the Commission is being forced
20 to decide whose economic rents are appropriate,
21 investment banks and HFTs or regulated exchanges? So
22 let's talk about those economic rents briefly.

23 In the second quarter of 2018, the top five
24 investment banks made over 20 billion in trading
25 revenues. That's just the top five. They are on track

1 to make over 80 billion total trading revenues for 2018.
2 Within their equity trading business, just to be fair,
3 they only made 8.4 billion in the second quarter. Again,
4 that's just the top five investment banks. In the second
5 quarter of 2018, Cboe's proprietary market data for the
6 entire industry was \$9 million. So that's 8.4 billion
7 versus 9 million.

8 The irony in all of this is the only ones left
9 with excessive economic rents will be the lawyers we all
10 have to hire to litigate these issues for years to come,
11 litigation that will likely play out long after we are
12 all here.

13 A preview of some of the facts that you will
14 hear at the roundtables today. First, the SIP revenue is
15 flat to down over the last decade. You will hear
16 evidence that firms have choice. You will hear that term
17 a lot, choice, when it comes to purchasing market data
18 and exchange access. And clearly, they exercise that
19 choice. You will also hear clear evidence of platform
20 theory, where the fierce competition between exchanges
21 restricts market data pricing power. And again, firms
22 exercise choice. And finally, you will hear from
23 executives from highly profitable businesses that whine
24 and complain about their costs, including me. Thank you.

25 MR. REDFEARN: Thank you, Chris. Stacey.

1 MS. CUNNINGHAM: Hi, I'm Stacey Cunningham.
2 I'm president of the New York Stock Exchange Group. We
3 operate five equity exchanges, two options markets, and
4 we are part of Intercontinental Exchange, which is the
5 largest global ecosystem of exchanges and clearinghouses
6 and data providers worldwide.

7 So I am going to start off with the good news.
8 I mean, the U.S. capital markets, the U.S. equity
9 markets are the deepest, most liquid, most transparent
10 and most efficient markets in the world. We are
11 literally the envy of the world's markets. And we think
12 we shouldn't take that position for granted.

13 The markets are driven, our markets are driven
14 by the forces of supply and demand, of competition and
15 transparency, and we shouldn't assume that tinkering with
16 those things is not going to undermine what makes us so
17 unique.

18 Our markets operate well. You know, we share
19 the Commission's view on the importance of protecting the
20 Main Street investor. We share a lot of the points that
21 Chris just made. I mean, the Main Street investor has
22 never had it better. They are able to look up a stock
23 quote for free. They are able to trade and get an
24 executed price that is better than they got before and
25 they are able to do it in less than a second, and all for

1 less than the price of a cup of coffee. The market data
2 debate is not a Main Street issue; it is a Wall Street
3 issue. It is about Wall Street profits and that's one of
4 the concerns.

5 The value and importance of market data and
6 connectivity has evolved and it has increased, based on
7 the competition that was introduced with regulations,
8 namely Reg NMS. That competition has benefitted
9 investors and brought costs down, as Chris just detailed,
10 but it's introduced fragmentation, dramatic
11 fragmentation. It is unsurprising that, in a fragmented
12 world, that variable costs come down and fixed costs have
13 gone up. But the overall, all-in cost to trade on the
14 New York Stock Exchange has come down.

15 When I say the all-in cost to trade, that
16 includes transaction fees, market data fees, colocation
17 fees, port fees and all of the connectivity fees. That
18 all-in cost to trade, while it's a different mix of
19 revenues than it was before, it has come down. It is
20 cheaper to trade on the NYSE today than it is to trade in
21 most dark pools. It is cheaper to trade on the NYSE
22 today than it is to trade on IEX. That mix is different
23 but it's coming down.

24 But fragmentation has introduced some
25 challenges. It is harder for institutional investors to

1 next two days. We've come with ideas and recommendations
2 that we do think would support some improvements and
3 enhancements to our public markets, specifically around
4 market data and connectivity. But we do think the time
5 would be better spent talking about how we encourage our
6 public markets to be more competitive globally and versus
7 private market landscape, the private market landscape,
8 because that is a Main Street issue. Like that is a real
9 Main Street issue when we look at the number of public
10 companies that are dropping. And part of the NYSE's core
11 mission is to make sure that public investors, the Main
12 Street investor, has access to opportunities so that they
13 are not left out of the most dynamic and fastest growing
14 companies that are out there in the world. And that's
15 part of what we would like to solve for and we think the
16 Commission shares that view. And think, if we took all
17 of the brain power that's in this room and on this dais
18 and among the Staff and focus on those issues, that we
19 would all win instead of fighting amongst ourselves. But
20 thank you. Thank you for having us here today.

21 MR. REDFEARN: Thank you, Stacey. Brad.

22 MR. KATSUYAMA: Thank you. My name is Brad
23 Katsuyama. I am the CEO and cofounder of IEX the
24 Investors Exchange. Just for clarity, I think we're the
25 only regulated exchange on the other side of this debate

1 source large liquidity. And, yes, it's more expensive to
2 stitch the market back together when you're looking at a
3 number of different venues.

4 But we look at the revenues that the NYSE earns
5 on market data and it is roughly \$220 million.
6 Industrywide, including the other exchanges, it's about
7 \$600 million. That is half of what it is for the SEC's
8 own Section 31 fees that are described as small. And it
9 is just a fraction, a miniscule fraction of the top five
10 equity trading revenues for five banks. So looking at
11 just five banks for just the first nine months of the
12 year, they just reported \$25.8 billion worth of revenues.
13 So this is a Wall Street issue and this is about Wall
14 Street profits.

15 When IEX earns a profit, those profits accrue
16 to their private owners, their largely institutional
17 ownership. When the New York Stock Exchange, Nasdaq or
18 Cboe earn profits, they accrue to their public
19 shareholders. That's changed. When NYSE, Nasdaq and
20 Cboe used to earn profits, they accrued to their member
21 owners. This is a Wall Street issue. This is how it's
22 changing. And this is about profits among Wall Street
23 and who deserves what.

24 And so we are perfectly content, and NYSE is
25 very pleased to be part of this conversation over the

1 from the regulated exchanges. You know, we appreciate
2 the invitation to be here. We are thankful for the
3 Staff's work in putting this together.

4 You know, to put the issue in context, you
5 know, we should consider how technology has evolved and
6 impacted other industries and contrast that with
7 basically what we're going to talk about today, what's
8 happening in the equity markets in the U.S. You know,
9 technology has been harnessed to bring sustained
10 improvements to all types of consumers by delivering new
11 products and services faster, cheaper and better. Even
12 in industries where there are a relatively small handful
13 of dominant players, if you think of smartphones or
14 computers, even data delivery and storage, competition
15 has yielded incredible performance and functionality
16 improvements with no cost increases or lower costs over
17 successive years.

18 If you compare that to the U.S. equity market,
19 there are 13 exchanges, all but one of them, us, owned by
20 just three companies. The products created and sold by
21 each exchange are unique to that exchange. And based on
22 comments that I saw posted last night, most members'
23 experiences are similar to that of IEX. There are
24 egregious markups, consistent price hikes by the
25 exchanges over the years.

1 The reason for this stark difference is because
2 there simply is no substitute. You know, we hear about
3 choice. There is no choice. There is no substitute for
4 a New York Stock Exchange direct connection in a New York
5 Stock Exchange data center. There is no competitor for
6 this product.

7 If there was any other alternative, and trust
8 me when I say this, IEX would have gladly paid millions
9 of dollars to someone else other than our competitors for
10 connectivity and market data from those exchanges. It
11 would simply be a bad business choice to do otherwise.
12 But there is no choice. Don't be fooled when they say
13 there is.

14 You know, law and regulation also gives
15 exchanges a special status. Because of the status and
16 the need for brokers to seek best execution to trade
17 actively on all major exchanges in order to meet
18 obligations to their clients, the exchange families also
19 enjoy a regulatory monopoly on the sale of their
20 products. The market data they sell is not generated so
21 much as regenerated from the trading activity of their
22 own members. Further, because the exchanges also control
23 the so-called public consolidated data feeds, by design
24 they have ensured that those feeds are suboptimal for
25 sophisticated traders, perpetuating their product

1 monopolies in a multitiered system of market data.

2 Like other exchanges, IEX does receive portions
3 of the revenue created by SIP fees. But unlike the other
4 exchanges, we believe those fees should be reexamined
5 based on full transparency of revenues and costs to
6 operate these systems. The excessive fragmentation
7 benefits exchanges by creating multiple product and data
8 monopolies but it creates an unnecessary burden on
9 investors and brokers who are required to make the
10 necessary investments to navigate an increasingly complex
11 market.

12 Commissioner Jackson in a recent speech made
13 this point very clearly, and I quote, why do we have so
14 many exchanges, only to have nearly all of them owned by
15 three corporate parents? I understand, of course, why a
16 company would buy and absorb competitors with the same
17 business model. But it's harder to see why a company
18 would acquire and then continue to operate virtually
19 identical businesses. One reason our exchanges do this
20 is so they can charge investors to connect to each
21 exchange, end quote.

22 You know, from its beginning, IEX set out to
23 become a very different type of market. Our approach to
24 offering market data and connectivity falls in line with
25 this. When we designed our market, long before we

1 applied to be an exchange, we made a decision not to
2 mimic other exchanges by trying to extract monopoly rents
3 from our members. As an exchange, we remain committed to
4 that decision. We also have consistently spoken out
5 against exchange pricing practices in testimony, comment
6 letters and published opinion pieces. We also joined a
7 petition late last year as the only exchange signing
8 alongside a broad cross section of investors, brokers and
9 traders asking the SEC to create more transparency around
10 exchange costs and revenues for market data.

11 IEX has continued to rely on simple, flat
12 trading fees rather than the controversial practice of
13 paying rebates for order flow. And we also provide our
14 market data and connectivity for free, both because we
15 think it results in a fairer, less conflicted and more
16 transparent market but also because it aligns our
17 interests more tightly with those of our broker members
18 and their investor clients over the long term.

19 The Commission's recent market data decision
20 rightly calls into question whether many previous
21 exchange fee hikes can be justified and it will raise the
22 bar for approval of new fee increases. From our
23 perspective, this change is welcome and long overdue.

24 In trying to answer the important question of
25 whether exchange products are priced fairly and subject

1 to sufficient market competition, IEX has initiated an
2 internal review of our own costs of offering direct
3 connectivity and market data. When comparing our
4 estimates to the prices charged by the large exchanges,
5 the results are striking. For example, we estimate that
6 the potential markup for providing industry-standard
7 connections in an exchange-run data center approaches
8 3,000 percent. So Doug's cable on the end, if you add in
9 people, if you add in some other things, you're still
10 looking at a 3,000 percent potential markup. An analysis
11 of our cost to produce and distribute market data
12 suggests a potential markup for standard depth of book
13 feeds of the type that are challenged in the SIFMA
14 litigation may approach 1,500 percent or more.

15 To be sure, there are differences among
16 exchanges and their individual costs of operations. But
17 there are also important common aspects including basic
18 space, hardware, software and personnel requirements.
19 And many of these cost elements actually decrease on a
20 per user basis, such that larger exchanges should benefit
21 from diminishing incremental costs. But it's impossible
22 to understand this connection between fees and costs
23 without adequate disclosure by exchanges.

24 IEX does not expect that our efforts to promote
25 transparency of our own costs will stop the debate but it

1 certainly helps to justify the point of having this
 2 debate. And it sheds light on a factor, costs, that to
 3 this point have been almost completely cloaked in
 4 darkness.

5 Our suggestion with how to move forward with
 6 this debate can be summarized in two words. Transparency
 7 and accountability. We need greater transparency of the
 8 revenues exchanges earn from selling market data and
 9 connectivity products. When they talk about market data,
 10 they seem to leave out the fact that you need to actually
 11 connect to get it. We need greater transparency on the
 12 costs that exchanges incur to offer these products. We
 13 need full voting representation by brokers, traders and
 14 investors on the governance committees that operate our
 15 public data feeds to ensure that these committees are
 16 fully transparent and accountable to all segments of the
 17 industry and the public. And finally, we should make
 18 historical market data more freely available to the
 19 public at little to no cost. It is unacceptable that the
 20 only studies that academics and other observers can
 21 perform are on data that the exchanges decide to offer
 22 them. Greater availability of historical data will
 23 increase the ability of independent observers to study
 24 market structure and recommend improvements.

25 As the only independent stock exchange, IEX

1 appreciates the opportunity to participate in these
 2 discussions and we look forward to answering any
 3 questions.

4 MR. REDFEARN: Thank you, Brad. Met.

5 MR. KINAK: Good morning. I guess I should say
 6 afternoon. By the time we get this thing started, it
 7 will be over.

8 I was going to keep my comments short and speak
 9 but I don't think I'm going to get a chance to speak
 10 after my opening comments so I will go ahead and lay
 11 everything out there right now.

12 So my name is Mehmet Kinak. I work for T. Rowe
 13 Price. I have been at T. Rowe for 19 years. And what I
 14 am doing today is representing the buy side, representing
 15 retail and representing long-term, Main Street investors.

16 I get tired of hearing exchanges say that they
 17 represent the institutional community, that they
 18 represent retail and that they represent long-term, Main
 19 Street investors. They do not; we do. We handle their
 20 pensions, their retirement accounts, everything you can
 21 imagine. We are here not to incentivize our own book but
 22 to incentivize the fairness and the returns of those Main
 23 Street investors. We are here for Mr. and Mrs. 401(k).
 24 I want to make that very clear to people.

25 When I am sitting here, I'm not worried about

1 my own book. Look, we have fees, too, and I will get
 2 into how much our fees have increased. But I'm not here
 3 trying to get our fees to come down because it's
 4 detrimental to our practice at T. Rowe Price. That's not
 5 what I am concerned about. What I am concerned about is
 6 an ecosystem that slants one direction over another.

7 Now, when Chris comes in here and says, hey,
 8 I'm not looking for compromise, that's basically what
 9 kind of a system we have now, right? They get to set the
 10 rules for us and we basically have to follow them.
 11 That's kind of a tilted system that I think probably
 12 needs to be addressed, having this ecosystem of a for-
 13 profit company that also can self-regulate itself, that
 14 also has policy reform that allows it to get flow. It's
 15 just a terrible cocktail that's been created,
 16 unfortunately, and it needs to be addressed.

17 So with that, let me start by saying the buy
 18 side hasn't been vocal on market data. I get that.
 19 We're usually kind of more involved in regulatory and
 20 structural reform. But we don't voice up on market data
 21 too often. But it does impact us. So these blanket
 22 statements that I just heard to my right that say costs
 23 have not gone up are incorrect.

24 In the last three years, our costs for
 25 nondisplay data at T. Rowe Price, that we pay, has gone

1 up 25 percent. In the last five years, those costs have
 2 doubled. For display terminal usage in the last five
 3 years, those costs have gone up 50 percent. So for
 4 someone to say that costs do not increase is absolutely
 5 false.

6 The other thing I want to point out, the non-
 7 displayed agreements that came into effect say seven to
 8 10 years ago have really caused a major problem for how
 9 we conduct our business as an institution. There are
 10 broad definitions around what's considered non-displayed
 11 and, frankly, there's a lot of creative liberties taken
 12 into what is a non-displayed product. They don't allow
 13 us to store, to reproduce, to report, to use for analysis
 14 any type of data without charging us.

15 I also want to be clear that the exchange
 16 actually doesn't derive data, they aggregate data. It's
 17 my data. It's retail's data. It's Doug's data. It is
 18 not their data. But we are having to pay for it multiple
 19 times, over and over and over again for every single
 20 instance where I have to look at it.

21 And this comment that retail doesn't pay for a
 22 quote is absolutely false. They don't pay for it
 23 directly but it is in their cost of execution, as is with
 24 us. We also pay for it indirectly, and I want to be very
 25 clear on this point. We pay a commission to brokers for

1 the services that we find valuable. That's how we pay
2 our broker-dealers for the executions that they have to
3 provide for us. They are being taxed for the commissions
4 that we are giving them, both directly from execution
5 fees, but also indirectly from the synthetic fees that
6 Doug talked about. We are no longer giving them the
7 value from a commission perspective that they probably
8 deserve.

9 Now, people can cite how much the top five
10 brokers have earned. Those are separate businesses.

11 We're in a market where commission rates have come down.

12 We're in a market where management fees have come down.

13 We're in a market, as Brad pointed out, where all
14 technology costs are declining. And yet market data fees
15 continue to increase.

16 We are going to get to a point eventually
17 where, if someone says to me, I have to raise commission
18 rates in order to provide that best execution service
19 that broker is obligated to produce for me, that hurts
20 mom and pop. They are the ones paying the commission
21 rates. They are the ones incurring those costs.

22 So when we say, hey, we're protecting
23 investors, we're not. If commission rates have to
24 increase, those investors get hurt and it's the tax that
25 the exchanges continue to charge.

1 Now, most people are going to sit here and say,
2 hey, we need better governance. I'm all for that. We
3 need better transparency. I'm all for that.

4 But the reality is, my ask is, these costs have
5 to come down. Plain and simple. How do we do that?
6 Bring competition into the space. I know for a fact that
7 Doug can do what the SIP does -- in fact, I could say
8 this factually. Doug does what the SIP does every single
9 day for a fraction of the cost of the SIP. Maybe I'm
10 wrong.

11 But there are competing firms out there that
12 basically aggregate data and can distribute it for a
13 fraction of the cost. Put real competition into that
14 space.

15 As far as proprietary data, regulate it. It
16 doesn't make any sense for the margins that exist right
17 now. There has to be some fairness and reasonable kind
18 of metric to decide what is fair and reasonable.

19 I look forward to your questions.

20 MR. REDFEARN: Thank you, Met. Hal.

21 MR. SCOTT: I'm Hal Scott, emeritus professor
22 at Harvard Law School and the director of the Committee
23 on Capital Markets Regulation. The Committee on Capital
24 Markets Regulation has found that the U.S. equity markets
25 are performing well for U.S. retail and institutional

1 investors, as the cost to buy and sell stock is near
2 record lows. However, we believe that marginal reforms
3 to the U.S. equity market structure could further reduce
4 trading costs for U.S. investors. And we identified
5 critical market data services as one potential area for
6 improvement.

7 By this, I mean that broker-dealers must pay
8 exchanges for access to the securities information
9 processors, SIPs, for proprietary or depth of book data
10 feeds and connectivity services to efficiently execute
11 investor orders and fulfill their best execution
12 obligation. This area, we feel, needs improvement.

13 While trading venues, exchanges and so-called
14 dark pools clearly compete for order flow from broker-
15 dealers and this competition has been the primary driver
16 of reduced costs for investors, it is fairly clear that
17 this competition has not constrained the cost of
18 exchanges' critical market data services. This is due in
19 part to the fact that broker-dealers do not pay for
20 market data services when they are choosing a trading
21 venue to execute a customer order. Instead, broker-
22 dealers must pay fixed costs to access these market data
23 services in order to make routing decisions. These
24 costs, however, are passed through to customers, so
25 investors have a direct interest in the cost of these

1 fees.

2 There are a wide range of options that the SEC
3 could undertake to examine whether the cost of critical
4 market data services are excessively high and, if so,
5 then to take action to reduce them.

6 First, a measure that the committee recently
7 supported would be to require exchanges to make
8 standardized and thorough -- and I emphasize the word
9 thorough -- disclosures as to their revenues from all
10 critical market data services and the underlying cost of
11 providing those services. Such transparency would
12 provide the SEC and the public with the information
13 necessary to determine if the cost of critical market
14 data services is meaningfully and unnecessarily
15 increasing the cost of trading stocks.

16 Second, the SEC could require that exchanges
17 provide further evidence that the fees that they charge
18 for critical market data services are appropriate and
19 subject to competitive forces when the exchanges file for
20 fee approvals. As we all know, the Commission recently
21 made it clear that they are doing so, and I applaud those
22 actions.

23 Third, the SEC could allow for competition
24 among consolidators of SIP data. The committee has also
25 supported this measure, as we believe it would address

1 concerns that the SIPs represent a single point of
2 failure for the U.S. equity markets, and could improve
3 the speed and quality of consolidated sources of market
4 data while also reducing their cost.

5 However, these reforms would not subject
6 proprietary data feeds and connectivity services to
7 competitive forces. Without such competition, the SEC
8 will be unable to exit the rate-setting business, whereby
9 they must act as an arbiter of fees for these services, a
10 burdensome, imprecise and potentially impossible task.

11 The SEC should therefore accept full public
12 comment as to regulatory changes that could better
13 subject these fees to competition. But if the SEC
14 determines that doing so is not possible, then the SEC
15 should consider whether it be more appropriate to only
16 allow exchanges to charge fees for these services that
17 match their direct costs. Thank you.

18 MR. REDFEARN: Thank you, Hal. Tom.

19 MR. WITTMAN: Thank you. My name is Tom
20 Wittman, Executive Vice President of Nasdaq, CEO of our
21 regulated exchanges in the U.S. and run marketplaces
22 around the world, Nordics and the U.S.

23 So first, I would like to thank the SEC for
24 convening this roundtable. This is another chapter in
25 the 20-year commercial debate of the cost and value of

1 proprietary data products used by large banks and trading
2 firms to give them a competitive edge into a public
3 policy issue. These are competitive must-haves, not
4 regulatory must-haves. I think Chris and Stacey have
5 outlined, you know, the banks' revenues compared to data.

6 There are three myths that have become a common
7 refrain in this public debate, three myths that Nasdaq
8 aim to dispel with facts, data and evidence over the next
9 two days.

10 Myth number one, the stock exchanges are
11 effectively taxing mom and pop investors. Quite the
12 opposite is true. We are in a golden age for retail
13 investors, as pointed out by Doug. Thanks to advances in
14 technology, individual investors can access state-of-the-
15 art analytical tools and market data at little to no
16 cost. Millions of U.S. investors get core market data in
17 real time as part of a low-cost service they get from
18 online brokerage firms and financial applications. Other
19 retail costs are a fraction of what they once were, from
20 low or even zero fees for ETFs and low and commission-
21 free equity trading. The costs of providing SIP data to
22 Americans saving for retirement and their life goals
23 through brokerage and 401(k)s at almost a dollar a month
24 for realtime data for each tape and these fees are
25 typically absorbed by the brokerage firms that provide

1 data among large banks, trading firms, commercial data
2 vendors and the exchanges. Nasdaq appreciates this
3 opportunity to discuss this important topic, address
4 common misperceptions and offer ideas to ensure our
5 markets are fair, orderly and protect our investors.

6 The direction of U.S. public policy for many
7 years has been toward deregulation and reliance on market
8 forces to drive innovation and democratize access for
9 U.S. consumers. Competitive market forces encouraged by
10 the SEC's Reg NMS framework have helped the U.S. markets
11 to be the envy of the world and ushered in a golden age
12 for retail investors. Today's markets are light years
13 ahead of where we were even a decade ago. Technology and
14 competition have been a massively democratizing force for
15 investors. Exchanges are fierce competitors which, more
16 so than we were when closed clubs owned by broker-dealers
17 and operated as near-monopolies in our listed stocks.
18 This is directly linked to an explosion of competition,
19 deployment of technology and a resulting decline in
20 investor cost.

21 Relentless fee compression on Wall Street has
22 also been the catalyst for an ongoing commercial debate
23 among banks, brokers and the exchanges over market data
24 products and market access services. But let's be
25 careful not to turn the commercial debate over

1 the data to those investors. Because the SIP cost is
2 capped, the cost for a large brokerage firm is estimated
3 at 17 cents per retail client per month as outlined by
4 our CEO in the earnings last night.

5 Myth number two, firms and professional traders
6 are forced to purchase the fastest data feeds and access
7 with lowest latency. The fact is, competition and
8 innovation have created a wide array of proprietary data
9 products that professionals can choose to use or not
10 based on their market model. The professional traders
11 and commercial data vendors profit immensely as they use
12 vastly more data and technology but fewer eyeballs to
13 transact trillions of dollars of securities. Moreover,
14 most of our product business aims to offer online
15 brokerages a lower cost alternative to SIP for many of
16 their uses. This data now powers an extensive and
17 innovative array of services for retail investors. Our
18 Nasdaq basic product has saved investors over \$200
19 million since 2009. The Commission has never issued a
20 rule or regulation requiring firms to purchase anything
21 other than SIP data. Trading firms that purchase
22 proprietary data are driven by demands of competition and
23 their business, not regulation, plain and simple.

24 Myth number three, exchanges have kept the SIP
25 slow, costly and starved for funds. The SIP operated by

1 Nasdaq is 400 times faster than it was in 2010. Latency
 2 is down to 16 microseconds. The SIP carries 20 times
 3 more messages than a decade ago at much lower cost per
 4 message. In fact, the SIP revenue is down 24 percent,
 5 adjusted for inflation, compared to 2008. And I think it
 6 operated very well over the last heavy trading days. The
 7 share of SIP revenues for the exchanges are also down
 8 significantly because of competition. The big gainers of
 9 SIP revenue have been large off-exchange trading dark
 10 pools and broker-dealers who account for about 40 percent
 11 of equity trading volume. Nasdaq shares up to 98 percent
 12 of dollars it receives for eligible prints with FINRA and
 13 Nasdaq tier of contributing firms on a quarterly basis.
 14 To that point, Nasdaq took in \$272 million in SIP
 15 revenues from the TRF and 232 million in revenue as
 16 rebates. At least one large broker-dealer received more
 17 rebates than it paid the Nasdaq fees for its market data,
 18 connectivity and equipment use in 2017.

19 Now, I know, Doug, the cable is cute and you're
 20 a competitor as well as a big customer of ours. And you
 21 are a firm that does participate in the dark pool. But I
 22 think what we fail to quote is the amount of rebates that
 23 come back to the firms that actually compete with the
 24 exchanges and trade off exchange. I would say that 50
 25 percent of the revenues you received in rebates cover 50

1 percent of your cost for both data and data center usage
 2 access fees for the Nasdaq stock market.

3 It bears repeating, U.S. markets are the envy
 4 of the world. Capital is abundant. Liquidity is deep.
 5 Spreads are tight and executions are fast and certain.
 6 The question then becomes, what is the basis for
 7 government intervention? To Nasdaq, it's clearly not
 8 Main Street investors. They pay low or no fees for a
 9 broad range of high-quality products and services.
 10 Competition and innovation and proprietary data have
 11 created an array of products that professionals can chose
 12 to use, purchase or avoid. There is simply no basis for
 13 government intervention in a well-functioning marketplace
 14 to resolve commercial dispute about the profits of
 15 sophisticated competitors.

16 There is, however, a role for the government to
 17 guide the transparency and governance of a utility-like
 18 function such as the SIP. Given the industry's apparent
 19 insufficient trust in the proper operation of the SIP,
 20 the government should promote competition, especially
 21 price competition. When it comes to the market data, we
 22 should not expand the role of government regulation in
 23 setting prices and the practices are being addressed
 24 effectively by market forces and competition.

25 Nasdaq believes in the value of the SIP as a

1 public feed and the value of prop products where
 2 experimentation can thrive. Earlier this month, we
 3 proposed market structure reforms that the SEC and
 4 industry could act on. We have also outlined our views
 5 and backed them with some extensive data and evidence to
 6 back up the arguments in Nasdaq's written submission to
 7 the SEC.

8 We look forward to engaging in the thoughtful
 9 debate that contributes to good public policy and
 10 continued innovation on the side of our investors. Thank
 11 you.

12 MR. REDFEARN: Thank you, Tom. And thank you
 13 all very much for those comments. Now that we have
 14 agreement, we can move on to --

15 (Laughter.)

16 MR. REDFEARN: So, look, there's a lot that's
 17 thrown out on the table here. And our intention really
 18 is to constructively engage and try to figure out how we
 19 can come to a, you know, a closer solution. And again,
 20 keeping in mind individual investors along the way,
 21 critical to how we think about all of this.

22 We have this product called the SIP, right?
 23 Which is, you know, which is out there and it's serving a
 24 certain function in the marketplace and it's unclear
 25 whether that function is exactly what the function was

1 when it was initially designed and even during Reg NMS.
 2 So we want to talk about a few different things.

3 We want to start just by asking this question.
 4 Because we have the SIP, we have the Security
 5 Information Processors out there. And I want to ask,
 6 what is it -- what is it for? Does it work for trading?
 7 Is it just for eyeballs? Can you use it for trading?
 8 Does it work for best execution?

9 And then the sort of second related question
 10 is, what should it be for? Should the SIP be for
 11 something else? So what is it for, what is it used for
 12 more?

13 So Doug, why don't we start for you. Can you
 14 use the SIP for your trading system?

15 MR. CIFU: Sure, so let me be direct in how I
 16 answer it. Which is, look, I think you framed it
 17 correctly, Brett, which is, you know, the SIP is an
 18 eyeball product. It hasn't really changed in its
 19 functionality, as I understand it, since, you know, I was
 20 in college, 1986, 1987. So it's a product that has not
 21 evolved. And as Met correctly indicated and as we use at
 22 Virtu, if we don't have a full view of the marketplace,
 23 if we don't have a full depth of book that we have
 24 consolidated into our version of the SIP -- so top of
 25 book but also many, many levels below, we cannot fulfill

1 our obligations, in our view, for best execution on
2 behalf of our many clients, including T. Rowe Price. And
3 that is what the marketplace demands.

4 So really, you have seen this amalgamation of
5 the SIP and the proprietary products as core products.
6 Let's just call it what they are. Without proprietary
7 data feeds, there's not a firm today, either as a market
8 maker or an institutional agency broker or prop trading
9 firm that can exist. It's just that simple. Without
10 that full depth of book, it's just impossible to exercise
11 your fiduciary obligations and, frankly, we would -- you
12 know, T. Rowe Price would cut us off tomorrow.

13 So the SIP has a certain functionality. It's
14 used by our retail customers, our retail broker customers
15 with respect to their -- and I'm not going to address,
16 you know, how much they pay for it. That's their
17 business with the exchanges. They put in their own
18 comment letters, they have their own views. That's not
19 my -- not my issue.

20 I know at Virtu, in order to fulfill our
21 obligations to our retail brokers and to our many, many
22 valuable institutional agency customers from around the
23 world. Without that full depth of book, we just don't
24 exist as a trading firm. And I think for all of the
25 firms that we compete with that that is essentially a

1 know -- but despite all of that, it still has this
2 central point of consolidation in one place, it doesn't
3 have depth, doesn't have -- there's a lot of things it
4 doesn't have. So I guess the question is, what is it --
5 what do you think the SIP is good for today and what do
6 you think the SIP should be good for?

7 MR. CONCANNON: So angry Chris left the room
8 and happy Chris is here.

9 (Laughter.)

10 MR. CIFU: He'll be back.

11 (Laughter.)

12 MR. CONCANNON: The SIP is of great value. You
13 have to go back to Congress, and they found value in
14 organizing the SIP. Now, that's many, many years ago.
15 But even the SEC to this day still requires that SIP
16 quote at time of execution. It was just a number of
17 years ago we requested the SEC, could we replace an
18 exchange product, an exchange proprietary product in
19 place of the SIP? And the SEC themselves said, no, the
20 SIP is required at time of execution.

21 Is it valuable? Well, when I look at our four
22 exchanges and I look at the number of members we have
23 connected to our four exchanges, not everyone buys our
24 proprietary market data. So there are firms in the
25 industry that are reliant on the SIP for execution. And

1 core product.

2 And I think Met and Brad made very interesting
3 points, which is what the exchanges have done throughout
4 the years is effectively try to slice and dice how they
5 charge for these things and say it really hasn't gone up.

6 But it has because there's many different ways. I mean,
7 SIFMA put a great letter in yesterday that kind of goes
8 through the many ways that we all have been charged a lot
9 more because of the way the various categories in which
10 market data is now charged.

11 And please don't forget connectivity. Because
12 as Brad said, you know, it's great to get market data but
13 if you're not actually physically connected to the
14 exchange, it's kind of meaningless, right? And so I know
15 the -- you guys find the cable kind of trite but it
16 really does drive home the point that market data and
17 connectivity are one in the same. So what these guys
18 have done is taken costs and sort of divided it into many
19 different buckets, if you will, including connectivity.
20 And it's just unconscionable how much that it's increased
21 over the years.

22 MR. REDFEARN: Thank you, Doug.

23 So Chris, I think we're aware that a lot of
24 technology has been invested in the SIPs, that the
25 aggregation speeds have gotten a lot faster, that, you

1 there is no rule or regulation that we've been able to
2 find where proprietary depth of book market data is
3 required by the regulators.

4 Now, if you want to fulfill a commercial
5 business, you have a choice of fulfilling that commercial
6 business and buying full depth of book from every
7 exchange in the U.S. No one actually does that. In
8 fact, when I add up our list of clients, it doesn't
9 include all the brokers in the U.S.

10 So the SIP does have value because people are
11 using the SIP, both broker-dealers as well as folks that
12 are routing orders among the various exchanges in the
13 U.S.

14 MR. REDFEARN: Stacey, yeah.

15 MS. CUNNINGHAM: I just wanted to one of the
16 points that Chris made that might be a helpful fact.
17 When you look across our exchanges as well, not only are
18 not all brokers members of all exchanges and not all of
19 our members are subscribing to proprietary data feeds,
20 not all of our members do the same thing on each of our
21 markets. So you look at some of our smaller markets and
22 a member of National Stock Exchange or NYSE National
23 might not subscribe to the proprietary data feed there
24 but they are also a member of NYSE and do subscribe
25 there. And part of that is the competitive nature of the

1 different markets that exist and whether or not they
2 feel, for their particular business model, they need to
3 take that feed. So I would challenge the point that Doug
4 made that all brokers that look like him, because I know
5 some that -- they don't look just like him but they're in
6 the same business and --

7 MR. CONCANNON: They're not as good looking as
8 Doug.

9 MS. CUNNINGHAM: But they're not doing all the
10 -- not acting with the same behavior and feel as if they
11 need to take all of the products across each of our
12 markets equally. So I think there is a competitive
13 landscape there. Some of them choose just to use the
14 SIP. So I think to answer your question about the value
15 of the SIP, some do feel that is.

16 And just getting back to the connectivity piece
17 of it, that's why I raised the point about all-in cost
18 because that all-in cost does include connectivity. So
19 when I'm talking about the mix of the services together,
20 the all-in cost has come down and is cheaper than trading
21 in many other places.

22 MR. CIFU: Just one point I should have made
23 before which is with regard to the SIP, and we put this
24 in our proposal letter yesterday, which is if everyone
25 thinks it's so valuable, terrific. Then make it

1 competitive. Right, Met articulated before, at Virtu,
2 you know, homogenizing 11 or 12 direct feeds into a top-
3 of-book feed and then distributing it is not really like
4 black magic; it's not that difficult to do. Right? So
5 we could do it for a fraction of the cost. If it's a
6 \$370 million business, I'm happy to do it for \$37 million
7 and still make money on it. I guarantee you we would
8 make money on it. And so would Citadel and so would a
9 bunch of other great firms that are sitting in here.

10 We all can do this. It's really not, you know,
11 an incredible technological exercise to homogenize the
12 top of book and distribute it. So there is just an
13 immense built-in margin to it. That's the frustration
14 that you hear today. Right? It's not that these folks
15 are ill intended; it's just that with the evolution of
16 technology and the reduction of costs, we should as an
17 industry be able to do this a lot cheaper. And this is
18 just a friction and a tax on the industry that we're all
19 bearing -- and ultimately passed on to the end user.

20 MR. REDFEARN: Brad, what do you think the SIP
21 is useful for or what do you think it should be useful
22 for?

23 MR. KATSUYAMA: I mean, I think you can break
24 it down in two areas where it's deficient. One is the
25 lack of information and the other one is just speed. As

1 you said, there's an aggregation cost from a speed
2 perspective. So if there is no element of speeding up
3 the SIP edge to edge and getting over the geographic
4 issues, so I think that's kind of a moot point. Anyone
5 who cares or is, you know, making machine-level decisions
6 cannot use the SIP just from a speed standpoint. But I
7 do think if you improve the information on the SIP, it
8 can certainly be valuable to a host of people now that
9 just simply either are getting the SIP without that
10 information, so just trading at a disadvantage, or may
11 look -- are not as speed dependent and may look to
12 convert over. But if full information and speed become
13 important, which it is for the majority of large players
14 maintaining their own electronic trading platform, then I
15 would not say the SIP serves much of a purpose to them.

16 But I do think, again, improving the
17 information is just about willingness. You know, we've
18 been pushing for more information to be on the SIP for
19 quite a while. But again, the less valuable the SIP is,
20 the more subscribers you have to the feeds that have more
21 robust information. So it's just a pure conflict issue.

22 MR. REDFEARN: So, Met, same question. I mean,
23 what is the value of SIP? And it would be interesting,
24 also, to hear your view of when you're handling your
25 institutional customer orders and you're dealing with

1 your counterparties, what your feeling is with respect to
2 participants who are potentially using the SIP for
3 routing or for their ATS versus using proprietary data
4 feeds?

5 MR. KINAK: So the SIP for us is kind of what
6 we look at. Obviously, investment decisions are probably
7 made by eyeballs and looking at the SIP itself from
8 either our Bloomberg or FactSet terminals. But as far as
9 brokers having a choice of whether or not they can use
10 the SIP or direct feeds, that doesn't exist. There is no
11 choice there.

12 If a broker is routing using SIP data, they are
13 not routing my flow. They can route someone else's but
14 they're not eligible to get my flow, period. That's not
15 negotiable. And it's kind of funny that people say,
16 well, we offer different services for different people.
17 Trading is a zero-sum game. Everyone has to understand
18 that. This isn't like Southwest where I get to pay \$15
19 extra dollars and I can board the plane faster than
20 anyone else. We're all going to get a seat, we're all
21 going to end up at the same destination. I might have to
22 sit in the middle and two people next to me I don't like
23 but, ultimately, I'm still getting where I need to go.
24 That's not trading.

25 If I'm slower than the other person, I lose.

1 That's it. That's the fraction of time we're talking
 2 about.
 3 So when someone says, hey, from a commercial
 4 enterprise, it makes sense for you to use a faster system
 5 over a slower system -- no. This is a best execution
 6 obligation. We are obligated to try and produce best
 7 execution on every single order that we have. If our
 8 brokers are not aligned in that manner to use the most
 9 direct, the fastest, the most robust feeds they can get
 10 their hands on, then we will trade with someone else.
 11 And that's the choice we actually have, is the
 12 choice of which brokers are aligned with us, not which
 13 exchanges give us different products that we may or may
 14 not find useful.
 15 MR. REDFEARN: Hal, do you have a view on the
 16 SIP and, you know, what do you think of how it's doing
 17 today and where do you think it could potentially go?
 18 MR. SCOTT: Well, when one looks at the SIP, I
 19 think historically Congress and the SEC as well has
 20 regarded it as a public good. And why is that? It's not
 21 just for traders, it's for the country. I mean, we
 22 follow the market. You know, lots of people make
 23 decisions about all sorts of things based on the prices
 24 at the market, not just trading decisions. So I think
 25 it's important that that information be provided to the

1 public.
 2 Now the question is, what information is
 3 provided to the public through SIPs? I think when the
 4 SIPs were created, people could correct me if I'm wrong,
 5 we didn't have prop data right beside them. We thought
 6 we were giving the public the correct prices, okay, of
 7 what was trading on exchanges. Now technology changes,
 8 okay, and the prop feeds are really the better source of
 9 information as to what these prices are. So why isn't
 10 the public entitled to have that, you know, as part of
 11 SIP?
 12 So I guess one possible way to go here would be
 13 to include basically the prop data in the SIP as far as
 14 possible and then make sure that the competitive
 15 consolidator is providing that information to the public.
 16 At least at some option. I'm not recommending that, but
 17 I think that's an option that should seriously be looked
 18 at by the SEC.
 19 I would not be in favor of getting rid of SIPs.
 20 That, I would not be in favor of.
 21 MR. REDFEARN: Yeah, so, Tom, I know there has
 22 been investment in the SIP. But in terms of where we
 23 think this goes from here, what are your thoughts in
 24 terms of what can be done to, I don't know, improve the
 25 SIP? Or should something be done to improve the SIP?

1 MR. WITTMAN: So I think we've made, with the
 2 SIP powered by Nasdaq's technology, a lot of improvements
 3 to that SIP. And it's, I think, an interesting stat is
 4 from the time it takes to ingest a message within a SIP
 5 and spit it out the other side is around 15 mics. And
 6 the Nasdaq system itself is a proper system, bringing in
 7 an order and sending out a prop feed is around 24, 25
 8 mics. So the SIP is fast.
 9 I think there's different uses between what the
 10 SIP can be used for. We think there is better governance
 11 that could be put around the SIP, advisory, advisory
 12 vote, and some clarification around the vendor display
 13 rule.
 14 As Doug talked about, the feeds that come out
 15 of the exchanges, there's different market models for
 16 different exchanges. So we can't run -- back to a
 17 comment that was made, we don't run three different
 18 equity exchanges with the same market model. An SRO has
 19 to have a ruleset for the market model it wants to run.
 20 A market model like a pro rata market model or
 21 a price time model needs to give market makers the
 22 ability to ingest that data and look at this very
 23 fragmented marketplace and figure out how they're going
 24 to manage the capital that they have at risk. So that
 25 requires a different type of feed and a feed that's

1 probably not of interest to me entering an order through
 2 an online brokerage firm to buy and sell stock at limit
 3 price. That's not of interest. But it is of great
 4 interest to those liquidity providers who are providing
 5 the liquidity to the marketplace so you can pick up your
 6 iPhone and see what the current price is of a stock. So
 7 there's different uses for these different data feeds
 8 based on fragmentation, market models in the way the
 9 exchanges are set up.
 10 MR. REDFEARN: I guess maybe a quick follow-up
 11 question. If -- we all appreciate the fact that speed is
 12 very relevant and important in today's market. And in
 13 the current SIP construct the aggregation times are
 14 pretty impressive, in particular at the Nasdaq UTP SIP,
 15 which has gotten down quite a bit. But they're still in
 16 one place, so it's still 350 microseconds from Mahwah to
 17 Carteret or whatever it is, 200-plus from Secaucus to
 18 Carteret, right? And so we're talking about potentially
 19 a world where there are brokers who actually might not be
 20 able to afford the other product, who might want to use
 21 the SIP for a trading system to use that. Is that the
 22 right structure to ensure that you have a competitive
 23 product for people to trade with?
 24 MR. WITTMAN: I think you could put the SIP
 25 anywhere you want it. Right now, they're on the East

1 Coast. You could recommend put all order data and have a
 2 clog for the exchanges in the same place. I mean, you
 3 can get crazy with these ideas.
 4 I think that the advancements made actually
 5 work and I think we've got to watch that we don't
 6 overload the SIP with a bunch of data that's not going to
 7 be relevant to a certain set of consumers. You can't
 8 create a lowest common denominator that's going to be
 9 expensive.
 10 We talk about in a data center what do you use
 11 to consume data. There's different size pipes for
 12 different consumers. Doug needs a bigger pipe. Those
 13 market-making firms need a bigger pipe because of the
 14 amount of equities and options that they're quoting. So
 15 they need a different infrastructure for that.
 16 So the SIP works. There are some incremental
 17 adjustments that we could make to that. But geography --
 18 I think we're -- you know, you're moving to the longest
 19 leg of the horse. What do you want to solve?
 20 MR. REDFEARN: So, Doug, moving on, we have a
 21 situation here then where I guess there are some brokers
 22 on the list that don't use the product. And I don't know
 23 if you have some idea of like who are the brokers? I'm
 24 interested in, you know, what is that sort of universe
 25 that's not using proprietary data for trading? And what

1 are your thoughts about, you know, what is needed for
 2 brokers to be trading? What do people need to have?
 3 CHAIRMAN CLAYTON: Hey, Brett, let me jump in
 4 for a second and give Doug a chance to think about his
 5 answer.
 6 I have to leave in a minute for something but I
 7 wanted to make a comment or two before I left.
 8 First, just the value of this debate and the
 9 willingness of you to come here. Now, I said it at the
 10 beginning and now I can say it after having heard, it's
 11 extremely valuable. Thank you.
 12 We're talking about, and I think Mehmet used
 13 the word, an ecosystem. Just to try and capture this for
 14 somebody who hasn't lived in this world for 25 years.
 15 The data -- it's clear, data is central to the ecosystem,
 16 absolutely. It's clear that data provides an advantage.
 17 Some of you believe, you know, striving for more data is
 18 an advantage that you're compelled by the law to
 19 undertake. Data production and distribution costs money,
 20 it's not free. We know that.
 21 The question we're trying to answer is, you
 22 know, how do we do this in the most effective way? And I
 23 want to take a step back and talk about that ecosystem.
 24 What we're looking for in that ecosystem is liquidity,
 25 resiliency, all-in cost of execution, quality of

1 execution and, to a point that has been made, the overall
 2 attractiveness of our public capital markets.
 3 So I know we're talking about data, I know
 4 we're talking about fees. But let's not forget that, you
 5 know, that's the end objective here.
 6 And with that, I want to say thank you. I also
 7 want to say, Hal, if we can do it with competition, I'm
 8 all for it because that means less work for us.
 9 And lastly, to your point, Hal, the value of
 10 prices, not just the value of prices for trading but the
 11 value of prices to our economy is difficult to overstate.
 12 So much -- so much of our economy depends on the
 13 participants believing that the prices they see, and
 14 particularly the prices they see in our equity markets
 15 and debt markets, are fairly derived and derived based on
 16 good information.
 17 So again, thank you all very much.
 18 MR. REDFEARN: Thank you, Chairman.
 19 So go ahead, Doug.
 20 MR. CIFU: Yeah, thank you. Look, I mean, I
 21 think Met put it best, which is -- and he's the consumer,
 22 right? So other brokers don't tell me how they run their
 23 businesses, not surprisingly. I can tell you what we do
 24 at Virtu and I can tell you my view as a former reformed
 25 lawyer and having had discussions with FINRA about this

1 over the years. Which is, I think in the absence of
 2 really understanding the marketplace and having full
 3 depth of book, I find it difficult to imagine that you
 4 can be competitive and I find it difficult to imagine
 5 that you could satisfy your best execution obligations.
 6 I just don't understand how you could have a properly
 7 functioning algorithm in today's marketplace that is
 8 routing a customer order in the absence of full depth of
 9 book.
 10 Now, that's not to say -- and again, pardon me
 11 for actually saying something complimentary about the
 12 exchanges -- I think they have done a nice job in terms
 13 of getting the SIP down to a speed that is as low latency
 14 and as fast as possible. I mean, they can't, despite
 15 their efforts, make the speed of light any faster.
 16 Right? And Carteret is in South Jersey, Secaucus is here
 17 and Mahwah is in North Jersey. I'm a Jersey guy, so I
 18 know this very well.
 19 And so you have to have a consolidation point.
 20 But that's sort of besides the point, right? It has a
 21 different purpose, the SIP, I understand what it's for,
 22 and leave it there.
 23 My biggest complaint about the SIP is that we
 24 just charge way too much to do it. All right? So at the
 25 end of the day, the market has said and will continue to

1 say that if you are a firm that is not capable of
2 harmonizing direct feeds and producing your own
3 consolidated view of the market to handle my order,
4 you're not going to continue to be in business in the
5 next five, 10 years. It's just impossible to do that,
6 you just can't compete.

7 MR. CONCANNON: So it's interesting to me to
8 hear from folks that say the SIP is fairly useless to
9 their business model is too expensive. Because I would
10 assume they're not paying the fees for the SIP. I
11 understand retail and large investment banks are some of
12 the biggest users of SIP, mostly because the eyeballs
13 that they employ, because the professional user fee --
14 not the nonprofessional but the professional user fee is
15 high relative to retail investor costs.

16 But when I think about -- you asked the
17 question, Brett, about brokers and how they use the
18 different services in an exchange, I happen to have a few
19 fun facts I'd like to share with you.

20 So this is just our top 10 firms across our
21 four exchanges by market share. So presumably, they're
22 making a lot of money, given the size of their market
23 share.

24 There are four investment banks and six HFTs.
25 Five out of the top 10 get a check from us after the

1 cancellations. So that one line that Doug can buy on
2 Amazon gives you 2.5 billion messages in a month and it
3 can be expanded up to one trillion messages per month.
4 So that's the capacity that that little cable can give us
5 because of the technology advances that we have.

6 So how do we charge for capacity? We charge
7 through ports. There was a time when we didn't charge
8 for ports. And guess what people did, they bought
9 hundreds of them. They just installed hundreds of ports
10 into our market and they can explode our capacity at any
11 moment. So the ports or access fees that we charge are
12 all related to the capacity that this SEC requires us to
13 deliver. When we open up our capacity, we are not
14 allowed to fall over. So we invest millions of dollars
15 in operating our exchange at a Reg SCI level that doesn't
16 allow us to tip over absent a fine. So it's that
17 capacity that people are buying when they are complaining
18 about their costs of market data.

19 In fact, Hal's study, it was a great study, but
20 it includes the hundreds of ports that firms choose to
21 buy in terms of capacity. So the growth of market data
22 in his study is false. It's not market data that's
23 growing, it's the capacity that the industry is demanding
24 from these exchanges.

25 I'll give you another stat. Sorry, this is

1 costs of their connectivity and market data. So we are
2 cutting them a check monthly after their costs.

3 The largest client we have by market share pays
4 the lowest market data bill among the top 10. So there
5 are some firms who have figured out how to profit and how
6 to trade without exorbitant market data costs, relative
7 to the other top 10.

8 The largest client we have by market share does
9 not buy the most capacity to trade on our four exchanges.

10 In fact, they are ranked fifth in terms of how much
11 capacity they buy. One of the top 10 clients pays no
12 connectivity fee to us. So they don't have a cable,
13 they're not required to have a cable and they pay
14 nothing, yet they're in the top 10. And how do they do
15 that? They go through a third party.

16 So a third-party aggregator pays for one cable
17 and is granted full access to not our one exchange, that
18 terribly cheap cable that Doug was pointing at. That
19 gives you access to seven exchanges. It also -- I did a
20 little math while I was waiting for my question. So you
21 get access to seven exchanges, not one. And it buys you
22 capacity. So that's really what we're talking about,
23 capacity to our exchanges.

24 Because, as you recall, we have no capacity
25 fees. We don't charge for orders or message traffic or

1 angry Chris again.

2 MR. REDFEARN: I knew he'd be back.

3 MR. CONCANNON: So just -- and let's go back to
4 last week, October 11, 2018. We got blasted with 8.2
5 billion messages across our equity exchanges. We didn't
6 slow down, we didn't fall over. Because we invested for
7 years in technology to handle 8.2 billion messages. Our
8 options exchanges handled 30 billion messages. And we
9 never charge for those 30 billion messages; we only
10 charge for that cable that Doug's talking about.

11 MR. REDFEARN: Chris, just given some of the
12 other feedback that we've gotten, including some of the
13 comment letters that come in that talk about markups or
14 things like that, you know, if somebody is connecting
15 into Cboe or one of the other markets, I think they don't
16 have a choice as to where they -- do they have a choice
17 as to how they get in there? So therefore, if they need
18 to connect and they need to buy certain things, including
19 for capacity, what are your views about, you know, sort
20 of this question about transparency vis-a-vis the markups
21 and the costs associated with that, given in some cases
22 the lack of choice?

23 And also on market data, remember a lot of it
24 is market data and connectivity together. Market data
25 alone oftentimes doesn't capture some of the -- Hal?

1 MR. SCOTT: You know, I think we should have a
2 system that's not dribs and drabs disclosure. Okay, so
3 Chris is giving us data here. I haven't heard this data
4 before. Why isn't this data available to everybody in a
5 standardized form, so we all can have rational discussion
6 with the full data in front of us. We don't have that.
7 Okay? And until we have that, we are not going to make a
8 lot of progress on this. So --

9 MR. CONCANNON: Yeah but, Hal, if we're going
10 to have full transparency, we need full transparency from
11 the industry, not just the exchanges sitting at the
12 center. We have to have full transparency. How much
13 does it cost for microwave technology across the U.S.
14 from Chicago to --

15 MR. CIFU: A lot.

16 MR. CONCANNON: Exactly. So when we're talking
17 about economic rents, Hal, you know well, everybody has
18 to show their economic rent so we compare them.

19 You're asking for what -- Brett, to go back to
20 answer your question, what are the costs associated with
21 a fixed connection? What I'm saying is it's not the cost
22 of the hardware that you connect through. It's not the
23 cost of the cable that you're connecting to. It's the
24 cost of the technology that sits behind it that has to
25 receive billions of messages. That's what we're charging

1 for.
2 We're selling capacity to our exchanges. And,
3 lo and behold, the top 10 firms on our exchange eat up 50
4 percent of the capacity on our exchanges. So there are
5 people in the industry, firms in the industry, that see
6 it as a profit -- a profit tool. They have choice. They
7 don't have to buy. In fact, the top firm doesn't buy as
8 much capacity as one of the middle firms. So they have
9 choice on how much capacity they can buy, they have
10 choice on which feed they want. They can get the top of
11 book, they can use the SIP or they can use full depth of
12 book. And, lo and behold, as we look at the data, every
13 one of our top 10 firms makes a different choice around
14 how much they spend on market data and how much they
15 spend on capacity.

16 MR. REDFEARN: Brad.

17 MR. KATSUYAMA: I mean, I think it's clear what
18 the coordinated effort here is from the exchanges'
19 standpoint, is just to kind of distract from, you know,
20 the most obvious issues. I think when you talk about the
21 quality of the markets, and the markets are fine, what
22 are we talking about? I mean, the quality of the markets
23 are due to the investors who provide those orders, the
24 brokers who send them to the market, the market makers
25 that supply liquidity.

1 Exchanges can't trade. So to take credit for
2 the quality of this market from an exchange standpoint, I
3 think, is ridiculous. It's kind of a distraction.

4 I think the whole Wall Street versus Wall
5 Street thing, again, it's another -- it's another
6 distraction, right? This is about fairness, this is
7 about competition. How many new, emerging brokers have
8 you heard about? Right? Because the cost, the table
9 stakes to be competitive is so high, it keeps other
10 people from coming around the table.

11 So you can quote stats about your top brokers.
12 In a way, the brokers that are arguing are almost
13 arguing against their own entrenched position, because
14 they can actually afford to pay it. I think they're
15 arguing from a perspective of fairness.

16 The last piece, you know, again choice, and to
17 flip it to say the industry needs to prove back to the
18 exchanges what the industry's margins are, again, it's
19 another ridiculous distraction. Because, at the end of
20 the day, exchanges enjoy a regulatory position. This
21 market has been set up so that exchanges are at the
22 center. There is a mandate to connect for best execution
23 purposes. So the industry doesn't have to prove anything
24 to the exchanges; the exchanges need to prove back to the
25 industry that the things that they charge for are fair

1 and competitive. Because in today's market, there really
2 is no competition.

3 So for a lack of competition, you know, barring
4 some massive regulatory reform, the only other option you
5 have is to prove that you're pricing things fairly under
6 the current regulatory regime.

7 So even -- you know, the discussion on the SIP,
8 there's a governance committee, it's going to hem and
9 haw, going to drag out, it's going to look something like
10 another thing that's dragging on in these committees.
11 Let's just get, brass tacks, transparency. What does it
12 cost? Okay. Because when you start talking about
13 message rate, guess what, 600 bucks for a four-gig phone,
14 \$150 a gig. You probably can pay 600 bucks, 700 bucks
15 for a 256-gig phone. That's three -- you can't talk
16 about message rate because obviously technology has kept
17 up.

18 So all the evolution that we've seen has just
19 not translated because of a regulatory monopoly. So
20 everything that you hear that's just trying to twist it
21 back or put it back on the industry, or let's talk about
22 that or let's talk about how great everything is, it's
23 all a point to get away from transparency.

24 Let's make this real simple. What are the
25 costs? And then we can talk about fairness. But you

1 can't talk, all-in costs, this, that, taking jobs here
2 and there. What are the costs? Let's figure out what
3 the costs are, then we can have a discussion on fairness.

4 And I think all of this, what you're seeing
5 right here, is a distraction to not have to hand over
6 what the costs are. And I think it's the exchanges'
7 responsibility to do that, given the positions that we've
8 been anointed with as regulatory -- as regulated
9 entities.

10 So, you know, from our perspective, again, we
11 could charge these charges. We could. And they say,
12 you're not going this because of this, that and the other
13 thing. At the end of the day, what's in the best
14 interests, long term, of the investment ecosystem?
15 Everyone is here to make money, but what's fair, given
16 the regulatory situation that we find ourselves in?
17 Everything else that I've heard is really just a
18 distraction from the core point.

19 MR. CONCANNON: For the record, that's angry
20 Brad that just showed up.

21 (Laughter.)

22 MR. REDFEARN: So we do have an obligation to
23 figure out what's fair, reasonable and not unreasonably
24 discriminatory. And the markets have evolved and the
25 technology has become more sophisticated and the

1 it's a barrier to entry for competition. As we get
2 larger, you know, we're going to be able to use our
3 buying power, if you will, and our scale in a way that
4 other brokers can't. So from a purely selfish point of
5 view, Brad actually makes the right point.

6 It's really remarkable, and I'm sitting here
7 reflecting, and I'm thinking is there another industry in
8 the world where, you know, we're a large customer,
9 probably the entire equity market is represented here.
10 We submitted a letter with 23 other firms, every -- you
11 know, retail firms, institutional firms, other market
12 makers, IEX, and we're all basically saying the same
13 thing. Like, you know, guys, it's just not right, it's
14 not fair, you're not being transparent. This is not
15 reasonable. This is not the way to treat your customers.

16 I mean, at Virtu, if I acted this way towards
17 the retail brokers that I do all the work for, towards
18 Met, they would just turn me off, right? Because it's a
19 competitive marketplace where I'm competing with Citadel
20 and Susquehanna and Two Sigma and all these other great
21 firms out there. Why do we have a system where every
22 customer is basically saying to you guys, enough? Be
23 fair to us, be transparent. This doesn't make any sense.

24 Okay, I get that there's more costs than the
25 \$88 cable. I did that for effect, right? But I run a

1 investments have, you know, ultimately helped the
2 efficiency of our markets.

3 But we have had people come in and tell us they
4 can't afford to buy the fast stuff anymore and so they
5 have to settle for this. So maybe -- this is what I was
6 getting at -- maybe there are people who are at a certain
7 point where they feel like they maybe can't compete with
8 Doug or maybe they can't do Met's business because of the
9 cost infrastructure here. And we have to create a fair,
10 reasonable and not unreasonably discriminatory market
11 environment for all of the participants in the market.

12 So we're trying to figure out how we get to
13 that point. So, you know, given some of this evolution,
14 how do we think about the broker-dealers on the bottom
15 part of the list? Is it that they don't want it or they
16 can't afford it or they have a different model? They
17 don't want to trade with Met, how do we understand that?

18 MR. CIFU: Well, Brad and Met actually made the
19 right point. Which is, you know, for Virtu, it's
20 actually a competitive mode. One of the reasons we've
21 scaled and grown and made an acquisition of Knight
22 Capital was to bring scale and efficiency to our business
23 model so that we could afford to continue to pay these
24 costs.

25 So from a purely selfish point of view, right,

1 major technology firm that connects to 235 marketplaces.
2 I know how much it costs to do this. Brad has been a
3 hundred percent transparent. He runs an exchange and he
4 told you what it costs to do this. Go read his blog, it
5 was very well done.

6 So we -- the emperor has no clothes. We're
7 here telling you that the emperor has no clothes. And so
8 the fix is, make it competitive, allow us to compete
9 and/or make these guys be transparent. Because you're
10 going to give them a regulated oligopoly, just be fair
11 about it. You know, this is the cable company, this is
12 the telephone company before it was broken up, right?
13 That's the industry that we're faced with.

14 MR. CONCANNON: I just -- Brett, I have to
15 respond, because both Brad and Doug are making a
16 statement that -- when you look at the fierce competition
17 that the exchanges engage in, the pricing competition
18 that we go back and forth, you see all the pricing
19 maneuvers that we are trying -- scratching at each
20 other's market share, all to solve the economic benefits
21 of the members, the same members that are complaining.

22 IEX is a new exchange. We even have a new
23 competitor walking into our space --

24 MR. KATSUYAMA: It wasn't very easy, but we're
25 here.

1 MR. CONCANNON: There's no -- well, you were a
 2 pretty successful dark pool and now you're an exchange
 3 dressed up as a dark pool.
 4 (Laughter.)
 5 MR. CIFU: Angry Chris is back.
 6 MR. CONCANNON: But the point is -- and this
 7 SEC has actually made the claim -- they understand
 8 there's fierce competition among the exchange business.
 9 Now, to suggest that we're not competing
 10 aggressively and we're in some oligopoly is absurd when
 11 you look at the facts of how order flow moves regularly
 12 across our various exchanges. Our market share is down
 13 because we didn't respond to pricing maneuvers by the
 14 other exchanges sitting up here. So there is fierce
 15 competition in the space.
 16 We've tried to compete with market data. We
 17 offer the lowest market data fees out there. And some
 18 firms buy it and some firms choose not to buy it. And I
 19 get that Met is demanding from his brokers that they all
 20 buy the fastest feeds and have microwave towers. But
 21 that's his choice to demand that. The SEC, by regulation
 22 --
 23 MR. KINAK: No, no, no.
 24 MR. CONCANNON: It is, Met. It is, Met.
 25 MR. KINAK: No, we have a best execution

1 obligation. That is paramount to everything we do.
 2 MR. CONCANNON: Okay, where is that best
 3 execution obligation written that you have to buy
 4 microwave towers?
 5 MR. KINAK: I have the best execution --
 6 MR. CONCANNON: Did the SEC issue that order?
 7 Or FINRA? Because I haven't seen microwave towers in any
 8 of their --
 9 MR. KINAK: For me to say to someone that I
 10 have the slowest systems, that I don't see the market in
 11 its accurate form but I'm still executing orders on your
 12 behalf is absolutely not even allowed -- I can't even say
 13 that to a client. Now, it doesn't have to be written in
 14 any regulatory rule. It is understood --
 15 MR. CONCANNON: It does, because it's
 16 commercial decision then.
 17 MR. KINAK: No, it is not a commercial
 18 decision. It's also -- let's get to the point here. You
 19 guys have built this system. This arms race was built by
 20 the exchanges to offer competing products from a speed
 21 perspective so that you can charge people differing rates
 22 for different market data. Now, when everyone has to
 23 come to the table to get it -- look, frankly, you got
 24 greedy. All right? You want to ask why you have to be
 25 obligated to show your fees? It's because you come with

1 privilege. You're an exchange. You have privilege.
 2 Take your protection away? Maybe I don't want to connect
 3 to you anymore. Right? Maybe I don't want to relate
 4 with you.
 5 But the reality is I have to take in, I have to
 6 see 100 percent of the market and I have to see the
 7 realtime market at all times. That is not a commercial
 8 decision. I do not make money based on what the spread
 9 or a tick change happens in microseconds. We hold
 10 investments for three and a half years. But I still have
 11 a best ex obligation to go and get the best price for my
 12 customer every single time that I trade. And it doesn't
 13 have to be written in a regulatory rule.
 14 That's ridiculous to say that comment. It's
 15 ridiculous to build the arms race and then turn around
 16 and say, you don't have to subscribe to it.
 17 MR. CONCANNON: Well, Met, in fact people don't
 18 subscribe to it. We have four exchanges and -- and
 19 you're not a subscriber and many brokers aren't
 20 subscribers of our fast data feed.
 21 MR. KINAK: So we are not a direct subscriber.
 22 We obviously subscribe through our broker-dealers and we
 23 require them to describe.
 24 MR. CONCANNON: That's a commercial decision
 25 and the SEC has never demanded in any rule or regulation

1 that anyone has to buy these --
 2 MR. REDFEARN: So, Chris, one of the questions,
 3 and we'll tone this down a little bit for a second and
 4 hope to get nice Chris back, is one of the questions that
 5 we're asking is about -- and I understand this and these
 6 are important issues and so it's understandable that
 7 there would be passion here. But one of the questions
 8 that we're asking is about the core data, is about what
 9 do people feel they need. Do people feel that they need
 10 to have depth of book to trade? Do they feel like they
 11 need to have this data?
 12 And to the extent that we hear yes to that
 13 question, then that has implications to it. The SIP
 14 hasn't really been revisited for a long time.
 15 We have other panels where we'll be having
 16 conversations about the fact that there's no odd lots in
 17 the SIP and for high-priced stocks, there's a lot of
 18 inside markets in odd lots and maybe odd lots should be
 19 in the SIP. There will be questions about if people do
 20 want to use it for trading, maybe there's another
 21 architecture we can use for that. So there may be ways
 22 that we can improve it.
 23 But we certainly have heard from plenty of
 24 people on trading that they need to buy certain products
 25 to be able to trade in the market. We've contemplated

1 the discussion about best execution and do you need to
2 have prop data. And so far, it's been limited solely if
3 you use the prop data for your customer execution engine
4 or your own trading systems, you have to use it for that,
5 so it's got to be one or the other. But it's kind of a
6 question that we struggle with on that front, so it's not
7 necessarily set one way or the other.

8 But I do feel like Tom has been down there
9 trying

10 MR. WITTMAN: I've been trying but I can't get
11 in.

12 MR. REDFEARN: I want to give you an opening
13 here, Tom.

14 MR. WITTMAN: He's checking the stock prices on
15 his pre-application on his iPhone there as we're talking.

16 I mean, the transparency conversation is hard
17 for me to follow because I think everything we do as
18 exchanges, we communicate to our customers, we file with
19 the SEC on what it is.

20 When it comes to cost of product, there is
21 choice. And, you know, you can't burden a certain class
22 of citizen with a behemoth data intake. If you look at
23 some of the -- like Nasdaq Basic, in 10 years, the price
24 was increased from \$20 to \$26 a month per user, 14 years
25 for total view, \$70 to \$76. I honestly think that the

1 cost to some of these firms has nothing to do with the
2 incremental increase of some of these products, it's the
3 cost of automation and changing from eyeballs, reducing
4 the number of people who trade and increasing the amount
5 of automation used to trade. So it's more about that and
6 buying services.

7 And Met, I know you want to push a button, but
8 you've got -- when it comes to your business, you have
9 broker-dealers that you use and those broker-dealers
10 compete with each other. Those broker-dealers compete
11 with us. And they have the opportunity to take a look at
12 any data product that we produce and any means for
13 acquiring that market data to run their businesses and
14 make money trading your order flow, right? So that's
15 competition. And I think that's what I want to see, I
16 want to see more competition. I don't want to see a
17 democratized solution like move everything into one
18 central place and have three different SIPs, you know,
19 producing the same data.

20 And I'm not asking to see what you or any of my
21 competitors or customers' margin is. I don't care how
22 Doug's algorithm or anybody else's algorithm and the
23 costs that they have to do that. You know, they've got
24 margins, they're making money. And I think what we do is
25 fair and transparent.

1 MR. REDFEARN: Guys, I want to close with one
2 last question --

3 COMMISSIONER ROISMAN: Actually, Brett, do you
4 mind if I have one quick question?

5 MR. REDFEARN: Yeah, sure.

6 COMMISSIONER ROISMAN: Thanks. So I appreciate
7 this low-key conversation.

8 (Laughter.)

9 COMMISSIONER ROISMAN: But I guess, what I've
10 heard, I mean, it's clear you guys are all passionate and
11 have been in this fight for a long period of time. So
12 I'm relatively new.

13 It sounds to me like a lot of this is, as I
14 tried to point out and I think many people have said
15 before, it does tie back to certain rules, NMS, like OPR
16 and then ultimately best execution and other things.

17 Doug, you mentioned opening up SIP for
18 competition. If you created your own SIP, would you use
19 it?

20 MR. CIFU: Sure. I mean, we use the SIP and we
21 pay -- despite what Chris said, we pay a decent amount of
22 money for the SIP. We pay more for the proprietary feed.
23 So, of course, we would absolutely use SIP.

24 COMMISSIONER ROISMAN: So the same product that
25 you would create for everyone would be what you would

1 use?

2 MR. CIFU: Yes.

3 COMMISSIONER ROISMAN: And, Met, would that
4 satisfy you?

5 MR. KINAK: I mean, if I had the opportunity to
6 measure his SIP versus the actual SIP and he was
7 providing the same robust data at a probably faster speed
8 and much lower cost, absolutely, yes.

9 COMMISSIONER ROISMAN: And do you think that
10 would negate the need for proprietary feeds? Because it
11 seems like Doug would still be taking the proprietary
12 feeds in order to create --

13 MR. CIFU: Sure, I mean, yeah. As I said,
14 they're really different products for different purposes.

15 COMMISSIONER ROISMAN: Right. So I guess my
16 point is, we can continue to create a SIP which will
17 always be slower, because it's aggregating properties,
18 than proprietary feeds. And there's still going to be
19 always a race because some clients are going to want the
20 best and perhaps there's going to be a better aggregator
21 than you guys. I don't know if there is one right now
22 but there could be.

23 MR. CIFU: Sure.

24 COMMISSIONER ROISMAN: So are we going to just
25 be here in five more years talking about the same thing?

1 MR. CIFU: Well, I guess it depends what the
2 solution is. I mean, if you made it all competitive, I
3 think as an industry we'd be very happy to have
4 competitors for the proprietary products as well. Right?
5 Or at least some measure of understanding what the cost
6 is of providing that proprietary product.

7 I think the SIP and the proprietary products
8 are very different and for very different purposes,
9 right? And so the point I was making before was that we
10 think that we could produce a SIP that was highly
11 competitive to what they were producing at a fraction of
12 the cost, because it's not such an engineering feat, if
13 you will, to aggregate a bunch of feeds and create a top
14 of book.

15 COMMISSIONER ROISMAN: I appreciate that.
16 Again, I think I just come back to it may be that this
17 body needs to provide more clarity on many of these
18 issues.

19 MR. REDFEARN: Thank you, Commissioner.

20 Listen, I know we're pretty much out of time
21 here. But the one question I did want to ask is, we have
22 to evaluate all of the fees that are for connectivity and
23 for market data on the proprietary side and otherwise,
24 but in particular on the proprietary side, with the
25 standard of fair, reasonable and not unreasonably

1 book data feed. Which, if you aggregate all the top-of-
2 book data feeds across all the various exchanges, you
3 would have, ironically, depth of book. Because if you
4 look at the statistics, 97 percent of executions are at
5 or inside the NBBO. The top of book from every exchange
6 gives you what is technically full depth of book.

7 But the cost of access to our exchange, as I
8 pointed out, it would be one cable per month. And then
9 you would have access to our seven exchanges and you
10 would need a port from the various exchanges. So it's
11 fairly cheap access to get to our market, which is call
12 it 16 to 18 percent market share of the U.S. equity
13 markets. Still doesn't give you the over-the-counter
14 market and all access to the dark pools that Met may
15 require his brokers to have.

16 MR. REDFEARN: Stacey.

17 MS. CUNNINGHAM: Thanks, Brett. It's hard to
18 get into this group.

19 So one thing I just wanted to say is I think
20 what I'm hearing a number of times happen is we're
21 pulling out one aspect of fees and focusing on just that
22 and stripping market data out of the overall ecosystem.
23 And, you know, I don't believe that I heard any of the
24 exchanges up here say that market quality that is good in
25 the market is a result purely of the exchanges. It is an

1 discriminatory. And we struggle with how to -- how to
2 identify what is fair, what is reasonable and what is not
3 unreasonably discriminatory.

4 So in as short a number of words as possible,
5 can you guide us in terms of how we should think about
6 doing that?

7 MR. CIFU: I think I would go back again to
8 Brad is probably the best person on this panel to discuss
9 it. He has been fully transparent at IEX in terms of
10 they run an exchange, they've got the same obligations as
11 the other 12 exchanges. Their exchange is situated --
12 their matching engine is in New Jersey like everybody
13 else's. So they are in the exact same footing as the
14 other three exchange groups. And Brad has fully
15 disclosed what it costs.

16 I think I would just look at that and say, why
17 do you guys charge so much more?

18 MR. CONCANNON: So it's a great question. And,
19 as I think about it, obviously the cost of access depends
20 on your choice of access. Clearly, if you want to be a
21 large player, you're going to buy more access.

22 But technically, you simply need, because of
23 OPRs, as the Commissioner pointed out, you simply need
24 top of book. You can get that -- you have, again, choice
25 -- from the SIP or you can get that directly, a top-of-

1 ecosystem and we recognize that.

2 And it is our all-in costs that matter because
3 there is a relationship between transaction fees and
4 market data fees and connectivity. And so I think that's
5 why it's important to look at that relationship and not
6 try to just isolate one component and say fees are rising
7 over here and we're going to ignore the fact that fees
8 have come down in other places, because that definitely
9 seems to be what's happening.

10 And we heard an impassioned response from Brad.

11 But it is cheaper to trade on NYSE than it is to trade
12 on IEX. And so I think if you're looking at just one
13 aspect of fees, yeah, you can talk about, you know, some
14 of the things in isolation. That's very different from
15 what the overall landscape is. And so I think it's
16 important to look at that holistically and there is
17 competition. The facts are, despite what we hear from
18 Doug and from Met, the facts are not all brokers take all
19 products, not all brokers exhibit the same behavior on
20 all markets. So there is a competitive landscape and
21 they are choosing what's right for them.

22 It doesn't mean that we can't make
23 improvements. And just to address some of the cost
24 concerns that have come up, I don't believe that
25 investors or anyone, that any market participant, is

1 expecting to pay the cost of the product, the cable, the
2 seat on the New York Stock Exchange. When people spend a
3 million bucks to buy a seat on the New York Stock
4 Exchange, they weren't thinking, well, how much went
5 into creating this seat. Or, Doug, when a Florida
6 Panthers fan buys a ticket, I don't think they're
7 thinking about the paper the ticket was printed on and
8 what that costs, or even the chair that they're sitting
9 in in the stadium. They're thinking about the ecosystem
10 that they're walking into and what they're about to
11 experience.

12 For exchanges, that's capacity, that's access,
13 that's the exchanges processing information that's coming
14 in, sequencing orders, putting them together. And it's
15 not just aggregation. It's how do the orders arrive and
16 how do they interact with each other. And that's what
17 gets published out.

18 There are enhancements we can make. We're here
19 with recommendations. I agree, Brett, that on the SIP, I
20 agree with Brad, you know, I think we can add more core
21 data to the SIP. I think odd lots does make sense to
22 include. We can include auction and balance information.
23 I know there's another panel that's going to go through
24 that. I think it would be helpful to add new products.

25 We can't solve the geographic latencies. Or

1 it fair, is it reasonable, is there competition, just
2 look at the margins. Right? Because if the margins are
3 extreme, and we can't calculate those because we have no
4 transparency, then that's telling you that, one, it's not
5 fair, two, it's not reasonable and, three, it's not
6 competitive. So they can say it, trust us. And I think
7 it's been trust us for a very long time. And part of the
8 reason we're sitting up here and there's so much anger is
9 that we've trusted for a long time and we've started to
10 figure out that we can't trust the exchanges anymore.

11 The only way to evaluate fair, reasonable and
12 competitive is to actually look at the data and look at
13 the numbers and assess the margins. And if they are
14 extreme and too high then what we have is a regulated
15 monopoly abusing its position in the market. It's plain
16 and simple.

17 MR. REDFEARN: Met.

18 MR. KINAK: First of all, for the record, I'm
19 always angry. I'll just put that out there.

20 (Laughter.)

21 MR. KINAK: A couple of things that Chris said,
22 one, we do not require brokers to connect to dark pools
23 or require that they run a dark pool. In fact, if they
24 choose not to trade at a specific dark pool, I could care
25 less. Depth of book is not a function of where things

1 there is debate the NYSE brought to the SIP committee a
2 long time ago to talk about the nature of a distributed
3 SIP and is that something we should explore. Those
4 conversations have been ongoing. But in the short term,
5 we could use wireless technology to deliver SIP and
6 overcome some of the geographic latencies.

7 So there are steps that we can take. But I
8 don't think we should get lost in some of the nuances of,
9 you know, what isolated costs are. This is an all-in
10 cost discussion and we shouldn't lose track of it. It's
11 a competitive landscape.

12 MR. REDFEARN: Brad, fair, reasonable and not
13 unreasonably discriminatory.

14 MR. KATSUYAMA: So I think, first off, what
15 Stacey said about cost to trade on New York versus IEX is
16 totally false. I mean, cost for who? If you're a
17 demander of liquidity, if you have an urgency to trade
18 like a lot of investors do, they're paying 30 cents a
19 hundred across the spread on New York. That's three
20 mils. Three cents a hundred on IEX, 10 times cheaper.

21 If you're a collector of rebates, yes, it might
22 be cheaper. Again, it's a whole other discussion. But
23 again, everything I've heard, it's just misdirection,
24 here, that and the other thing.

25 I think if you want to get to the heart of is

1 trade, it is the actual depth of the book, where in the
2 price of a stock people are residing. It doesn't matter
3 if 97 percent of the time it happens in the NBBO, it
4 still doesn't give me clarity on what depth of book is.

5 But when you talk about fair and unreasonable,
6 the barrier to entry for a broker-dealer right now is
7 significant. It's extremely significant. Whenever a
8 small broker-dealer comes into our offices and says, hey,
9 look, I'd love to route. You know, MiFID has come in --
10 and I hate to bring European regulation into the
11 conversation -- but MiFID has come in and given us an
12 opportunity from a nonresearch perspective to compete for
13 best execution. Our first question to them is, are you
14 taking in the full, you know, data services that all
15 these exchanges offer? I'm talking, you know, direct
16 feeds, depth of book information, all of that stuff? And
17 if the answer is, no, then the conversation ends.

18 I don't see how smaller brokers can afford all
19 the things that Doug pays for and compete in this
20 environment. So do I think it's fair and reasonable?
21 Absolutely not.

22 And finally, you know, Brad made the point that
23 we're angry. The reason we're angry is I'm sitting here
24 as an investor and the exchanges keep saying that they're
25 here for my protection and for my innovation. I haven't

1 seen it. Okay? You may have innovated for other market
2 participants. As an institutional investor, I don't feel
3 protected at the exchange and I don't feel like they're
4 innovating on my behalf. And that's why you see the
5 passion that comes out. Thank you.

6 MR. REDFEARN: Fair, reasonable and not
7 unreasonably discriminatory.

8 MR. SCOTT: So I think, again, I'll come back
9 to the disclosure. I think we need full and
10 comprehensive disclosure of the cost of these exchanges
11 in providing the data. It's not an answer to say, well,
12 if you want us to provide our costs, we should have every
13 company in America tell us their cost. It's not an
14 adequate response to say, you want to know the margins of
15 the exchanges, we should know the margins of every
16 company in America's margins. That's not the answer.
17 They're SROs, okay?

18 And you, the SEC, have a statutory obligation
19 to judge whether they're charging fair and reasonable
20 prices. You don't have that obligation with every
21 company in America but you have it with them. And
22 therefore, they need to provide this disclosure.

23 MR. REDFEARN: Tom, final word. We're trying
24 to understand how we do that, how we meet that statutory
25 obligation of fair, reasonable and not unreasonably

1 discriminatory.

2 MR. WITTMAN: So I think Nasdaq does that every
3 day. I think what's going to be difficult is -- the
4 points were made by Chris a bit -- you've got to take a
5 look at this in the entire ecosystem. Because there are
6 banks and brokers that have a net check given to them by
7 exchanges for liquidity provision because they're net
8 adders. I talked about the profit sharing we do with the
9 SIP data. So these things are all interrelated, along
10 with market structure, Reg NMS, order protection.

11 So it's not going to be -- it's not going to be
12 an easy task to dissect those intersections and make
13 those determinations. But like I said, we -- I think we
14 do that every day.

15 MR. REDFEARN: So I want to just thank the
16 panelists for coming here today, for bringing your
17 passion and your thoughts. We really appreciate it. We
18 will struggle with these issues and try to land at the
19 right place. And so an open discussion is extremely
20 helpful. We appreciate your participation, also allowing
21 other members of your organizations to come in to other
22 panels and help us figure this out.

23 We do want to get to the right place. We do
24 want to do the right thing by investors and keep them at
25 the top of the mind throughout this process.

1 Let me just make a quick administrative
2 announcement. So we are behind schedule with this but I
3 am glad we were able to have the conversation we did. I
4 will just remind the audience that we will be starting
5 promptly at 1:15. I know that there will be challenges
6 getting in and out of security here, so just keep that in
7 mind.

8 And lastly, I would just ask if the panelists
9 from Panel Two in the afternoon can come by here just for
10 one second, that would be super helpful.

11 But with that, let me thank you again, thank
12 you all very much. We appreciate it.

13 (Applause.)

14 (Whereupon, at 12:33 p.m., a luncheon recess
15 was taken.)

16 A F T E R N O O N S E S S I O N

17 MR. REDFEARN: We are going to ask everybody to
18 grab their seats. Please come in and get seated as soon
19 as you can. We are actually going to have to probably
20 get started before everybody makes it through the
21 security line but we will do our best to fill them in
22 later.

23 So that being said, I am going to turn it over
24 to John Roeser.

25 MR. ROESER: Okay. Our second panel will focus

1 on, to the extent the SIP data is meeting the needs of
2 market participants.

3 I'd like to start off by thanking our panelists
4 and give them a few minutes to introduce themselves and
5 give their thoughts on how the SIP is working well and
6 what could be improved.

7 MR. ALBERS: Perfect. Thank you, John.

8 My name is Oliver Albers and I am the global
9 head of sales and strategic partnerships within our
10 global information services business at Nasdaq, and that
11 covers our data business, which includes our exchange
12 data, but also a lot of other data assets that we have,
13 our index business and our investment data and analytics
14 business.

15 So with that said, I want to thank the SEC for
16 convening this roundtable. To Nasdaq, this is not a one-
17 dimensional conversation about market data, access fees,
18 colocation or even best execution. Our competitive and
19 multifaceted markets exist as a single fabric whose
20 strength relies on many threads. We all need to be very
21 mindful to pull those threads carefully and focus on the
22 impact to Main Street investors. We should rely on
23 market forces and shy away from government rate setting
24 which, frankly, does not work. Nasdaq welcomes the
25 opportunity to contribute to a better understanding of

1 the SIPs and a proprietary data product servicing
2 investors of all shapes and sizes around the globe.

3 The SIPs consolidate the best bid, best offer
4 and last sale from all U.S. equity exchanges and also
5 calculate and disseminate the national best bid, best
6 offer, or NBBO, for any publicly traded equity in the
7 U.S. The NBBO is a really important reference price and
8 benchmark for investors. So much so that nearly 97
9 percent of trades occur at or within the NBBO. The SIPs
10 are the basis for this important information. But firms
11 can also create their own BBO, which we heard earlier,
12 but it's not easy for all participants. The SIPs make it
13 easy. The SIPs also do this quite well.

14 There have been vast improvements in SIP data
15 in recent years, even as SIP revenue to exchanges has
16 fallen. The Nasdaq SIP has an average latency of just 16
17 millionths of a second, which is 15,000 times faster than
18 the blink of an eye. The Nasdaq SIP can also handle 10
19 billion messages per day, 20 times more than a decade
20 ago, and significant cybersecurity and fraud prevention
21 investments by Nasdaq and other operators have increased
22 the overall market efficiency and resiliency.

23 Most importantly, SIP data comes at low or no
24 cost to Main Street investors. The nominal price for SIP
25 data has dropped by 96.3 percent over 30 years. When

1 vendors, global points of presence and even directly on
2 our website. We provide choice to make it as easy as
3 possible for firms and investors of all shapes and sizes
4 to consume our data. For all of these products, we are
5 far from the only game in town and the intense
6 competition we face has only benefitted mainstream
7 investors.

8 So I hope the key takeaway from this
9 conversation is that a simplistic view of core versus
10 noncore, slow versus fast, public versus private is
11 inaccurate and misleading. First, the SIP isn't slow;
12 it's state of the art and lightning fast. Second, prop
13 isn't necessarily deeper or more expensive than the SIP.
14 And finally, competition between the SIPs and prop
15 products isn't problematic, it's good; it encourages
16 innovation and experimentation that ultimately drives
17 down cost and benefits Main Street investors who get all
18 of this data at little or no cost.

19 So while our analysis suggests that the
20 regulatory scheme for U.S. stock market data is
21 accomplishing its goals, we do think there is room for
22 improvement. One example is we have asked the SEC to
23 clarify the vendor display rule to eliminate confusion
24 among broker-dealers about when they must use
25 consolidated SIP data and when they may rely on data from

1 adjusted for inflation, the SIP revenues allocated to the
2 exchanges has fallen 23.7 percent from 2007 to 2017.
3 Meanwhile, SIP revenues to off-exchange trading venues
4 have gone up. In fact, 30 percent of all SIP revenue
5 earned by Nasdaq over the past five years has been given
6 back to broker-dealers.

7 Turning to proprietary products, let's start
8 with the question of why they even exist. Well, there
9 are many different types of market data consumers, from
10 major Wall Street banks and market makers to retail
11 online brokerages and media companies across the world
12 and all have differing data needs. In a competitive
13 market with many different types of participants, there
14 is no one size fits all. Some trading firms have
15 business and trading models for which they need and are
16 willing to pay for the latest technologies, both from
17 exchanges and other third parties, and online brokerage
18 firms on the other hand may choose top-of-book
19 proprietary data and connectivity that meets their needs
20 at a lower cost than the SIPs. And, of course, many,
21 many others rely just on SIP data and do not purchase
22 direct feeds from an exchange.

23 Generally, Nasdaq offers BBO, last sale, full
24 depth-of-book feeds for each of our equities exchanges
25 via a multitude of connectivity options, via market data

1 a stock exchange like Nasdaq. Such clarity could reduce
2 the already low market data cost for the investing public
3 without negating brokers' obligation to provide best
4 execution when an investor trades, which remains
5 sacrosanct.

6 So I want to thank the Commission again for
7 convening this conversation and really look forward to a
8 lively discussion -- hopefully not as lively as the last
9 one.

10 (Laughter.)

11 MR. ROESER: Thanks, Oliver. Matt.

12 MR. BILLINGS: Thanks, John. Good afternoon,
13 virtual Chairman Clayton, Commissioners and Commission
14 Staff --

15 (Laughter.)

16 MR. BILLINGS: -- thank you for the opportunity
17 to participate in today's roundtable. I am Matt
18 Billings, managing director, market data strategy, TD
19 Ameritrade.

20 TD Ameritrade, based in Omaha, Nebraska, was
21 founded over 43 years ago. TD Ameritrade on behalf of
22 our 11 million accounts has long advocated for market
23 data structure that provides retail investors with
24 equitable, low-cost access to quality market data. It
25 should not be a surprise that TD Ameritrade strongly

1 agrees with Chairman Clayton's goal of ensuring that the
2 current market data structure is in the best interests of
3 retail investors, Main Street investors.

4 One of the strengths -- I'm going to go a
5 little bit off script there -- so one of the things we
6 heard about in the first panel was about the golden age
7 of retail investing, about how it's never been better for
8 retail investing. And I am respectful of that because
9 we're all in the same ecosystem and all these people up
10 here, we're all in the same ecosystem, we're all driving
11 towards the same thing and that's the client experience.

12 But I do want to state that that process for
13 the retail investor starts with firms such as retail
14 brokers such as TD Ameritrade and our peers in that
15 group. That's where it starts. That's where the
16 innovation and the drive about the client experience,
17 that focus on client experience is always paramount to
18 what we do and how we think.

19 Back to script, I apologize.

20 One of the strengths TD Ameritrade sees in our
21 offering is our ability to provide such a diverse
22 community of retail investors quality trading tools and
23 technology, research and execution, all at a low cost to
24 investors. As market data is the lifeblood of the
25 markets, access to quality market data, whether through

1 browsers, downloadable software, mobile platforms, IBR,
2 it's critical to our offering.

3 TD Ameritrade, with our largely self-directed
4 retail clients, is one of the largest redistributors of
5 SIP data. As such, TD Ameritrade believes the SIP does
6 offer retail investors an adequate core, top of book,
7 consolidated representation of the market.

8 With that said, there are several areas of the
9 CTA UTP plans that warrant review. We have provided a
10 more thorough review in our written comments that we
11 previously submitted. We will briefly touch upon a
12 couple of these areas in this statement. Particularly,
13 challenges presented in the onboarding of clients for
14 realtime consolidated data, and the administrative
15 burdens of the CTA UTP plans.

16 First off, I would like to touch upon the
17 challenges for our clients. For retail investors to
18 receive realtime SIP data, they are put through multiple
19 steps. The account must be that of a natural person
20 versus a legal entity. That matters. If you are a legal
21 entity, you are immediately disqualified and you are now
22 considered a professional, okay, and that changes the
23 scope of it. A legal entity being a qualified plan,
24 401(k), sole proprietorship, partnership, corporation.
25 It doesn't disqualify you from realtime data, it changes

1 the scope of where you stand in that area.

2 You may need to provide current employment
3 information, employer, address, title, function, answer a
4 series of questions on top of that, and ultimately attest
5 to exchange agreements. This is primarily done to
6 determine whether the client qualifies as a
7 nonprofessional versus a professional user of market
8 data. This is a key point of differentiation.

9 The retail client, by default, according to the
10 plans, is considered professional and must prove
11 themselves otherwise. For Main Street investors who open
12 a small business account, a mom or pop shop, they
13 probably would be shocked to find out that they are
14 considered professionals and must pay \$92 across all
15 three tapes per month to access realtime consolidated
16 data or, instead, receive delayed data if you so choose.

17 Retail brokers have the administrative burdens
18 of establishing and maintaining policies, procedures and
19 systems to determine whether retail investors are
20 classified correctly as professional or nonprofessional,
21 and to maintain those classifications going forward. The
22 plans regularly audit brokers for compliance with their
23 overly complex rules, which are not harmonized across the
24 CTA and UTP plans, and are cause for misinterpretation.

25 Obviously, TD Ameritrade takes this contractual

1 obligation seriously. But in the area of market data,
2 the goal posts always seem to be moving. An expectation
3 of review is evolving as we speak from a securities
4 registration, a Broker Check, a FINRA Broker Check
5 registration, to having to check LinkedIn and other
6 nonverifiable websites to determine professional and
7 nonprofessional classification. Noncompliance, in which
8 a client may be determined to be misclassified as a
9 nonprofessional by those reviewing on behalf of the plans
10 comes as a high cost, as they will seek back payments for
11 up to 36 months.

12 Now, let's compare this review of CIP data to
13 an exchange top-of-book offering. It is important that
14 an exchange top-of-book solution, a standalone exchange,
15 indicative of such as Nasdaq Basic, Cboe One or NYSE BQT,
16 only accounts for the orders under that exchange complex
17 so it is not a consolidated quote and cannot be
18 represented as such. The exchange indicative offerings
19 come at a fraction of the cost of the SIP. You may pay
20 for one year of an exchange top-of-book solution for what
21 you would pay for one month of the SIP.

22 An exchange top-of-book data enterprise license
23 largely incorporates professionals and nonprofessionals
24 under their licenses, removing the cumbersome burdens on
25 qualifying clients during onboarding, simplifying

1 management of those accounts and reducing audit risk.
 2 The question ultimately becomes, at what point does a
 3 retail broker move away from the NMS plans in favor of
 4 these alternative exchange top-of-book data products that
 5 provide for that fixed license that costs significantly
 6 less than that of the SIPs and also allows retail brokers
 7 to avoid negative onboarding investor experience,
 8 administrative overhead and the audit risk liability that
 9 currently exists under the plans.

10 TD Ameritrade and many others have observed the
 11 market system has challenges. As a result, we welcome
 12 the Commission's focus on ensuring a system that makes
 13 sense for retail investors, for all investors.

14 Again, I thank you for the opportunity today
 15 and look forward to answering your questions.

16 MR. ROESER: Thank you, Matt. Michael.

17 MR. BLAUGRUND: Thank you, John.

18 First, I would like to thank the SEC Staff, and
 19 Director Redfearn in particular, for the invitation to
 20 participate on today's panel. Stacey earlier spoke about
 21 the equity market landscape and how fragmentation has
 22 changed both the ways exchanges operate and how financial
 23 firms run their businesses. These changes set the stage
 24 for exchange market data to play a critical role in
 25 improving outcomes for end investors. Market data has

1 democratized access to realtime information, which
 2 historically was only available to those at the physical
 3 point of sale. It has facilitated competition for order
 4 execution services. It has allowed for significant
 5 industry automation. It has enabled transaction cost
 6 analysis, resulting in improved accountability of agents
 7 to asset owners, and it has enabled improved regulatory
 8 surveillances.

9 We can likely all agree that market data is
 10 exceptionally valuable for investors. But what we can't
 11 seem to agree on is what different constituencies should
 12 pay for it and why different types of users should pay
 13 more or less. There are broadly three classes of users
 14 with distinct fee schedules. Retail investors that view
 15 market data on their phone or a website; industry
 16 professionals that view data on screens, often on a
 17 professional market data terminal; and nondisplay use, in
 18 which computers consume market data programmatically to
 19 support algorithmic trading or the operation of an
 20 execution menu.

21 Segmenting usage in this way allows for an
 22 equitable allocation of fees and there are several key
 23 policy points that merit mention. First, retail
 24 investors do not directly pay for the market data they
 25 see and we aren't asking them or their brokers to pay the

1 same level of fees we'd expect from market professionals.
 2 The most a retail subscriber pays to view SIP market
 3 data is \$3 a month and many pay less. We think it's an
 4 appropriate public policy for Wall Street to subsidize
 5 market transparency for Main Street investors.

6 Second, until the last five years, the cost of
 7 market data was overwhelmingly paid by those who were
 8 viewing data on screens, while those who consume data
 9 into algorithms paid very little. The exchanges and SIPs
 10 introduced nondisplay usage fees to acknowledge the
 11 industry's automation and to ensure purely electronic
 12 trading firms were paying their fair share.

13 Third, all market data products offered by the
 14 exchanges and SIPs are universally available to everyone.

15 We don't offer unique or preferential pricing to anyone
 16 and there's no such thing as a private feed. All
 17 exchange market data is public.

18 Like any of us in our early forties, the SIP
 19 could use a makeover.

20 (Laughter.)

21 MR. BLAUGRUND: NYSE has recommended four
 22 potential changes to the core data regime, some of which
 23 Stacey mentioned earlier. The first would be to expand
 24 the definition of core data to include odd lots priced
 25 better than the BBO and auction imbalance information.

1 Secondly, we recommend the SEC undertake rulemaking to
 2 establish a simplified SIP revenue allocation
 3 methodology. Third, we recommend publicly webcasting all
 4 SIP operating committee general sessions to provide
 5 comfort to the industry that the participants and
 6 advisers are acting appropriately and are accountable.
 7 And fourth, we recommend the SEC undertake an analysis of
 8 the cost and benefits to the industry to shift the SIP
 9 from a single location design to a geographically
 10 distributed system. Taken together, we think these
 11 enhancements to the SIP would meaningfully increase its
 12 value to the industry and address many outstanding
 13 concerns.

14 Again, I appreciate the opportunity to
 15 participate today and look forward to the discussion.

16 MR. ROESER: Thanks, Michael. Jeff.

17 MR. BROWN: Thank you, John. And thank you,
 18 Director Redfearn, for holding this important two-day
 19 event. Certainly, we need to discuss market data every
 20 20 years or so, whether we need to or not.

21 But let me just begin -- first of all, I'm Jeff
 22 Brown, I run Schwab's government affairs office. And you
 23 might wonder why you'd have a lobbyist up here. But I
 24 have actually had a long career in the markets. At one
 25 time, I was chair of the Nasdaq UTP committee, so I have

1 some insight into how that organization works or doesn't
 2 work.
 3 Let me begin by giving you just a short
 4 statement. And that is that the public's market data,
 5 quotes and trade prices, are still a monopoly and the
 6 public is charged a monopoly toll for its own
 7 information. Now, you might think -- and people who know
 8 would say, well, that's Jeff's words, he's been saying
 9 that for years. But it's actually Chuck Schwab's
 10 testimony before the Senate Banking Committee from
 11 February of 2000. And, you know, sadly nothing has
 12 changed. Literally, that's why we're here, because
 13 nothing has changed.
 14 Now, we've had 19 years since then of a
 15 revolution in telecommunication and digital processing,
 16 you know, that has changed the way products can be
 17 delivered and offered, and certainly the volumes that are
 18 sent through the system. And I don't really want to talk
 19 today about fees and costs, I want to talk about the
 20 quality of the SIP product.
 21 You know, the SIP data feed has less data
 22 today, less information today, than it did 20 years ago.
 23 Absolutely, the exchanges said, well, we've spent so
 24 much to be able to run billions of bits of information
 25 through it, that's true. But it's still a top-of-the-

1 book product. And the exchanges will say, well, that's
 2 sufficient for retail investors; they don't need any more
 3 than that. And indeed, you know, Chris Concannon said
 4 this morning and I agree with him, and so it just shows
 5 I'll agree with exchange people every now and then, it
 6 shows that the SEC has always accepted that point of
 7 view. The SEC has said, oh, top of book is all you need.
 8 So a product that was developed in the 1980s is still
 9 used today.
 10 Now, think about that. If you were trying to
 11 sell something and you were selling a product that had
 12 been designed, all the features designed in the 1980s,
 13 you'd be able to sell that? I know the exchange financed
 14 a paper where the market data structure was compared to
 15 the market for automobiles. And so think about it. If I
 16 just tried to sell an automobile that was designed in the
 17 1980s, do you think anyone would buy it? And even worse,
 18 do you think the government would say to people, you
 19 know, that's all you need?
 20 Well, we don't think that's all you need as a
 21 retail investor. The SIP, which is valuable, and I agree
 22 with Hal Scott's comment this morning that it's something
 23 we need, but it can be upgraded and it can be made
 24 relevant again by adding depth of book.
 25 Now, why don't the exchanges want to add depth

1 of book? Because they're afraid it will cannibalize
 2 their sale of proprietary data. But frankly, retail
 3 investors, if you want to deal with the latency issue,
 4 you can't solve it, you can't outlaw the laws of nature
 5 that say electrons only move so fast. What you can show
 6 them is information on below and above the bid/ask, so
 7 that they don't rely on the simple top of book but they
 8 can make judgments about where a stock may be going and
 9 where they may need -- what type of order they need, what
 10 type of -- whether they need to move now or wait.
 11 So our recommendation for this panel and for
 12 this day is that the SEC move to impose, you know, depth
 13 of book on the SIP. Because we think that change alone
 14 can offer retail investors a tremendous benefit.
 15 MR. ROESER: Thanks, Jeff. Simon.
 16 MR. EMRICH: Thank you. Thank you to you and
 17 the commissioners for organizing this roundtable on such
 18 an important topic. I'm very happy to be here and
 19 participate in discussion.
 20 My name is Simon Emrich. I am the head of
 21 market structure strategies at Norges Bank Investment
 22 Management. We are the investment management division of
 23 the Norwegian Central Bank and we are responsible for
 24 investing the Norwegian government pension fund global.
 25 We are large, long-term investors in global financial

1 instruments. As of the end of last year, we were
 2 invested in assets in excess of \$1 trillion across 72
 3 countries. Our investment in the U.S., less equities,
 4 amounted to approximately \$250 billion, making it our
 5 largest holding by country.
 6 We are active market participants in all of the
 7 markets that we are invested in through a variety of
 8 fundamental and systematic strategies. These are managed
 9 both in house and through external managers. Our active
 10 participation in that many countries means that we have
 11 to be very well aware of the differences in market
 12 structure across those countries and regions. This
 13 includes the macro structure of our peer investors, the
 14 intermediaries and trading venues, as well as the
 15 regulatory environment.
 16 From this perspective, there's a number of
 17 features of the U.S. equity markets that, in our mind,
 18 are exemplary. This includes the effect of competition
 19 across trading venues for order flow, the regulatory
 20 framework that's been set up, especially around best
 21 execution obligations, and certainly not least --
 22 thinking about Europe in particular -- the existence of a
 23 consolidated tape, which provides an aggregate,
 24 transparent lens to pre- and post-trade transparency. We
 25 think that this adds great value to the marketplace here

1 in the U.S.

2 Our investment horizon and the nature of our
3 liability stream often allows us to consider longer term
4 issues in market structure on both a macro and a micro
5 level. We make those views available publicly and also
6 sponsor some academic research in that area on the
7 evolution of asset markets.

8 We believe that the current macro structure of
9 the U.S., in sense of our peer investors that we have,
10 what we've seen over the last 10 years is an increase in
11 institutionalization of asset management, such that for
12 the 1,000 largest stocks in the U.S., on average, 80
13 percent of the shares outstanding is now held by
14 institutional investors, and the rise of passive
15 investment strategies, those factors are at least
16 partially driven by the micro structure of markets and
17 their regulatory framework.

18 The concentration inherent in institutional
19 asset management depends crucially on the quality of the
20 price discovery process in public markets. Similarly,
21 many passive investment strategies, especially if they're
22 in an ETF wrapper, depend on efficient trade execution in
23 short, tight, no-arbitrage bounds.

24 Secondly, if we look at the -- at the market
25 data structure in particular and the cost for brokers,

1 product at Bank of America Merrill Lynch within the
2 equities division.

3 Market data has been widely debated over the
4 last several years, primarily due to the changes in fees
5 and the increased appetite for more sophisticated
6 products. I like to think it is important to understand
7 how the proprietary and CTA UTP products are used in the
8 marketplace so the investor community is more informed.

9 Proprietary market data products like Nasdaq
10 Total View, NYSE Integrated Feed, along with the depbooks
11 products from CBOE provide valuable information to the
12 investor community to make informed decisions about
13 accessing publicly available quotations. The direct
14 feeds provide users the ability to provide a depth of
15 book across the U.S. equity exchanges. The key features
16 of the direct feeds are order-by-order information, adds,
17 modifications, cancels and trade messages, imbalance
18 feeds for auctions and security status. Some markets may
19 provide an aggregated book information as an option to an
20 order-by-order book feed, which I just mentioned.

21 The standard information processor, or the SIP,
22 is divided into two parts, the CTA for tape A and tape B
23 securities and UTP for tape C securities. Generally, the
24 SIP provides the following information: Top of book,
25 best bid and offer, limit up/limit down bands, normalized

1 from a longer-term perspective, we are seeing a decrease
2 in the competitive landscape for broker-dealers. We are
3 going to talk about that a bit later. But we see that
4 the set of brokers that are just feasible for us keeps on
5 shrinking, at least possibly due to market data and
6 technology cost.

7 Any changes to the market microstructure will
8 over time impact the macrostructure as well. As an
9 investor with long investment -- long-term horizon, we
10 have to be very aware of this connection and evaluate
11 innovation on a microstructure accordingly. In this
12 context, we believe that the evolving revenue mix for
13 exchanges, with its greater emphasis on subscription-like
14 fixed fees, as opposed to variable per-trade fees, has
15 the potential to have a substantial impact on the
16 macrostructure of markets. Exchanges play a crucial role
17 in price discovery and trade matching processes and they
18 need to be fairly compensated for these services.

19 I very much look forward to the discussion and
20 your questions. Thank you.

21 MR. ROESER: Thank you, Simon. Adam.

22 MR. INZIRILLO: Thank you very much. I'd like
23 to thank the SEC, Brett and his staff for organizing the
24 market data panels today and tomorrow. My name is Adam
25 Inzirillo. I am managing director, cohead of electronic

1 quote conditions, security status for the listing
2 exchange, Rule 201 status and trades. SIP is valuable
3 for trades, as it provides the entire universe, including
4 but not limited to hidden and ATS transactions.

5 CTA and UTP have been moved to binary which has
6 reduced latency. But please note, the SIP latency stats
7 are published via the websites, which generally only
8 measure the inbound message out to the marketplace for
9 publishing. So the key difference between proprietary
10 and the SIP feeds is the ability to build a depth of book
11 across all markets.

12 The nature of the SIPs, the nature of the
13 locations of the SIPs introduce unavoidable latency
14 effects. The UTP SIP, which are Nasdaq-listed names, is
15 in Carteret. CTA SIP, which is NYSE Arca, AMEX, Bats,
16 IEX-listed names, is located in Mahwah. For example, the
17 general time of travel between Carteret and Mahwah is
18 approximately 350 microseconds.

19 Ideally, the market data revenue which, for
20 example, in 2017, which is also publicly available on the
21 CTA and UTP websites is tape A is 164 million, tape B was
22 96.5 million and tape C was 125 million. The market data
23 revenue pools should be used to consolidate the CTA and
24 UTP. There is no longer a need to have them isolated or
25 separated.

1 In addition, the quote revenue pool can be used
 2 to create a centralized data center for equal and fair
 3 distribution of data. Lastly, the quote revenue could be
 4 used to standardize protocols across the exchanges for
 5 direct access to proprietary products and allow for
 6 easier access to direct or similar connectivity, it would
 7 be worthwhile to have a single point across all
 8 exchanges. So, for example, today for a connectivity
 9 cost to a particular market center, you may pay 20,000 or
 10 15,000. However, if you build a direct feed for each
 11 market center, you then have to pay an incremental fee
 12 per market center. So having a single cost would allow
 13 for an easier barrier to entry -- reduce the barrier to
 14 entry, excuse me.

15 Although the industry has made great strides
 16 over the last eight to 10 years, there is more that can
 17 be done to ensure fair and equitable data distribution
 18 across all market participants. Thank you.

19 MR. ROESER: Thanks, Adam. Mark.

20 MR. SKALABRIN: Hi, I'm Mark Skalabrin, founder
 21 and CEO of Redline Trading Solutions.

22 So Redline builds high-performance trading
 23 technology that's used by our customers, who are banks,
 24 hedge funds, proprietary trading firms, to integrate
 25 market data into their applications. So we're in more

1 than half the top 12 investment banks in applications
 2 like smart order routing, matching, we're in eight
 3 different dark pools, in order to provide the NBBO price
 4 reference. And so we get an in-depth look of how these
 5 customers need to use market data in order to be
 6 successful in the market.

7 It's been talked about already from other
 8 participants, I think Adam included, that, you know, you
 9 cannot -- these customers cannot be competitive with the
 10 SIP. And there's two main reasons that have been talked
 11 about. One is latency, the geographic latency. So, just
 12 as an example, if you're sitting at Secaucus and you get
 13 a direct feed tick from Bats, it shows up in a few
 14 microseconds from when they publish it. That same tick
 15 for the SIP for Nasdaq-listed symbols goes to Carteret,
 16 for NYSE-listed symbols they go to Mahwah and they come
 17 back again. The real numbers are, for one, about 350
 18 microseconds and the other about close to a millisecond
 19 in latency for those to show up for someone using the SIP
 20 to get the Bats tick. So this is just an architectural -
 21 - an obsolete architecture, really, for an automated
 22 trading system in today's world. It just -- you can't be
 23 competitive with those kind of latencies compared to just
 24 getting it directly from the exchange.

25 And then as also has been mentioned, there's a

1 series of content that exists in the direct fees, some
 2 depth in orders and imbalances and odd lots and other
 3 things, that provide valuable information in how to make
 4 decisions in trading applications. So a smart order
 5 router who wants to get a hit rate for their clients to
 6 take their orders and effectively fill them need the
 7 direct feed information.

8 Now, we sell to various customers, leading
 9 firms that have lots of money and really imbed this
 10 technology, but also to startup brokers and small firms
 11 trying to integrate in the market. And not all of them
 12 use direct feeds. And it was mentioned before that some
 13 people just don't buy the direct feeds. Some people can
 14 do without it. And we deal with them in that decision
 15 process. It's not a mystery why they don't use the
 16 direct feeds; it's solely cost. Okay? They can't afford
 17 the cost of the infrastructure.

18 And what we do for our customers who are using
 19 the direct feed is we build a synthetic NBBO that looks
 20 exactly like the SIP. And you might say, well, geez, if
 21 you can build that, why doesn't that obsolete the SIP?
 22 And it's solely a pricing issue that, someone who gets
 23 the SIP, their starting price is, nondisplay, about
 24 \$150,000 a year. If we create something that looks
 25 identical to the SIP in form with our technology and they

1 use that to trade, top of book, no odd lots, just
 2 identical but doesn't have the latency constraints, then
 3 it costs about \$750,000 a year because they have to pay
 4 the direct feed fees to do that. So that's the dynamic
 5 of the market for people trying to start up and compete
 6 with people with more resources. It really is a barrier
 7 to entry.

8 All right, thank you.

9 MR. ROESER: Okay. Thanks, Mark.

10 So pretty happy so far. Let's focus on the
 11 costs of SIP data. How has the cost of SIP data evolved
 12 over time? Has it increased, decreased, stayed the same?
 13 Who bears the cost, nonprofessionals, professionals,
 14 brokers that use the data for nondisplay?

15 I'll start with Oliver.

16 MR. ALBERS: Let me turn on my mic here. So
 17 I'll take that.

18 So I think if you look at the cost of retail,
 19 it's stayed flat or even decreased over the years. I
 20 think, you know, if you look at who absorbs the vast
 21 majority of the cost of the SIP, it is the professional
 22 trader. I think about 20 percent of the SIP revenues
 23 come from retail and about 80 come from professional
 24 traders.

25 But, you know, the professional sort of user

1 fees or subscriber fees have stayed relatively flat over
2 the past, you know, 10 years. I think, you know, where
3 you have seen changes and, you know, this was kind of in
4 line with, you know, we're moving into a data economy,
5 you know, technology is overtaking humans in certain
6 capacity and, you know, there is a tremendous growth in
7 nondisplay usage. And so while you see a tremendous
8 decrease in the number of eyeballs that are accessing
9 data, you see a decrease in the eyeballs, you see a
10 tremendous increase in terms of the numbers of servers
11 that are accessing the data.

12 And so, you know, we've seen some offset of the
13 professional fees from a usage standpoint, the revenue
14 that comes from the eyeballs, to revenue that comes via
15 nondisplay fees.

16 MR. BLAUGRUND: Can I just add?

17 MR. ROESER: Sure. Go ahead, Michael.

18 MR. BLAUGRUND: The data that Oliver was
19 referencing there is now publicly available on the SIP
20 websites. One of the recommendations from the SIP
21 Advisory Committee was to add that transparency, both CTA
22 and UTP. In addition to the overall levels and
23 distribution of revenues by SRO, include the breakdown by
24 revenue type.

25 MR. REDFEARN: Just to take a quick follow-up,

1 the thing that we were kind of referencing in our opening
2 statement, our challenge here is that we want to kind of
3 recast this whole professional/nonprofessional
4 discussion, in which we sense there's way too many folks
5 out there designated as professionals that should be
6 nonprofessionals, that should be under that cheaper rate.
7 Regardless of who you are at, regardless of not at TD
8 Ameritrade, but whoever you work with, it's meaningful to
9 think that if you are simply a sole proprietorship and
10 you open an account at one of these retail broker-
11 dealers, you get tagged as a professional. And
12 therefore, if you wish to receive that realtime data, you
13 have to choose to absorb that cost or receive delayed
14 data.

15 We think it makes sense to kind of rethink that
16 approach and kind of, you know, balance it out in some
17 way.

18 MR. BLAUGRUND: If I can make two quick points?
19 You know, I think Matt makes a really important point
20 that if the process and the procedure of onboarding
21 clients is creating friction for retail participation, we
22 should absolutely address that. And I'd be shocked if
23 anyone, you know, takes the other side of that argument.

24 I think, you know, historically the SIP
25 Operating Committee, you know, wanted to establish

1 Oliver, are you talking about the revenue generated from
2 pros and non-pros? Or are you talking about the actual
3 cost for an individual pro versus a non-pro?

4 MR. ALBERS: I'm talking about the revenues
5 generated from pros/non-pros.

6 MR. REDFEARN: And that is in the scenario
7 where the total number of pros in particular has gone
8 down over that period of time?

9 MR. ALBERS: Yes.

10 MR. REDFEARN: Okay, just wanted to clarify
11 that. Thanks.

12 MR. BILLINGS: I think to clarify one point, we
13 actually don't know the costs to produce the SIP, as was
14 discussed in the previous panel. We just know who bears
15 the cost of paying for it. And that is, you know, in
16 large part, retail investors. The retail investors, we
17 are -- TDA being a large redistributor, we do meet the
18 enterprise license caps. Those cap out for
19 nonprofessionals -- let me say that's for
20 nonprofessionals -- at just over \$1.8 million per month.
21 That does not -- external professionals are outside the
22 caps and that's another leg that you have to pay beyond
23 nonprofessionals.

24 And as Oliver was mentioning, there's a
25 significant amount of nonprofessionals out there. And

1 policies and ensure they were fairly applied. And so I
2 think that's probably why you now have a longer checklist
3 like you were describing. But I think, as a policy
4 matter, we would all be on board with trying to find a
5 reasonable definition of retail, such that someone who
6 isn't a market professional isn't unfairly categorized.

7 The second point I would make, you know, with
8 respect to the cost of running the SIP, I know it was
9 made in the earlier panel but I think it's important to
10 reiterate, the cost of producing market data is not just
11 the cost of the circuitry of the aggregating processor,
12 it's the cost of operating exchanges, it's the cost of
13 operating FINRA, you know, operating the full market.

14 We haven't disclosed the direct costs of the
15 SIP in part because I think we're worried about the
16 misperception that the direct costs of the SIP would
17 represent the overall cost of producing data. And I
18 think a large part of that reluctance comes from a view
19 that it would be misunderstood.

20 MR. ROESER: Jeff.

21 MR. BROWN: You know what? We've heard this
22 several times today about how SIP data for retail
23 investors has gone down every year. And that's just not
24 true. And we -- you know, I think SIFMA just submitted a
25 study by Expand, which is, I guess, an affiliate of

1 Boston Consulting. And that study shows that SIP data
 2 has gone up since 2010 by about 200 percent.
 3 And one of the areas where we are directly
 4 impacted is there is a cap of a dollar per month for
 5 nonprofessionals. But there's also a per-query fee. And
 6 that per-query fee has gone up. And we have millions of
 7 clients who are charged based on that per-query fee.
 8 They don't hit the cap, they get charged. And as that
 9 fee goes up -- and it went up 50 percent in 2015, I
 10 believe.
 11 So that impacts the cost structure that causes
 12 us to pay more. And, you know, we'll cover that for our
 13 customers. But, you know, at the end of the day things
 14 aren't free. And when you hear the exchanges talk about
 15 there's a free lunch for retail, that just doesn't exist.
 16 People pay for it. Our firm has to cover that.
 17 And Matt makes a great point that the
 18 contracting with the SIP providers is so arcane and full
 19 of these distinctions. You know, if you use your iPhone
 20 and you use your iPad to look at trading information and
 21 you just happen to have them both open, you're a
 22 professional. And, I mean, that distinction -- there may
 23 have been some legitimate basis years ago. It makes no
 24 sense now for our clients to be labeled that, simply
 25 because they open two devices. So there needs to be a

1 real hard look at that whole structure.
 2 MR. ALBERS: Jeff, I think what you just said
 3 is inaccurate. It doesn't classify you as a professional
 4 if you have two devices open. Just for the record.
 5 And one other thing I'd just like to -- I mean,
 6 when we talk about the cost of retail, Professor Jim
 7 Angel from Georgetown University did do a study recently.
 8 And for large firms, the average price for a
 9 nonprofessional is 14 cents a month.
 10 MR. BILLINGS: We do not agree with that math,
 11 respectfully, to Professor Angel. I don't know if it
 12 accounts for everything that goes into the absorption of
 13 the SIP and then our redistribution of it. I mean, we're
 14 paying for -- everything such as that. And, you know, I
 15 would contend that there is a lot more that goes into
 16 that than a simple, you know, one number divided by this
 17 number. There's a lot -- as you know, it's as complex as
 18 anything is in our business. And this is as complex as
 19 that.
 20 MR. ALBERS: And there's a lot of things in
 21 there that have nothing to do with exchanges, network
 22 providers, software providers, et cetera. Like, you
 23 know, I've seen stats where, you know, in terms of the
 24 cost of consumption, the actual content fees are like 5
 25 percent.

1 MR. ROESER: Okay, Simon. Costs of SIP data to
 2 market participants, how has it evolved?
 3 MR. EMRICH: So from our perspective, you know,
 4 we use both SIP and direct feeds, we use top-of-book
 5 direct feeds, we have depth of book as well. What we
 6 find is the use cases for SIP data over the years has
 7 just decreased, has decreased substantially. We use the
 8 data directly for our trade planning and then for
 9 posttrade TCA as well. And obviously, the brokers that
 10 we employ as agents also have to use the data. So for
 11 the brokers, as has been mentioned before, the brokers
 12 can't really be competitive for our sort of trading just
 13 using the SIP. They need to have the full depth of book.
 14 We depend on them to slice up our orders and trade them
 15 over time. We need them to have a full view of the
 16 market, not just the top of the book.
 17 From our own perspective, from our trade
 18 planning perspective, similarly, we are looking for
 19 larger trade sizes. We are very interested in block
 20 trades and conditional orders and things like that. We
 21 find that the information that we receive from the SIP is
 22 just not sufficient for that; we need to have the full
 23 depth of book.
 24 Even from a posttrade perspective, for a TCA
 25 perspective, the geographical latency of the SIP has been

1 mentioned before. The brokers that we employ, we find
 2 that the tech stack that they need to have is fairly well
 3 defined. You need to be in Secaucus, you need to be
 4 colocated at the exchanges, you need to have a certain
 5 port quality, you need to use millimeter waves to connect
 6 to the various trading venues. The SIP does not
 7 represent that physical reality that the brokers observe
 8 in terms of the sequencing of the orders, the sequencing
 9 of the quotes coming in. So even from a posttrade
 10 perspective, from a TCA perspective, using the SIP for
 11 that is for us no longer sufficient to evaluate the best
 12 execution obligation that we place on the brokers.
 13 MR. REDFEARN: Simon, just a quick follow-up.
 14 On the last panel, there was some discussion with Met
 15 from T. Rowe regarding sort of the dialogue with the
 16 brokers that they use to handle their orders about
 17 whether they may or may not use the SIP. You kind of
 18 alluded to this, but is this a question that you ask
 19 brokers that are handling your orders? Do you use the
 20 SIP for your router or for your ATS versus the direct
 21 data feeds? Is this a metric that you use to --
 22 MR. EMRICH: So it used to be from a
 23 transaction cost analysis. Over the years, we observed
 24 that there were significant differences in the
 25 performance of some of the brokers that we employed. So

1 we started, you know, trying to explain why that was the
2 case. And we really found out that it's the tech stack.

3 You either have it or you don't. And part of that tech
4 stack is really do you use direct feeds.

5 So similar to what Met was saying in the
6 earlier panel, the discussion is over the second you say
7 that you don't use direct feeds. Now, that's for the
8 algorithmic portion of our executions. For other larger,
9 larger trades that we do, you can make a different
10 argument. But for the algorithmic portion, it's
11 certainly the case that direct feeds and direct depth of
12 book feeds are a nonnegotiable requirement.

13 MR. ROESER: Adam.

14 MR. INZIRILLO: Yeah, I think it's important to
15 note too, when you take in the proprietary market data
16 feeds, you have to be able to process it efficiently,
17 right? So there's a thing called a feed handler. So the
18 information comes in, you have to process it in a timely
19 manner to ensure that it's accurate and consistent,
20 right? So a depth of book is important for calculating
21 or understanding the marketplace across all the U.S.
22 equity exchanges.

23 The SIP is also necessary. We have to have
24 that for redundancy, to be able to look at the best bid
25 offer should one of the direct feeds fail. In addition,

1 products as well as the SIP products.

2 MR. ROESER: Mark.

3 MR. SKALABRIN: Yeah, so we -- I mean, we live
4 in a world of automated trading. So we don't have much
5 perspective on the display fees for the SIP. And as Adam
6 said, the nondisplay use of the SIP since 2013 has
7 probably gone up by a factor of three in terms of doing
8 it. And the access fees have sort of modestly increased.
9 But the big increase, like on the direct feeds, has been
10 the injection of this nondisplay fee. And that's really
11 what drove that increase.

12 I think if I was an exchange, I would say that
13 the price of the SIP is not too bad. And I could see
14 that argument, if it was useful for the purpose that it
15 used to be useful for. But, as Adam said, it's -- in the
16 kinds of applications that we see, it's been relegated to
17 a backup feed, really. It's a fail-over to the real feed
18 you need to do the job. And at that, it's expensive for
19 a backup feed.

20 And I think, you know, you take the price and
21 the other sort of structure of the SIP and you apply it
22 to, you know, a feed that really solves the problem well,
23 I think that's probably okay.

24 MR. ROESER: Okay, let's move to latency
25 differentials between the SIP feed and the prop feed and

1 there's some additional information that we also -- that
2 only comes through the SIP. For example, the limit
3 up/limit down bands. Imbalance feed information also
4 comes through the proprietary market data feeds.

5 However, if you so choose to, you may utilize, you know,
6 an imbalance feed product from one of the exchanges like
7 NYSE or Nasdaq.

8 So I think it's also important to realize that
9 there is value to data. Right? So if you value depth of
10 book, you may have to pay a little bit more for it.
11 However, over the last couple of years, I think it's
12 important to note, between the SIP fees as well as the
13 proprietary fees, there's been an increase in nondisplay
14 fees. For example, on the prop feeds, you usually have
15 category one, category two and category three. Category
16 one means that you're filling principally. Category two
17 generally means that you're filling principal and agent.
18 Category three means that you operate an ATS and there's
19 generally a fee across the board for each one of those.
20 Generally speaking, they don't double dip. You pay the
21 one fee if you have to.

22 And similarly, in 2015, CTA also built out a
23 nondisplay fee. So I think one of the bigger fee
24 increases across the board over the last four to five
25 years have been the nondisplay fees across the prop

1 talk about what are the challenges that result from those
2 differentials and thinking in terms of geographic
3 latency, the consolidation times and the different
4 connectivity options that may impact latency. And I
5 think I'll go -- start with Mark and go in reverse order.

6 MR. SKALABRIN: Okay, we talked about this a
7 little bit already. But, you know, there's a couple
8 different sources of latency in the SIP. One is
9 geographic latency. Stop there. It's architected in a
10 way that data has to go to one place, get merged and come
11 back again. I will note that there's two parts to the
12 SIP really. There's a BBO, the top of every exchange,
13 and there's an NBBO. And it's only the formation of that
14 NBBO that requires data to go to one place and come back.

15 And I would argue that that NBBO isn't that useful
16 anymore at all and that, you know, if exchanges put out a
17 feed directly at every -- you know, published like they
18 do and it was transported by the industry, that it would
19 be totally usable. And effectively today, people have to
20 form the NBBO at their location. Even a dark pool does
21 that that's just trying to match at the best bid and
22 offer. If they use the SIP NBBO, their customers would
23 be subject to latency harm, because it's too old to use
24 at their location after it's merged to really get
25 effective performance.

1 So, I mean, the solution is, you know, get data
2 streaming out of exchanges, bring it to where you need it
3 and then process it the way it needs to be processed and
4 that solves this core latency problem.

5 MR. INZIRILLO: Yeah, I'd like to just put out
6 a couple facts that I grabbed from the website for the
7 CTA and UTP. So there has been a lot of work in just
8 latency. And again, what I mentioned before, it's just
9 the inbound message versus publishing. Right?

10 So if you look at Q2 in 2013 for the tape A and
11 tape B feeds, it was roughly 59 microseconds for the
12 average. Today, it's roughly 13 microseconds.

13 If you go back in the ninetieth percentile,
14 which is probably more indicative of how long it really
15 takes to travel or publish the information, in Q2 2013,
16 it was roughly a millisecond. Today, it's roughly 18
17 microseconds when you get down to the ninetieth
18 percentile.

19 I think there's another element of this that
20 really doesn't emphasize the issue also with the SIP, is
21 during high times, during market volatility, it's the
22 queuing or the publishing of information, right? So, for
23 example, if I take in the direct feeds, I can be able to
24 extrapolate that information. In that packet, it doesn't
25 update the quote. Meaning like there's not a refresh.

1 What can happen is the SIP will actually have that
2 because the administrator or the tape C provider or tape
3 B provider will then publish just a size update, right?
4 So it would still be showing 10, the direct book might
5 see the feed would be down from 10 to 9, right? So there
6 is a lot of information that gets published. So during
7 times of high market volatility, you do see a lot of
8 queuing and, as a result of that, causes additional
9 delays, particularly when you add on the geographical
10 items that I mentioned before.

11 MR. DONOHUE: Just to follow up, on the queuing
12 issue, can you see it in the latency stats published by
13 the SIP or is this only -- can you only see this by
14 comparing the SIP to the direct feed?

15 MR. INZIRILLO: Yeah, I think -- correct me if
16 I'm wrong, Michael or Oliver, but I think generally the
17 CTA and the UTP publishes only the inbound versus the
18 publishing latency stats. So for you to actually do the
19 detailed analysis, you would actually have to look of
20 calculating the depth of book, meaning all the market
21 centers across all the U.S. exchanges, and then comparing
22 that versus the SIP. And during high volatility, you do
23 see times where there's a queuing that does occur. So if
24 you have a report the next day, that would help you find
25 that.

1 MR. SKALABRIN: Just one quick thing on that.
2 Sorry. We measure that. So we at Nasdaq will correlate
3 the direct feed and the SIP and just build statistics.
4 And, you know, the P50 tracks very close to what Nasdaq
5 said, you know, that's just a handful of microseconds at
6 that location, because it doesn't have to go somewhere
7 and come back for a Nasdaq-listed symbol. But the maxes
8 and the P99.9, you're into the milliseconds. You know,
9 on a given day, it could be tens of milliseconds maximum
10 difference between the direct feed and the SIP.

11 MR. BLAUGRUND: Mark, I think to your question,
12 you can now actually divine that from the SIP data
13 itself. The exchange puts a time stamp of when they sent
14 it and then there's also a time stamp added by the SIP
15 when it was processed. Some of the more enterprising SIP
16 Advisory Committee members have spent some energy on
17 that.

18 MR. REDFEARN: Mark, can I -- I just want to
19 see if I understood you correctly. Did you say that
20 during the busiest times of day, that you see in the data
21 tens of milliseconds of difference between what you're
22 seeing in SIP versus the direct feeds?

23 MR. SKALABRIN: Yeah. If you look at the
24 maximum of a day, it would be there. The P99.9 is
25 usually over a millisecond. And that's sort of real

1 experience, sort of just measuring it as it's received.

2 MR. ROESER: Simon.

3 MR. EMRICH: So I think the point was made
4 earlier, I think in the first panel and also in the
5 beginning of this panel, you know, 97 percent of the
6 time, trades happen within the NBBO. You know, in our
7 experience, when we look at our transaction costs, it's
8 the other three percent that matter. So there is a --
9 there is a delay.

10 And part of that, the most interesting part of
11 the delay for me is really the location of the
12 consolidator, the geographical delay that's introduced,
13 and the data connection element to the consolidator.
14 Right? So from our perspective, the latency of the
15 consolidator itself, the consolidation engine, the
16 improvements that we've made are remarkable over the
17 years. But it just doesn't measure the physical reality
18 of the brokers that we're using. So even from a
19 posttrade perspective, it doesn't tell a story that we
20 need to hear, that we need to find out.

21 It was quite interesting to sort of hear about
22 the, you know, competing SIPs and different locations.
23 If I look at the broker landscape right now, they've all
24 converged on one physical location. So most of the
25 brokers we are using, they are in Secaucus, right?

1 Geographically, it makes sense in terms of the distance
2 to the various -- to the various exchanges. So it would
3 seem to me that, to mitigate the geographic latency
4 element, it's really not so much about having competing
5 ones but it's really about moving to Secaucus as well.

6 MR. BROWN: From a retail firm perspective, you
7 know, we look at it entirely differently. You know, as
8 Met said this morning, it's an eyeball issue for our
9 firm, you know, whether our clients are seeing what it is
10 that's actually out there. And, of course, the latency
11 issue has come way down within the SIP, as we've heard.
12 But that doesn't mean that the time and place advantage
13 for firms that are in Secaucus, it doesn't -- I mean, it
14 really just replaces the old -- if you were on the floor
15 of the New York Stock Exchange in the '70s, you had a
16 time and place advantage. Now it's just automated by
17 being in Secaucus.

18 So for the way we look at it is then, you know,
19 and this is really why our reform, we think, is
20 important. Clients ought to see more so that they don't
21 have to rely on the NBBO and whether it's there when they
22 want to make a trade. And indeed, when we look at our --
23 our numbers, you know, we've heard that three percent of
24 trades occur outside the BBO, well, we see in our order
25 float as much as 20 percent of our orders, you know,

1 exceed the BBO at the time that they arrive at Schwab.
2 And so, you know, that's a big difference.

3 But even if it were 3 percent of orders
4 exceeding the BBO, I recall when in NMS we adopted a
5 trade-through rule because there were trade-throughs of
6 less than 2 percent in the market. We adopted a trade-
7 through rule to prevent that. But we allow 3 percent or
8 up to 20 percent of orders to kind of be executed in the
9 blind if you don't know the depth of market. That's not
10 fair to a retail client. Retail clients shouldn't be at
11 that disadvantage. And so that's why we're pretty
12 adamant about changing the SIP.

13 MR. BILLINGS: Hey, Jeff, can I ask for a point
14 of clarification? What do you mean by 20 percent? What
15 are you getting at with that number?

16 MR. BROWN: When an order arrives, it exceeds
17 the BBO at that given -- at that given time.

18 MR. BILLINGS: So you're talking like enhanced
19 liquidity, larger than the bid or ask, your client order?

20 MR. BROWN: Yes.

21 MR. BILLINGS: Okay. Got it, thank you.

22 MR. BLAUGRUND: I think the question was the
23 relative speed profile between SIP and the proprietary --

24 MR. ROESER: Yeah, geographic latency and the
25 consolidation time. But also maybe it would be helpful

1 to get into what are the connectivity options that are
2 different for the SIPs and the proprietary feeds and what
3 method of transmission is used on the proprietary feed
4 versus sending data to the SIP, fiber, microwave?

5 MR. BLAUGRUND: Sure, I will try to tackle as
6 much of that as I can. So as a baseline, I think
7 everybody knows this but, just to restate it, exchanges
8 publish their information to the SIP and over any
9 proprietary feeds at the same time. Right? That's an
10 important policy to comply with Rule 603.

11 That being said, the method of transmission of
12 that information and the timing of the aggregation of
13 that information into a consolidated feed plays a role.
14 As I think we all acknowledge, the aggregation time has
15 improved dramatically. As we've seen that decline, it
16 highlights the fact that the geographic latency becomes a
17 more meaningful portion of the overall time line.

18 Exchanges publish their proprietary data over a
19 multicast, sort of a broadcast mechanism. But today,
20 when they publish to the SIP, they have to use a unique
21 hash protocol, right? So it's a bespoke protocol, sort
22 of in SIP-readable language that's the same across all
23 the different exchanges, so the SIP just reads one type
24 of incoming message and has to spend less time
25 normalizing that to produce the BBO. It helps keep the

1 aggregation time down but it necessitates a secondary
2 publication.

3 We would recommend that the operating committee
4 direct the processors to change that consumption
5 mechanism so that the processors could take the
6 proprietary feeds directly, so exchanges would just be
7 producing one outbound output, which could be carried
8 because of its technical protocol over wireless. Whereas
9 the existing unicast protocol does not lend itself to
10 that mechanism.

11 So we think that that would be a very
12 meaningful improvement in terms of the data-center-to-
13 data-center timings we currently see, potentially pairing
14 that, as we discussed, with a geographic distribution of
15 the platforms.

16 MR. SHILLMAN: Michael, are there any
17 reliability tradeoffs with that approach?

18 MR. BLAUGRUND: Thank you, that's a great
19 question. Yes. You know, wireless is -- is innately
20 less reliable than fiber. If it's cloudy or if it's
21 storming, you know, you can lose packets. It's an
22 engineering problem to be solved, to have a fiber backup
23 and to arbitrate appropriately between, you know, you'd
24 expect to get something over wireless first but, if not,
25 if you receive it over the fiber, to baffle with that.

1 It is a policy decision, though, because you're going to
2 have things arrive in an unexpected sequence. And so we
3 would just need to be comfortable that that would become
4 the new norm.

5 MR. REDFEARN: Just to chime in, I think it's
6 an interesting point because we've talked about
7 aggregation, latency and now getting into the -- you
8 know, and that problem, probably more so at the UTP SIP
9 but has been largely solved. And then there's this sort
10 of connectivity thing.

11 It's interesting, there are provided services
12 directly from the sort of exchange source data center
13 over microwave which, by I think the websites will
14 indicate 40 to 50 percent faster in terms of transmitting
15 that way. So as far as another source of latency, it's
16 interesting.

17 So you're suggesting, Michael, that if the
18 protocol was changed, that it might be just as feasible
19 to utilize microwave. If there's bad weather, maybe they
20 flip back to fiber. But in a situation like that, it
21 might be another part of the equation to the extent that
22 there was an interest in seeing the SIP get more aligned
23 with where the proprietary networks are.

24 MR. BLAUGRUND: Yeah, I think there would be
25 tradeoffs. The fidelity of the sequence would be

1 NBBO is really important. And when you look at, you
2 know, consolidated -- I'm sorry, competing consolidators
3 or distributed SIP, it gets really, really complicated
4 and you start to think about, like, all right, how do you
5 determine what data centers they go into? Is it just
6 Secaucus, is it Weehawken? You know, do we actually need
7 another one in Chicago for the options market makers?

8 And, you know, when you're talking about
9 competing SIPs, you know, I think there's real value,
10 especially to Matt's business and Met's business, in
11 terms of understanding what that NBBO is. And, you know,
12 do you get into -- you know, if you have competing
13 consolidators, do you get into the idea where there is,
14 you know, benchmark reference price arbitrage.

15 I mean, I like Doug, I think he's probably a
16 really nice guy. But do I want to trust him executing my
17 trades and managing the price that they're benchmarked
18 against? I don't know. You know, it creates some
19 different conflicts there.

20 MR. REDFEARN: So, I mean, it's an interesting
21 question that's come up. And, you know, in the -- I
22 believe what I've heard is that in sort of the -- for the
23 industry, for market makers, for a lot of the banks, a
24 lot of the market participants, they're using services
25 like Mark's or others where they're aggregating NBBO.

1 somewhat degraded but it might be an appropriate
2 tradeoff.

3 MR. BILLINGS: I would say it's very thought
4 provoking. You know, I think as we're managing our
5 client base and the human consumption of it, doesn't mean
6 that we settle for anything and that if we have a want to
7 keep on improving upon where we are today with the speed
8 and resiliency of the SIP, we are all for that. You
9 know, we rely an incredible amount on it. So as much as
10 people can get creative and not jeopardize that
11 operational resiliency that we have today, that just
12 makes for that much more competitive a solution that we
13 have and that we utilize for our client base.

14 MR. ALBERS: Yeah, so one recommendation that
15 we would like to make is actually standardizing the
16 connectivity kind of at the SIP operating committee
17 level, where the SIP manages the connectivity from all
18 the different exchanges to the consolidator so we can
19 ensure, you know, we have good, solid connectivity from
20 each individual exchange, from their egress all the way
21 into the SIP. Where today, it's left up to each
22 individual exchange to determine how they distribute
23 their data through the actual consolidation mechanism at
24 the SIP. So that's one thing we'd recommend.

25 I will say, as well, you know, we feel like the

1 Aren't we also in a world where all market participants
2 are basically aggregating their own NBBO and there's a
3 slightly, you know, slightly different NBBO, not only
4 dependent on how well you aggregate it but also where you
5 are? So presumably in Carteret, you're getting the --
6 you know, you're getting the Nasdaq quote faster than
7 you're getting it in Mahwah or in Secaucus. Whereas, if
8 you're in Secaucus, you're probably getting Bats a little
9 bit faster.

10 So the NBBO is going to vary, inevitably, based
11 upon where you are, presumably, right? And, I don't
12 know. Mark, is there one NBBO or does that no longer
13 exist?

14 MR. SKALABRIN: No, there's not NBBO. It no
15 longer -- it never existed. It was useful at some point
16 to, you know, at some location, bring everything together
17 and say that this was the NBBO. But at that same moment
18 in time at every other place in the world, the data was
19 coming together, saying that the NBBO was something
20 different.

21 And so it's really a fake thing. And it's not
22 a
23 -- it's an inaccurate thing to say that there was an
24 NBBO. And this problem has come up before where people
25 say, hey, how can I do this when it might disagree with

1 the NBBO. And it's already there today. All these
2 players who take direct feeds and synthesize an NBBO if
3 they need an NBBO already are using something different.
4 And they already have to justify that in a regulatory
5 way that they're doing the right thing. And the good
6 news for them is that what they're doing is more accurate
7 and more effective than using the SIP NBBO, which was
8 constructed at some other location a long time ago with
9 data that had a lot of latency feeding it.

10 So I don't -- I don't see that this problem --
11 that that problem really exists because we've sort of
12 moved past it.

13 MR. REDFEARN: Mark, we're going to be moving
14 on in a second to talking just a little bit more on the
15 content differentials to get a little bit of a deeper
16 understanding of that. But in that vein, when we think
17 about the NBBO, if you're constructing an NBBO from all
18 the different markets, one of the issues that will come
19 up in content and already has come up is this issue of
20 odd lots, right? So the odd lots, really you don't see
21 odd lot quotes in the SIP. And if it's less than 100
22 shares, then it won't constitute the BBO. And, in
23 particular, at times for expensive stocks, that might be
24 meaningful.

25 When you're constructing an NBBO from direct

1 play a role in that analysis.

2 MR. SHILLMAN: Just quickly following up to
3 Oliver, with Nasdaq's suggestion to standardize
4 connectivity, you know, to the SIPs, was that suggestion
5 with a particular goal in mind to minimize latency, you
6 know, along the lines that Michael is suggesting, or
7 reliability?

8 MR. ALBERS: Yes.

9 MR. SHILLMAN: Or just standardization?

10 MR. ALBERS: Well, the standardization but with
11 the goal of increasing efficiency and, you know, the
12 resiliency and, you know, the determinism of the SIP.

13 MR. SHILLMAN: So consistent with Michael.

14 MR. ALBERS: Absolutely.

15 MR. REDFEARN: Do you contemplate microwave
16 technology in that as well, Oliver?

17 MR. ALBERS: So what's interesting with
18 microwave, we actually had a microwave offering for SIP
19 out of our Carteret data center and nobody took it. So,
20 I mean, we would look at it. We would always look at it.
21 But, you know, it comes down to our customer needs and
22 what they're looking for.

23 MR. REDFEARN: But didn't you say that it was
24 the markets that were deciding how the data got from the
25 exchange to the SIP?

1 feeds and you're looking at odd lots, at individual
2 markets, can you just tell us how -- is the NBBO the
3 same? Or how do you think about the odd lots sort of at
4 the inside when you're looking at the prop data feeds
5 versus the SIP?

6 MR. SKALABRIN: For odd lots in particular, we
7 just provide, you know, customers can choose whether they
8 want to see them or not. It's frequent in like a dark
9 pool or someone who is under regulatory scrutiny from
10 someone who might be using the SIP to compare their data
11 that we exclude odd lots specifically so that -- we
12 actually do lots of things to make our NBBO look like the
13 SIP. And -- but we can include them or not include them.
14 It's just a customer-specific thing.

15 One thing I want to just point out though is
16 that when you construct an NBBO at a different location,
17 it's just not a faster version of the NBBO that was
18 constructed someplace else. Because data comes together
19 in different ways, the price of the NBBO can be
20 different. And the way that's analyzed though is you run
21 trade-throughs for instance, as you look at every
22 individual source exchange and see whether you traded
23 through that exchange. And that's really all you need to
24 do to verify that the price that was used was correct.
25 And the NBBO doesn't really play -- the SIP NBBO doesn't

1 MR. ALBERS: I'm sorry?

2 MR. REDFEARN: I'm talking about getting from
3 the exchange to the SIP.

4 MR. ALBERS: Oh, you're talking about inbound,
5 from the exchanges to the SIP, rather than SIP
6 distributing --

7 MR. REDFEARN: Correct.

8 MR. ALBERS: Oh, we could absolutely look at
9 microwave as well. I mean, it's -- what are the costs?

10 MR. BLAUGRUND: I don't think we need a second
11 day --

12 MR. REDFEARN: What's that?

13 MR. BLAUGRUND: No second day required. We're
14 done.

15 MR. ALBERS: Yeah. But, no, we do need to look
16 at it and say, okay, you know, who's going to benefit,
17 you know, who pays for it. But, you know, if it's good
18 for the Main Street investor, I mean, we would absolutely
19 look at it.

20 Going back to the odd lot thing, I have an
21 interesting stat that I wanted to share. You know, the
22 markets have changed dramatically over the past 10 years.
23 So today, 50 percent of the notional value in Nasdaq-
24 listed names is in high-priced names, over \$100. So, you
25 know, a 50-share order of Amazon is actually a big order.

1 Brett is probably one of the few that can trade Amazon
 2 in blocks.
 3 (Laughter.)
 4 MR. REDFEARN: I wish.
 5 MR. ALBERS: But given that, I mean, we're all
 6 for expanding the SIPs to include odd lots. I mean, it
 7 seems like a no brainer, the way the markets have evolved
 8 over the years.
 9 MR. SHILLMAN: What about auction, auction
 10 imbalance information, like New York suggested?
 11 MR. ALBERS: Auction imbalance information, I'm
 12 not going to go there. And I'll tell you why. I'm a
 13 firm believer in incentives. And in about 2003, I spent
 14 a year working with a whole assortment -- hundreds of
 15 people at Nasdaq refining our crossing process. And we
 16 patented it and, you know, it's state of the art. It's
 17 leveraged across multiple different data centers -- I'm
 18 sorry, multiple different exchanges. And it was a
 19 competitive differentiator for us. We view that as our
 20 IP and we view that as something that is already broadly
 21 available to retail investors everywhere via, you know,
 22 Bloomberg, Thomson Reuters, on our website. It's
 23 available to retail online brokers. And, you know, we
 24 just don't see a need for including it on the SIP. And,
 25 frankly, a lot of retail users don't use the imbalance

1 information either. And so including it on the SIP is a
 2 tax. It's like, you know, why are we trying to tax
 3 everyone? You know, and that's where it comes down to,
 4 you know, we're about choice and competition.
 5 And so, going forward, when we're looking at
 6 innovation, you know, I also want to make sure we have
 7 incentives as exchanges to, you know, compete and make
 8 sure, you know, that our IP is value.
 9 MR. REDFEARN: Does that mean, however, then if
 10 somebody wants to trade the close and actually see the
 11 imbalance to help them trade the close, they would have
 12 to buy that feed separately?
 13 MR. ALBERS: No. So I can give you a website
 14 Brett, you can look it up. You can watch it every day.
 15 MR. INZIRILLO: Brett, can I just add one thing
 16 to that? Just on the odd lot piece, as well, and then
 17 I'll get into the imbalance. I think the odd lot piece,
 18 where it becomes a little bit of an issue is also odd
 19 lots are not protected, right? So if you do publish them
 20 to the SIP, they're going to show a 50 lot. And then
 21 what is the obligation of the broker-dealer to access
 22 that potential bid or offer at an odd lot?
 23 In addition, if you have odd lots and you have
 24 a round lot, right? For example, if I look at, you know,
 25 Bats Y and they're showing 50 at 10 and 100 at 10, in the

1 direct feed, I can see that there's 50 and 10. But what
 2 am I going to -- should the exchange publish 150 shares
 3 out loud? Today, currently, they just do everything in
 4 round lots, right? So there would be a little bit of an
 5 element or a change there.
 6 And then just on the imbalance feed, I do think
 7 it is important, also even for retail. So if you are
 8 trading high net worth, it is important to understand
 9 what the imbalance is at a particular exchange, because
 10 you might have a different time horizon or an idea about
 11 where you want to be able to trade, whether it's NYSE or
 12 Nasdaq. So maybe not for the general retail but also for
 13 high net worth, imbalance feed is -- imbalance feeds are
 14 informative.
 15 MR. BILLINGS: John, so there's a lot going on
 16 there with odd lots. I want to be a little bit cautious
 17 because when we say we'll accept all odd lots, that gives
 18 us a little bit of, you know, smack of that could be
 19 overly -- overrun people with information. I think maybe
 20 there's a thoughtful way of doing it. Maybe there is a
 21 price level metric that does it. Above, like --
 22 essentially, we're redefining what an order is, what a
 23 round lot is. If you're going to change it to say above
 24 \$2,000 is X, this or this or this. So we would be
 25 cautious.

1 I mean, more transparency is always -- you
 2 know, we're always for more transparency. But I think it
 3 deserves thinking it through a little bit, thinking about
 4 the implications. And couldn't agree more with Adam in
 5 the fact that if we're going to fight to have more
 6 transparency, you want to have an answer to whether you
 7 have to actually honor those -- that liquidity out there.
 8 So I think it's a thoughtful way of going but I think
 9 it's one that says -- you know, I'm trying to think of
 10 like the education burden for our -- for our clients that
 11 says, you know, if we have this security, this is now
 12 considered what your increment you're trading, this
 13 priced security versus this priced security. I think it
 14 could be managed, I just think it's something we need to
 15 talk through.
 16 MR. REDFEARN: I think, Matt, one of the
 17 things, not for this panel but on an ongoing topic is,
 18 given that there are a lot of these high-priced stocks
 19 that are out there and you have this, you know, sort of
 20 sometimes an inside odd lot market quote that, you know,
 21 might be worth contemplating whether or not the round
 22 lot, right, as is perceived, whether it's for OPR or how
 23 people think about execution quality. For stocks over
 24 \$100, you know, maybe it's only 10 shares or for stocks
 25 over \$1,000, maybe it's only one share. Right? Because

1 if you look at the notional value.

2 So I think that we have to think about those
3 concepts and together. But, you know, to have an inside
4 odd lot market that is meaningful, meaningful value and a
5 lot of trading is happening there and people who are
6 using the SIP are not seeing that. And in some cases,
7 they don't want to see it because it might even change
8 the way people think of the BBO. There's enough trading
9 happening in that zone that it probably warrants, you
10 know, some consideration about how we think about that.

11 MR. BLAUGRUND: And just to be clear, I don't
12 think we have a prescriptive recommendation. I think we
13 really should look at the cost/benefit of any change.
14 With respect to the high-priced securities, we would
15 strongly recommend everyone split their stock.

16 (Laughter.)

17 MR. ROESER: Okay, so I think we've covered odd
18 lots. Are there other -- does anyone else have any views
19 on the differences in the content and information, SIP
20 versus prop, that are worth noting, challenges or issues?
21 Matt?

22 MR. BILLINGS: I would say that we were a
23 little bit nuanced in our approach with what Jeff
24 mentioned earlier about depth of book. We -- obviously
25 not in the SIP and whether we might want to incorporate

1 meeting obligations to clients and operating markets?

2 And I'll start with Oliver.

3 MR. ALBERS: Yeah, so others on the panel
4 probably know this better than I do. But, you know,
5 firms subscribe to SIP data and utilize SIP data for a
6 multitude of purposes. You know, I think it's -- I don't
7 know of any firms that take -- you know, that are
8 actively engaged in adding liquidity to the markets or
9 trading on the markets that are, you know, only consuming
10 products. I think SIP is a big part of it and, you know,
11 will continue to be.

12 MR. BILLINGS: John kind of led off with our
13 position there. You know, from function, the SIP does
14 work for the retail investor. You know, as we look to
15 improve it and, you know, tackle some latency and go down
16 that route. But suffice it to say if anyone has and
17 deals with any of these self-directed platforms and you
18 have traded with any one of those platforms, you
19 understand the speed at which these platforms operate
20 from the quotes that you receive and the order executions
21 that you receive. So we believe that the SIP, you know,
22 serves that function in regards to that.

23 MR. REDFEARN: I think the -- I think the
24 question though, Oliver, was, is it sufficient? Right?
25 So this comes back to the question of, for people who are

1 it into the SIP. You know, once again, we're thinking
2 about what's the implications of that? You know, to be
3 clear, you know, buy side does not have the corner of the
4 market of long-term investors. We have a supermajority
5 of clients who trade less than a handful of times a year,
6 they're thinking for the long term, they're balancing --
7 they're rebalancing their portfolios. And then we have
8 our active traders, no doubt.

9 There's a place for depth of book. We have
10 platforms for depth of book. We purchase it for those
11 platforms, explicitly for those active traders to get
12 them a picture that we think makes the most sense to
13 them. But there's other platforms which it's not
14 necessary. It's a little bit -- you know, if it's
15 somebody who is, you know, just checking in, checking
16 their balances, seeing where they're at, you know -- and
17 then it's a supermajority of the clients are like that.
18 So although we think it's another good thought, we just
19 want to be cautious to say, is there implications if you
20 embed the depth into the SIP, does it -- any implications
21 regarding latency and, once again, the cost/benefit
22 analysis around that.

23 MR. ROESER: Okay. So let's shift to how is
24 the SIP data being used and is it sufficient for those
25 purposes, thinking in terms of trading and routing,

1 trading and they're trying to provide best execution for
2 their clients, right, and who knows the regulatory things
3 that come with that. But is the SIP actually sufficient
4 for that or do they absolutely need to get something else
5 to be able to do so?

6 MR. ALBERS: Absolutely, I think it's
7 sufficient. And I think, you know, looking at customers,
8 it merits that. Because there are clients that just use
9 the SIP.

10 MR. BILLINGS: Well, I mean, we outsource
11 execution services to people like Doug, who was on the
12 original panel. And he obviously made his point, and
13 others out there who made their points clear, that they
14 use, you know, as much information as they can get to
15 process the orders that we provide them.

16 MR. REDFEARN: I think Simon already spoke to
17 this point a little earlier, that when you look at
18 trading with your clients, you pretty much -- I'm sorry,
19 with the brokers who are handling your business, you
20 think that maybe it's a different answer?

21 MR. EMRICH: So the SIP data is, for our
22 purposes, cannot be sufficient, right? And it cannot be
23 sufficient from a pretrade perspective. So for us, from
24 a trade planning perspective, we do need depth of book.
25 It cannot be sufficient for the brokers that we employ as

1 agents. We find they are not competitive if they are
2 simply using the SIP. And it also is not sufficient for
3 our posttrade analysis. So from a TCA analysis, we do
4 have to recreate the physical reality that our brokers
5 observed, to be fair to the brokers. And that requires
6 us to use the direct feeds.

7 Now, the introduction of the additional time
8 stamps in 2015 has made a huge difference, when there was
9 the time stamp of the exchange trade match also reported
10 on SIP has made a huge difference in our posttrade
11 usability of the SIP data. It's not perfect, we have to
12 make some assumptions on the delays that the brokers
13 observe, wherever they're located. But the use case has
14 improved.

15 I want to make one additional point, which
16 again sort of brings in a bit of an international
17 element. There's a number of issues with the SIP that
18 can be improved. There are also some more fundamental
19 issues with the SIP that some of the delays you will
20 never be able to bring them down to zero. So there will
21 always be a role for direct feeds. But having a SIP from
22 a price discovery, price dissemination perspective for,
23 you know, in the first panel I think it was one of the
24 commissioners referred to it as it's good for the
25 economy. If you look at it internationally, I think in

1 many regions it would be a huge benefit to have anything
2 approaching a consolidated tape. And we don't have that.
3 So the U.S. is one of the very few markets where we have
4 that sort of consolidation.

5 MR. DONOHUE: Simon, do your use cases change
6 at all if the SIP latency decreases significantly? Or
7 are your use cases the same because of the content and
8 other reasons?

9 MR. EMRICH: So there's two parts. There's --
10 we mentioned the different sorts of latency. And the
11 main restriction from a posttrade perspective for us is
12 the geographic latency that's introduced by the location
13 of the SIPs, right, which just doesn't match the
14 geographic location of the brokers that we deem to be
15 competitive in the algorithmic space, who do tend to
16 congregate in Secaucus. So moving the SIP or having a
17 version of the SIP which is defined based on Secaucus
18 would remove that portion.

19 From an order book aggregation perspective, the
20 technology that brokers generally use is that the command
21 and the control, the smart order router is located in one
22 physical location and then they are colocated at the
23 exchanges to actually pass on the orders. But all the
24 decisions are made at a central place, right? I can -- I
25 can envision a different -- a different algorithmic setup

1 where some of the decisionmaking powers are actually
2 forward located at the exchanges and the smart order
3 router doesn't have to be as centralized as it is right
4 now. We're not there yet.

5 But so right now, the main -- in which case,
6 the latency of the SIP aggregation engine also starts to
7 matter. Right now, it's primarily the geographic latency
8 from the difference in location.

9 MR. ROESER: So just thinking of latency, the
10 SIP data used for operating markets, Michael or Adam, do
11 you want to give your views on the utility of the SIP?

12 MR. BLAUGRUND: Well, with respect to NYSE in
13 particular, you know, historically NYSE only traded tape
14 A names and relied on the CTA SIP to provide top-of-book
15 information for our market. We continue to do that for
16 tap A, though that will change when we move to our Pillar
17 technology platform next year.

18 We're in a bit of a unique position, I think,
19 with respect to this question because we are located in
20 the same data center as SIAC. So what we find, and I
21 think it was mentioned on the earlier panel, is not every
22 broker that's running a dark pool consumes the
23 proprietary feeds from every exchange. Notably, two of
24 the five that we operate charge no fees for proprietary
25 market data. But even so, we don't see universal

1 consumption. So I think that members are likely making
2 their own optimization decisions about how to operate
3 their businesses.

4 For us, you know, because we historically have
5 not required depth of book for NYSE, the SIP was
6 sufficient.

7 MR. ROESER: Okay.

8 MR. INZIRILLO: Yeah, I think it's -- I think
9 you have to have a use case where you use both, right?
10 So depth of book is important to understand where you are
11 potentially in the queue when you aggregate yourself
12 across the overall market center. SIP becomes important
13 because it allows you to understand, again, limit-up,
14 limit-down bands are the only thing that are published
15 via the SIP. Also, you can learn about security status,
16 opening indicator, you could also use the trade
17 information out of there. So if you want to optimize how
18 you calculate the depth of book across the market, you
19 would then potentially isolate the depth of book is
20 purely to understand, order by order, what the current
21 available quotations are by size. And then, for the SIP,
22 it allows you to calculate the other information so you
23 understand is the stock open, what are limit-up, limit-
24 down bands and what's the last sale information. So
25 you'd want to be able to optimize it by bifurcating the

1 two of them.

2 MR. BROWN: We, like Matt's firm, route our
3 orders to execution partners. But one of the questions
4 we've looked at is, you know, if they use a SIP for
5 pricing or do they use the direct feeds for pricing, does
6 that impact our clients' execution? And so we've studied
7 that. And the result is that it's an insignificant
8 difference between the use of them, which is odd because
9 we've heard so much about how, you know, the direct feeds
10 are necessary for execution. But we haven't seen -- in
11 fact, the study shows about a one thousandth of a cent
12 difference and it varies between the two feeds. So we're
13 not certain that -- I think the point is that a firm that
14 executes has to -- we can't cherry pick the feed that
15 they want to use. It has to be consistent. Because
16 otherwise, you know, it shouldn't be -- they shouldn't be
17 able to choose one that creates the opportunities for
18 themselves.

19 MR. ROESER: Okay. So I think we're getting
20 close to our time. But I did want to raise one more
21 issue and that's with regard to the competitive dynamic
22 between the SIP products and the proprietary feeds.
23 Should we be thinking of these as one market? How do
24 they compete? Do they compete with one another?

25 And I'll go to Oliver. You had some ideas --

1 MR. ALBERS: You want me to focus there? Okay.
2 So on the vendor display rule, I think -- and Chris
3 Concanon kind of alluded to this that, you know, Bats
4 submitted a no-action letter a few years ago and, you
5 know, I thought his reason for doing so was a little bit
6 more competitive than that, in that, you know, we were
7 doing quite a job taking business from him. And so he
8 submitted that and basically got a response from the SEC
9 that kind of changed the vendor display rule or at least
10 the industry's kind of perception of the scope of the
11 vendor display rule.

12 So the original vendor display rule said that
13 brokers must offer consolidated data in the context of
14 when a trading and order routing decision can be
15 implemented. So basically at the point of order entry.
16 And the guidance that was given as part of the Bats no-
17 action letter changed that to, when a trading and order
18 routing decision can be made. And that's an expansion of
19 kind of the vendor display rule, in that, you know, I can
20 make a trading decision when I'm looking at my Yahoo
21 account or walking down the street. And so we would
22 really like to see some clarification come out to put it
23 back to its original intent, when it can be implemented.

24 MR. REDFEARN: So just a question in terms of
25 understanding these products and their relationship to

1 Nasdaq has some ideas on the vendor display rule and can
2 you share your views?

3 MR. ALBERS: Yeah, so it really depends on the
4 customer use case in terms of the proprietary feeds
5 versus the SIP feeds and what they're doing. In many
6 ways, the proprietary feeds are complements to the SIP
7 feeds for many, many use cases. For other use cases,
8 especially use cases outside of the U.S., you know, the
9 Nasdaq Basic, our best bid, best offer, you know, serves
10 as a lower-cost substitute. And with that, those
11 competitive -- because we're in such a competitive
12 environment and we're competing for business against
13 Michael and, you know, Chris Concanon and his Cboe One
14 product, you know, we're also actively engaged with those
15 brokers and those media companies that are using these
16 proprietary products to help engage and educate their
17 investors about trading in the U.S. capital markets. So
18 this competition is actually really good, in that it
19 drives capital flows internationally to us.

20 And so in that regard, I guess do you want me
21 to go to our market data recommendations next? So we did
22 make two -- actually three recommendations. One, we
23 recommend --

24 MR. ROESER: Well, focus on the vendor display
25 rule.

1 one another, so for example on Nasdaq Basic, which you
2 characterized as a lower-cost substitute, that's a lower-
3 cost substitute, for example, from the Nasdaq UTP SIP?

4 MR. ALBERS: Yes, correct, correct. When the
5 SIP data is not required for regulatory purposes.

6 MR. REDFEARN: So basically, it's just a
7 cheaper thing to buy from the SIP so it's in competition
8 with the actual SIP data?

9 MR. ALBERS: Yes, correct.

10 MR. GRAY: Maybe to follow up on that, I think
11 in the Nasdaq earnings conversation yesterday, there was
12 some reference to the Nasdaq Basic product had saved
13 broker-dealers something like 200 million over nine
14 years. So was that calculation sort of what they would
15 have paid to the SIP versus what they actually paid to
16 Nasdaq?

17 MR. ALBERS: Yeah, that's exactly it. So
18 looking at the fees they would have paid to the SIP and
19 then looking at the -- what they were paying for Basic.
20 And it's actually \$240 million since the launch of the
21 product. So it's been a success.

22 MR. REDFEARN: So before, when you were talking
23 about the total pool of SIP revenues, where the revenue
24 had basically gone down a little bit or the revenue was
25 more or less flat but the users had gone down, the total

1 top-of-book revenue pool would basically include not only
2 the SIP revenue pool but also some of these competing
3 products?

4 MR. ALBERS: Well, Basic is a factor in that.
5 But, you know, there are other factors, as well.
6 Automation and lower employment rates in financial
7 services, et cetera.

8 But the other thing I want to point out is
9 Basic is also -- we have had a lot of people that were on
10 delayed data before move up to realtime data, start to
11 trade more. You know, facilitates a better ecosystem.

12 MR. INZIRILLO: Brett, can I just add one thing
13 to that? One of the offsetting factors for potentially
14 declining of the tape and the quote revenue is you've
15 seen an increase again, just not to belabor the point,
16 but an increase in nondisplay fees. So prior to 2015,
17 you did not have the nondisplay fee in the SIP and now
18 you have it. And it represents somewhere between 8 and
19 10 percent of the overall revenue, plus other, which is
20 also an increase there. So that's selling to, you know,
21 TV rights and other applications like Google and Yahoo
22 Finance is also now making up a bigger chunk of that,
23 somewhere between 6 and 8 percent, as well. So it's a
24 bit more diversified of the tape and the quote revenue.

25 MR. REDFEARN: Okay. We're just trying to

1 understand -- we're just trying to understand those -- so
2 it looks like that may be in part an offsetting way of
3 capturing revenue in circumstances where users may have
4 been lost to the --

5 MR. INZIRILLO: Yeah, correct. So if you look
6 at the stats, a couple things that you saw, professional
7 was 55 percent. So if you go back years before that,
8 that number was higher. I think it was roughly 60-some-
9 odd percent. And so you've seen a little bit more of a
10 diversified -- that was on the UTP. Also, on the tape A
11 and tape B, 50 percent was professional. Where if you go
12 back five to 10 years ago, that number is closer in the
13 60s, 70 percent.

14 MR. ROESER: Okay, thank you. Do any others
15 want to chime in on the competitive dynamic? Okay.

16 MR. BILLINGS: Yeah, I would, real quick.

17 MR. ROESER: Okay.

18 MR. BILLINGS: Yeah. So to Oliver's point, you
19 know, not only is the Nasdaq basic or NYSE BQT or the
20 Cboe One less expensive than the SIP, keeping in mind
21 it's not as comprehensive as the SIP, that's a business
22 decision you need to make from a client experience, from
23 our perspective. But, as we talked about earlier, it
24 does away with the CTA UTP plan considerations that, you
25 know, their CTA and UTP plans are not harmonized and it

1 costs us a lot of headache from an administration
2 perspective. And the enterprise licenses for these
3 indicative top-of-book solutions don't come with that
4 barrier. Those professionals that we need to worry about
5 classifying and working through and going through the
6 process and working through the audits in regards to
7 that, that largely goes away with the utilization of
8 these indicative, top-of-book solutions.

9 MR. ROESER: Okay. So I think to get our next
10 panel started on time at 3:00 and get a little break in,
11 we should wrap up on that note.

12 So thank you very much to the panelists.
13 (Applause.)

14 MR. REDFEARN: So we will take a 10-minute
15 break and we will start again at 3:00. And if the
16 panelists from Panel Three could come up here, that would
17 be helpful.

18 (Recess.)

19 MR. REDFEARN: Okay, thank you. Welcome back.
20 Welcome back all of the folks here, as well, and thank
21 you for joining us, who are our new group of panelists
22 here.

23 We are here for our last panel of the day.
24 Panel Three is going to focus on the proprietary side, so
25 exchange proprietary data products and access services

1 that offer the most content and the lowest latency. Some
2 of these have been referenced, obviously, in contrast to
3 the SIP discussion that we had earlier.

4 On this panel, we're going to start similarly,
5 where we ask each of the panelists to introduce
6 themselves and generally discuss the evolution of the
7 proprietary data products and market connectivity
8 services going back five years or so, specifically trying
9 to better understand the content, the connectivity and
10 the costs of both data and connectivity.

11 So we'd try to get people to stay in the three-
12 minute range if at all possible. But we'd like to go
13 ahead and get started with the introductions and the
14 introductory statements. And James, we'll start with
15 you.

16 MR. BROOKS: James Brooks. I thank the Staff
17 for inviting me to this roundtable. I manage proprietary
18 data at ICE Data Services, which includes oversight of
19 the NYSE Group's proprietary data feeds. I do not have
20 any responsibility for the market data disseminated under
21 the national market system plans.

22 Exchanges offer a variety of data products to
23 meet the diverse needs of market participants. For
24 example, the New York Stock Exchange offers a top-of-book
25 feed, a trade feed, an imbalance feed, a depth-of-book

1 feed and an order-by-order feed. All proprietary data
2 feeds are regulated and are made available to market
3 participants under equal terms. NYSE is not required to
4 offer any of these products and customers subscribe only
5 to those products which serve their particular business
6 models. The annual revenue that the NYSE Group earns
7 across all five of its equity exchanges for all realtime
8 proprietary data is less than \$100 million.

9 Firms pick and choose firms from which they
10 consume data and decide which data products to take from
11 any individual exchange. The more liquidity is
12 fragmented, the more firms tend to spend on market data,
13 particularly, any firm electing to subscribe to the most
14 comprehensive data from all venues.

15 Customer usage shows that firms make very
16 different choices when deciding what works best to
17 maximize their for-profit business models. For example,
18 roughly half of the global investment banks take the most
19 comprehensive New York Stock Exchange order-by-order
20 feed, the other half do not. More than 30 alternative
21 trading systems reported volume to FINRA this September.
22 More than half of them do not use any proprietary data
23 from the New York Stock Exchange. Of the ATSS that do
24 use the New York Stock Exchange data, the use is mixed,
25 with ATSS choosing either the order-by-order feed, the

1 Colocation customers are allowed to host their
2 own customers in their colocation space at any price
3 point they choose, which is not set by the exchange.
4 Such hosting has increased significantly in the past
5 several years. In short, there is competition in choice
6 made available to customers of NYSE Group's colocation
7 services and its potential customers.

8 MR. FRIEDMAN: I am Michael Friedman. I work
9 at a firm in New York called Trillium. Trillium operates
10 two business lines. One is a midsize prop trading firm
11 called Trillium Trading. The other is a trading
12 technology vendor called Trillium Labs, which owns and
13 operates a posttrade surveillance system. And in both of
14 those business lines, we consume depth-of-book data. So
15 I wanted to briefly talk about our use cases in both of
16 those.

17 At Trillium Trading, I'll talk about our role
18 in the ecosystem. Trillium Trading is fairly specialized
19 in the market structure ecosystem, in that all of its
20 parent orders are initiated by a human trader. It's
21 manual trading. We are particularly relevant to the
22 ecosystem in times of rate volatility when more
23 traditional liquidity providers have kind of exceeded
24 their risk parameters and pull their quotes and we step
25 in and provide manual quotes during those times. So we

1 depth-of-book feed or the top-of-book feed.

2 Another topic of this roundtable is market
3 access. The NYSE Group has operated a data center in New
4 Jersey since 2010. The facility and its network are
5 highly resilient and highly redundant, with equal numbers
6 of hops and cable length between customers' equipment in
7 colocation and the matching engines.

8 As part of its colocation service offerings the
9 NYSE Group's exchanges charge for cabinets and
10 connectivity. Prices for cabinets have not changed at
11 all since the data center opened in 2010 and the rates
12 for connectivity to the local area networks have changed
13 once. Bandwidth needed to consume the largest data feeds
14 for U.S. equity and equity-based options trading has
15 increased significantly in the past several years. In
16 response, our data centers offer higher bandwidth options
17 up to 40 gigabytes a second, with the price per gigabyte
18 decreasing the larger the connection.

19 The NYSE Group's exchanges took steps to
20 increase customers' choice by introducing a meet-me room
21 in 2012, allowing firms to select any private carrier to
22 transmit data in and out of the data center. In 2013,
23 the NYSE Group's exchanges began offering partial
24 cabinets for colocated firms looking for lower price
25 points and less space.

1 often act as kind of an emergency brake in restoring
2 equilibrium to the market during great market stress.

3 We at Trillium Trading need depth-of-book data
4 to do that type of trading. We need to see where
5 resistance levels are, we need to see how likely it is
6 for us to get out of a position once we get into it, and
7 all of those -- there are other reasons as well. But we
8 -- in order to make those judgments, we need to consume
9 depth-of-book data.

10 And just bringing this back to the SIFMA
11 litigation decision from last week, we haven't heard a
12 lot of talk about firms of our size and our use case and
13 our role in the record in that case. There was a lot of
14 talk about the big fish who are the major consumers of
15 depth-of-book data. I think there was some evidence in
16 that record that there were only 50 to 100 firms, period,
17 who buy all of the depth-of-book feeds. And we're one of
18 them but we're not at the top of that list. We're kind
19 of in the middle of that list. And our experience, as
20 far as our ability to barter our order flow for
21 discounted rates on market data is not the same as what
22 some of the evidence in that case suggested it was for
23 the people at the front of that list who really have a
24 huge amount of volume.

25 On the subject of the comments from

1 Commissioners Peirce and Roisman about the decision last
 2 week, I just had a couple of comments there. I think
 3 they are overstating a little bit the role of the order
 4 protection rule in forcing firms to consume depth. I
 5 think, yes, we do kind of follow the order protection
 6 rule, as everyone does, of course, and use depth of book
 7 to achieve that. But we would probably be making similar
 8 decisions if not the exact same decisions on where to
 9 route orders even without the order protection rule, in
 10 the interests of achieving best execution and in the
 11 interest of really just getting the best quotes out there
 12 that satisfy our trading strategy. So I don't think the
 13 world, as far as demand for depth feeds, would be a whole
 14 lot different without the order protection rule.

15 On the other point that Commissioners Peirce
 16 and Roisman raised that, where are we now, is the
 17 Commission going to be a rate-setter like a utility? I
 18 just share the view of probably most people in this room
 19 that nobody wants the Commission to be a utility rate
 20 setter. It would be great if we could kind of unleash
 21 the gates of competition to have the invisible hand of
 22 the market take care of that for us. And I actually on
 23 the train this morning circled the exact same provision
 24 line in the 2005 Reg NMS final adopting release that
 25 Brett read to everyone this morning about competing

1 consolidators. And one way to have competition is to
 2 have a competing consolidator. The problem that was
 3 identified back in that release was a competing
 4 consolidator based on buying data from the exchanges is
 5 still buying data from the exchanges. It's packaging it
 6 up differently. Maybe you have depth of book in the
 7 competing SIP feed now. But it's still involving the
 8 exchanges in that process.

9 And a few pages later in that same adopting
 10 release, there's a discussion about independent
 11 dissemination of data by other market participants, by
 12 broker-dealers. And I think there was a reference in one
 13 of these earlier releases to the Boat model in Europe,
 14 where when MiFID I first came in in 2007, the big banks
 15 got together and created a trade reporting facility from
 16 scratch, voluntarily, privately, without any government
 17 or regulatory intervention.

18 And it strikes me that you could have that as a
 19 solution here as well. You could have -- a depth-of-book
 20 quote is an order message. And every order message has a
 21 sender and a recipient. And we've only been focusing on
 22 the recipients, the exchanges, to consolidate all those
 23 quotes. But what if you consolidated the quotes from the
 24 senders, from the exchange members, and put together a
 25 competing consolidator based on the senders of those

1 messages? You'd probably have latency issues. The
 2 senders of those messages, by the way, are already hard
 3 at work building a new way of reporting all those
 4 messages for the consolidated audit trail, so maybe
 5 there's some tailwind you could leverage from that
 6 process to enable you to have a competing consolidated
 7 feed from a different source that didn't involve the
 8 exchanges and provided some real competition to the
 9 exchanges.

10 Sorry, I'm running long here. But one last
 11 point on the other use case at Trillium is for posttrade
 12 surveillance. The types of data we've been talking
 13 about, in addition to being useful for trading, are
 14 useful for compliance purposes. To take a couple of
 15 examples, the market access rule, Rule 15c3-5, requires
 16 among other things pretrade risk checks. And you have
 17 to, before sending an order, make sure that the account
 18 sending it hasn't exceeded their buying power and isn't
 19 overextending themselves, isn't going to be a risk of
 20 default at clearance.

21 In order to run that pretrade check, you kind
 22 of need some reference of current SIP data to know what
 23 the value of their position is at that moment. In the
 24 UTP plan and in the CTA plan, that's a nondisplay use and
 25 suddenly you're forcing anyone who has to do this rule-

1 mandated risk check to buy this nondisplay license from
 2 the SIP feeds.

3 In our case, we also -- you do posttrade
 4 surveillance, which is also part of Rule 15c3-5, to look
 5 for things like spoofing and layering. You need depth-
 6 of-book data to really accurately look for spoofing and
 7 layering. If you look at some of the enforcement actions
 8 that have come through FINRA and even some of the
 9 criminal cases, they talk about patterns where the
 10 culprit was entering fictitious orders at tiers four
 11 through eight of the order book. How are you going to
 12 find tiers four through eight of the order book without
 13 actually having the depth-of-book data as part of your
 14 detection feed? And so it's important to use that data
 15 for trade surveillance as well.

16 Sorry about that.

17 MR. REDFEARN: Thanks. Chris.

18 MR. ISAACSON: Yeah. Good afternoon, I am
 19 Chris Isaacson, EVP, Chief Information Officer, Cboe
 20 Global Markets. Also happen to be one of the founding
 21 employees, was one of the founding employees of Bats
 22 Global Markets before Cboe purchased Bats. So thanks to
 23 Brett and the Staff and the Commission for having me here
 24 today. It's a joy to be here.

25 You can also refer to me as the other Chris or

1 the joyful Chris, as the angry Chris has left the
 2 building.
 3 (Laughter.)
 4 MR. ISAACSON: So I look forward to discussing
 5 these topics that we have for this panel in relation to
 6 Main Street investors, as we at Cboe strive to cultivate
 7 and maintain a transparent, dynamic and efficient market
 8 ecosystem that benefits all market participants,
 9 especially these investors.
 10 Today, the trading experience for retail
 11 investors has never been better. Executions are faster,
 12 spreads have narrowed and broker commissions have
 13 dramatically decreased, in many cases to zero.
 14 Importantly, in light of this roundtable, it is
 15 aforementioned parts of execution and not the market data
 16 costs that determine what retail investors actually pay
 17 to trade. In fact, retail investors have little or no
 18 market data costs as a direct result of the current SIP
 19 model which offers fast, reliable and inexpensive market
 20 data that serves millions of nonprofessional customers
 21 and that count has gone up. So we must not lose sight of
 22 these facts when discussing potential modifications to
 23 the SIPs, as it was done on previous panels.
 24 Now, as for depth of book and market access
 25 services, the truth is exchanges aren't required to offer

1 these services and firms aren't required to take them.
 2 In fact, I just ran some stats and Chris shared some of
 3 these, but less than half of our customers, half of our
 4 members take depth feeds or the pitch or order-by-order
 5 feed as we refer to it. And, in fact, we don't take
 6 direct feeds from all the exchanges; we just take it from
 7 a subset that we deem good for our business purposes.
 8 And that's disclosed as part of our exchange rules. You
 9 can go find it.
 10 So, moreover, firms are not obligated to become
 11 members of all exchanges, let alone every exchange. So
 12 firms make commercial decisions based on their own
 13 individual business needs. And recognizing that not all
 14 customers and their individual needs are alike, we offer
 15 a wide range of product offerings across our exchanges in
 16 order to give customers choice. And these choices allow
 17 customers to decide which exchanges to connect to and by
 18 what means, which features to utilize, which data feeds
 19 to purchase and ultimately which fees they're willing to
 20 pay.
 21 So Cboe invests tremendous time and money to
 22 continuously and reliably offer this wide range of
 23 offerings across all our exchanges to compete for market
 24 share with other exchange operators and the 30 or so dark
 25 pools or off-exchange venues that are out there today.

1 So while this roundtable is primarily comprised
 2 of exchanges as well as highly profitable firms voicing
 3 their displeasure about the prices they're paying
 4 exchanges for their services but they aren't mandated to
 5 take in many cases, we must not lose focus on the
 6 experience of the retail investor, as Chairman Clayton
 7 mentioned this morning.
 8 So thanks again for having me and I look
 9 forward to continuing this important dialogue. And I
 10 commend you all for staying awake for an entire day of
 11 market data roundtable.
 12 MR. REDFEARN: It's very exciting, Chris.
 13 MR. ISAACSON: Thank you.
 14 MR. REDFEARN: Vlad.
 15 MR. KHANDROS: Thank you for putting this
 16 together, thank you for having us. You know, market data
 17 is the oxygen of our ecosystem, so this is an important
 18 panel or set of two days and we really appreciate the
 19 opportunity to be here. I just want to put out two quick
 20 comments and then get on to some others.
 21 If I say nothing else, market data pricing is
 22 inelastic in many areas. And we'll get into that much
 23 greater, but I just want to make sure I explicitly say
 24 that up front. And a lot of folks noted that the U.S.
 25 capital markets are already very strong. We strongly

1 agree. We just think they could be a lot better, and so
 2 we're here to talk about how we make them better.
 3 And sorry, I'm Vlad. I'm with UBS, managing
 4 director at UBS. We are -- we operate a wealth
 5 management division, asset management division, a retail
 6 market maker, an ATS. In all the -- in most of those
 7 areas I just mentioned, we're probably number one or one
 8 of the biggest globally in all those areas. So I think
 9 we have a very diverse business across retail, brokers,
 10 pension funds and other types of clients. Hopefully, we
 11 will give you a more -- a very balanced, holistic view on
 12 our views on market data.
 13 And when it comes to market data itself, we
 14 looked internally and we actually -- this is pretty
 15 fascinating. I actually didn't know this until last
 16 week, admittedly. I should have. But within UBS, our
 17 third largest expense as an entire firm after human
 18 capital and real estate is market data. Third, third
 19 largest expense. Which surprised -- at least surprised
 20 me. Which is fascinating as a firm that's a major
 21 financial firm, that market data is our third largest
 22 expense.
 23 The equity market itself is extremely
 24 competitive, it's extremely efficient. The cost of
 25 trading, broadly speaking, continues to come down.

1 However, from a market data perspective, our costs
 2 continue to escalate significantly.

3 There was a great piece that hopefully folks
 4 had seen or will be able to take a look from SIFMA that
 5 was submitted, I believe, last night. And one of the
 6 charts that SIFMA submitted showed the pricing of NYSE
 7 nondisplay market data, which is one of the main topics
 8 for this panel. And from memory, I believe it went up
 9 1,100 percent. So I know I heard earlier comments that
 10 maybe market data had not gone up or it's flat. But just
 11 one core area that we're talking about for this panel,
 12 it's up 1,100 percent. And that's a public document from
 13 SIFMA.

14 There's a lot of different areas that we want
 15 to talk about and there's a lot of components of market
 16 data. I just want to also emphasize that, from our
 17 perspective, when we talk about market data, we're
 18 thinking about the broader ecosystem. That includes
 19 things like connectivity and how we receive the market
 20 data. That's all very core. And when you look at it all
 21 in aggregate, the prices become even more egregious in
 22 aggregate.

23 I also wanted to emphasize, you know, there was
 24 a comment earlier -- there was a lot of great comments
 25 earlier today. There was one from Simon from Norges and

1 his quote, he was talking about the difference of
 2 performance among brokers. And I'm sorry if I misquote
 3 you. I think said the performance difference amongst
 4 brokers is significant and it's really the tech stack,
 5 you either have it or you don't.

6 And that's where we see -- you know, our market
 7 share, fortunately, has increased. And we think one of
 8 the reasons is because we have the ability to invest
 9 heavily in a lot of these areas that we think are vital
 10 for best execution. We have clients now that the
 11 difference between being their top executing broker and
 12 being cut off is one basis point in a rival, one basis
 13 point.

14 Some clients don't necessarily prescribe the
 15 exact form of market data we use. That said, if we don't
 16 invest heavily in market data, it's hard to imagine that
 17 we wouldn't be one of the brokers cut off for those set
 18 of clients that measure cost that carefully.

19 And it worth noting, and then I'll turn it over
 20 to Jamil, but it's worth noting, you know, we just put
 21 out a piece that came out, I think, today or yesterday
 22 that we called Data Science and the Trading Desk that was
 23 authored by our head of Americas Cash. And I think what
 24 you'll see in the piece from Todd Lopez, it shows how
 25 trading desks are increasingly more forensic in their

1 cost of trading. And more and more, the buy side is
 2 taking in complex market data, paying more for it and
 3 measuring the brokers even more strictly. So all of
 4 these things we're talking about, they all add up to
 5 performance overall.

6 So we appreciate the opportunity. The last
 7 comment we had, I just had the opportunity to spend the
 8 last few days in Europe and I was in Asia a few weeks
 9 ago. And across our business, these issues are not
 10 unique to U.S. equities. So fortunately or
 11 unfortunately, I believe the Chair started this session
 12 by talking about how he was with IOSCO. There's a lot of
 13 regulators globally looking at what the U.S. does. And
 14 hopefully, we can collectively come up with solutions to
 15 further improve the U.S. capital markets.

16 Thank you again.

17 MR. REDFEARN: Thank you, Vlad. Jamil.

18 MR. NAZARALI: Thanks, Brett. And thanks to
 19 you, the Commission and Staff for setting up this really
 20 important discussion.

21 My name is Jamil Nazarali and I am global head
 22 of business development at Citadel Securities. Citadel
 23 Securities is a leading global market maker across
 24 equities, options, fixed income, ETFs and FX. On an
 25 average day in the U.S., Citadel Securities handles more

1 than 20 percent of U.S.-listed equity volume, more than
 2 25 percent of listed options volume and about 40 percent
 3 of all retail broker-dealer orders. Our clients include
 4 retail brokers, institutional investors and banks, and
 5 they benefit from our ability to provide consistent and
 6 reliable liquidity across a variety of market conditions.

7 Accurate and up-to-date market data is critical
 8 to the functioning of our markets and it helps market
 9 makers like us provide the best prices to our customers.

10 And as Vlad said, when we are thinking about market
 11 data, we need to think much more broadly than the SIP.
 12 We heard a lot of numbers about SIP costs staying flat
 13 over the last decade or so. But when we think about
 14 market data, we need to think about the cost of direct
 15 feeds, ports, cross-connects, usage fees which are
 16 charged by the number of servers that consume the market
 17 data, and colocation. Having all of these is absolutely
 18 critical to us and other market makers in providing the
 19 best prices to our customers. And so when we think about
 20 market data, we need to look at it holistically.

21 Second, there's been a lot of discussion about
 22 whether using the direct feeds is a commercial decision
 23 or something that's important for your best ex
 24 requirements. And I will say that our customers demand
 25 the best prices and it's not a commercial decision for

1 us. If we didn't use direct feeds, if we didn't give our
2 customers the best available price in the market --
3 which, by the way, you need all of those things that I
4 just talked about -- we wouldn't be in business.

5 MR. REDFEARN: Ronan.

6 MR. RYAN: Hello, everyone. I echo the
7 sentiment of the rest of the panelists and thank the
8 Staff for putting this together. I think it's absolutely
9 a critical discussion to be had. I also appreciate the
10 fact that you made me wear a tie and I feel like a choked
11 dog up here. So, thanks.

12 My name is Ronan Ryan. I am the president --

13 MR. REDFEARN: We never said you had to wear a
14 tie, Ronan.

15 MR. RYAN: Yes, you did, back in the green
16 room.

17 (Laughter.)

18 MR. RYAN: My name is Ronan Ryan. I am the
19 president and cofounder of IEX, the Investors Exchange.
20 As everyone here is probably aware, we are the only U.S.
21 stock exchange that does not charge for market data or
22 for market access.

23 Before founding IEX, I built smart order
24 routers at RBC and prior to that, I was a technology
25 vendor for a little over 10 years. So I have been

1 every individual order at every price level. We made
2 this choice for commercial reasons. Our target customer
3 is the broker-dealer acting in an agency capacity, who is
4 less likely to be mining the order-by-order data for a
5 signal. Rather, their customers' orders are usually the
6 content that gives the proprietary feeds value and become
7 the signal that others trade against, increasing
8 execution costs for them. This is one of the many
9 examples where exchanges treat buy side more as a product
10 than a client.

11 Accessing IEX is fair, simple. Unlike our
12 peers, IEX does not monetize tiered connectivity into the
13 exchange. In fact, we don't offer connectivity of any
14 kind directly into our matching engine.

15 I'll go a little ad lib here because I would be
16 remiss not to say it and I'm sure we'll talk about it
17 within this panel. But this is the third panel of the
18 day and I've heard constituents from the buy side, from
19 market makers, from brokers, virtually line up and say
20 they have to use the direct fees and exchanges are kind
21 of telling them, well, no, you don't, it's your choice.
22 So I think it's a really important discussion to have and
23 I appreciate the opportunity to discuss it.

24 MR. REDFEARN: Thank you, Ronan. Joe.

25 MR. WALD: Good afternoon, Director Redfearn,

1 involved in market data and the connectivity evolution
2 over the past 15 years from different perspectives, as a
3 vendor to latency-sensitive proprietary firms, as a
4 broker trying to circumnavigate a fragmented market and
5 now as an exchange offering a commercial alternative to
6 the predominant business model of our incumbents.

7 When I think about proprietary market data
8 products and access, there are two main decisions an
9 exchange must make, what to offer and what to charge for
10 it. How IEX answers those questions is pretty well
11 known. Like I said, we offer enough functionality so
12 that our members can compete on a level playing field and
13 we give it all away for free.

14 We do this to align our business models with
15 our customers. Just as brokers earn trading commissions
16 when their customers choose to trade with them, IEX earns
17 transaction revenue when brokers choose to trade on our
18 exchange. It's pretty simple. IEX offers free depth-of-
19 book feed as well as free top-of-book feed. And
20 importantly, we don't offer faster versions of our own
21 market data feeds for a premium price. It's truly one
22 feed at one speed.

23 We intentionally decided not to provide order-
24 by-order granularity on our depth-of-book feed. This
25 type of granularity enables the recipient to identify

1 all of the SEC Staff, thank you very much for the
2 opportunity to be here today. My name is Joe Wald and I
3 am the CEO and cofounder of Clearpool, a financial
4 technology and independent agency broker. Clearpool has
5 a unique voice in the debate surrounding market data and
6 market access.

7 First, we are a relatively new entrant to the
8 market, launching in 2014. And therefore, we have recent
9 first-hand experience with the challenges and potential
10 barriers to entry of the current market data and market
11 access regime. Second, we primarily serve regional
12 broker-dealers. They are the lifeblood of research and
13 banking for small and midcap companies. Their clients,
14 in turn, are asset managers who invest on behalf of many
15 pension, 401(k) and individual investors, the Main Street
16 investor. Our broker-dealer clients rely on us to
17 provide their institutional clients with competitive and
18 transparent algorithmic execution services.

19 We look forward to the discussion during the
20 roundtable of the critical issues related to market data
21 and market access and, as discussed in detail in our
22 written submission for the roundtable on the SEC's
23 website, we believe that there are several important
24 questions that we would like to see examined that should
25 ignite deeper inquiry, conversation and subsequent action

1 on these issues.
 2 First, is there a disproportionate impact of
 3 the current market data and market access regime on
 4 smaller broker-dealers and does this act as a barrier of
 5 entry to innovation? From what we have experienced,
 6 through the high costs for market data and the complex
 7 and opaque tiering structure established by the exchanges
 8 for transactional fees, smaller broker-dealers end up
 9 subsidizing many of the costs for larger firms. And for
 10 new entrants, securing market data is a significant
 11 upstart cost. Our take on this is, yes.

12 Is there a lack of transparency and an innate
 13 conflict around market data fees and market access fees
 14 managed by for-profit entities? It is very difficult for
 15 consumers of market data disseminated by exchanges to
 16 understand the reasonableness of pricing due to the lack
 17 of information provided by the exchanges around market
 18 data and other fees. Compounding the problem, market
 19 participants do not have adequate opportunity to provide
 20 input into any changes of those fees. This question, our
 21 take is, yes, as well.

22 And, as you've heard a number of times today,
 23 are there viable alternatives to exchanges' proprietary
 24 data feeds? Clearpool and other broker-dealers are
 25 compelled to purchase exchanges' proprietary data feeds,

1 both to provide competitive execution services to our
 2 clients and to meet our best execution obligations due to
 3 the content of the information contained in the
 4 proprietary data fees as well as the latency differences
 5 between them, which are major and important
 6 considerations for brokers. With respect to this
 7 question, our take is, absolutely not.

8 The spirit of this market data conversation
 9 should be about creating a level playing field. Ideally,
 10 the same data at the same speed at the same cost. No one
 11 should be able to buy that advantage; it must be earned.

12 And for us to have the most competitive and efficient
 13 equity markets in the world, we should demand nothing
 14 different.

15 Look forward to answering your questions and
 16 thank you very much.

17 MR. REDFEARN: Thank you very much. So we --
 18 I'm going to just take a little bit of a different
 19 approach to start with just a few follow-up questions for
 20 some of the comments that were made initially, just so we
 21 can get, you know, a little bit more background on that.

22 The first one is, James, you used a number that
 23 was less than 100 million in revenue for market data.
 24 Did that include connectivity or was that just data?

25 MR. BROOKS: That's proprietary data across our

1 five exchanges, not connectivity.

2 MR. REDFEARN: Okay. And do you have or would
 3 you -- in terms of breaking out the connectivity, because
 4 a lot of what we've heard from different folks is it's
 5 also sort of, to get the data, to use the data, you need
 6 to have the connectivity. Do you have any sense of what
 7 that would be?

8 MR. BROOKS: This isn't an earnings call and
 9 I'm not going to start putting out new numbers in this
 10 forum.

11 MR. REDFEARN: Okay.

12 Secondly, Chris, you mentioned the -- you know,
 13 the sort of choices in terms of the differential products
 14 or provisions that are put out there. And we've had some
 15 interesting commentary on whether or not there's a choice
 16 or there's not a choice. I guess the question, vis-a-vis
 17 what maybe what Joe said is, part of our job is to ensure
 18 this concept of fair, reasonable and not discriminatory.

19 And given all the choices of different things at
 20 different speeds, how -- you know, how does that line up
 21 with, you know, managing sort of the not discriminatory
 22 responsibilities that we have at the Commission?
 23 Especially if -- especially if Joe -- I mean, it sounded
 24 like Joe was suggesting that it's sort of out of reach
 25 for some of the market participants like to really

1 compete at those levels.

2 MR. ISAACSON: I think defining what is out of
 3 reach is very difficult because somebody with --
 4 depending on the resources of the firm that wants to come
 5 in, you could define out of reach as a very, very low
 6 number or a very, very high number.

7 I think, as I mentioned in my opening remarks,
 8 the choices we offer our members, they -- nobody has to
 9 take the data. That's their own volition. And less than
 10 half of them do, right at less than half take the pitch
 11 market data.

12 We offer different ways in which they want to
 13 connect. For instance, the connection speeds they want
 14 to connect at, they can connect at one gig, one gigabit
 15 or 10-gigabit connections. And also the speed at which
 16 or the shape of how much bandwidth they need, we offer
 17 shaping of that feed to either 100 megabits on our
 18 equities markets or a gigabit. So they can tune their
 19 connectivity needs and costs to what they want to pay and
 20 what they think fits their business model, if they decide
 21 they need to take direct feeds for -- if they think
 22 that's what they need to be competitive.

23 However, as I have said, we don't take all the
 24 direct feeds from all the exchanges. And many of our
 25 customers don't take the direct feeds from us. So,

1 clearly, somebody -- half of our members are figuring out
2 how to run business models without it.

3 I don't know if that answers your question.

4 MR. REDFEARN: Is the "we don't take direct
5 fees from all the exchanges," is that usually meaning
6 that there's a few markets that have like less than 1
7 percent significance or they're not meaningful and most
8 of the -- because I know that a lot of times, even from
9 when you look at the exchanges, you see the ones that
10 they will take and they won't take.

11 MR. ISAACSON: I think that market share is a
12 factor. Market share, price can be a factor, location
13 can be a factor. And we look at all of that.

14 In fact, it's interesting that we ran some
15 statistics within the team and it showed that when we did
16 have a price increase on one of our data feeds, there was
17 attrition of subscribers. There was a high single-digit
18 attrition of subscribers. So there was some elasticity
19 on the price. It's like, some people decided I don't
20 want to take it anymore. So that countervails what some
21 people have said, where I absolutely have to take it,
22 there's no choice.

23 MR. REDFEARN: So Vlad, you used an 1,100
24 percent static.

25 MR. KHANDROS: Yes.

1 price is in the market in as quick a way as possible. So
2 you need to have the most up-to-date prices. And to do
3 that, you need to have all of the different components
4 that I described earlier. Right? You need to have the
5 fastest cross-connects, you need to have the direct
6 feeds, you need to be colocated.

7 And the good news for retail investors is that,
8 because we're spending the money on all those things, we
9 do get them the best prices. But it costs a lot to do
10 that. And it's not a commercial decision.

11 It's a little -- you know, we hear this
12 argument. And, with all due respect, saying that some
13 people take it and some people don't. It doesn't really
14 shed light on whether or not people need it. You know,
15 there's utilities, right, there's natural gas companies
16 and they sell natural gas and not everyone buys it,
17 right? That doesn't mean that it's not a utility. For
18 those people that have it, they have to have it. Right?

19 And so there's no substitutes for it. And I think
20 that's kind of -- that's really important to understand.
21 When you need it, there's not a substitute.

22 MR. KHANDROS: I think earlier, Met talked
23 about trading being a zero-sum game. And one of his
24 points that he was making, which I would certainly agree
25 with is, you know, ultimately, it's whoever is first in

1 MR. REDFEARN: Can you just --

2 MR. KHANDROS: Good memory.

3 MR. REDFEARN: -- go a little bit farther on
4 that? What was the period of time that you were talking
5 about the nondisplay?

6 MR. KHANDROS: That was looking at the NYSE
7 nondisplay data from when it was created in, I believe,
8 '12, 2012, through present. I'm sorry, 2010 through
9 2017. I just saw it right now. Thanks to T.R. at SIFMA
10 for sending that to me. So it was 1,100 percent and
11 that's what SIFMA submitted yesterday.

12 And that's where, you know, earlier comments
13 around SIP revenue coming down, confidently they've been
14 much more than offset by the increase of nondisplay fees
15 and then the selling of competing products from the
16 exchanges that compete with the SIP itself.

17 MR. REDFEARN: So, Jamil, you used the term
18 "not a commercial decision." If it's not a commercial
19 decision, what is it? I mean, is it a regulatory
20 decision? Is it a best ex decision? Is it a competitive
21 decision? Is it commercial? I'm just trying to
22 understand.

23 MR. NAZARALI: We feel it's necessary to get
24 our customers the best prices in the market. And there's
25 only one way to do that, and that's to know what the best

1 line will get that liquidity. It's not like getting on
2 the airplane and irrespective of when you get on, you're
3 getting on the same plane. So it was a great analogy
4 that really struck home.

5 There's a lot of firms that, for one reason or
6 another, have over time decided to outsource the routing,
7 outsource their algo usage, outsource a lot of their
8 trading infrastructure. And those might be a lot of the
9 firms that we're hearing from that maybe choose or are
10 able to not consume some market data services and they're
11 instead outsourcing it to other firms that are able to
12 invest in those market data services.

13 MR. REDFEARN: Yeah, Ronan.

14 MR. RYAN: Yeah. So along the lines of what
15 Vlad is saying, we're obviously a stock exchange. We
16 have approximately 160 -- I didn't run these stats -- but
17 160 brokers connected to IEX. We probably roughly have
18 30 of them taking our market data tops, our market data
19 depth of book, and that's free. So that's, back of the
20 napkin, less than, you know, 25 percent.

21 But what's important to note is if you look at
22 the equity landscape, there's probably only 20 or so
23 brokers that have their own platform anyway. And those
24 other brokers, the smaller brokers, are white labeling or
25 using the access of the other top 20 brokers, call them,

1 to access the markets. And again, the top 20 brokers,
2 you know, from the bulge bracket to the market makers to
3 the buy side, again, you know, we had two buy sides, Met
4 and Simon, basically say they'd laugh a broker out of the
5 room if the broker told them they didn't have direct
6 feeds. Jamil is saying it. You have to have direct
7 feeds to compete correctly.

8 So, you know, yeah, we have less than 25
9 percent taking our feeds that are free. But that's not
10 the important detail. It's who takes the feeds, why do
11 they need it and who are they serving?

12 MR. REDFEARN: So we're trying to move our
13 understanding of this ecosystem past data into sort of
14 also the connectivity layer, right? So we've talked a
15 little bit about ports and whether they're, you know,
16 logical ports or physical ports or what have you. Can
17 you, and maybe back to you, James, can you -- for
18 whatever is published numbers -- can you tell us a little
19 bit about like what you get for -- you know, what are
20 some of the options that you have and what is some of the
21 variability between sort of what that means in terms of
22 price and costs -- I'm sorry, in terms of speed and cost?

23 MR. BROOKS: So Mahwah opened in the data
24 center in 2010 and there was a network. That network has
25 since had to be upgraded and there's been significant

1 investment in the network. And when designing networks,
2 it's not just about latency, it's about capacity. And at
3 some point, if you don't do things such as go to 40 gigs,
4 people are going to drop packets when they're taking huge
5 data feeds and those data feeds could be equity option
6 feeds such as the OPRA feed. So there has been a lot of
7 investment across the whole industry and certainly
8 exchanges, too, in their data centers to upgrade
9 capacity.

10 And if firms just want to send orders in,
11 that's a much lower level capacity. And there's a menu
12 of options from a gigabyte up to 40 gigabytes that firms
13 can chose from to take -- to take directly from the
14 exchange.

15 Not everybody in the data center is a customer
16 of the exchange. There's third party hosting in the data
17 center, where some firms choose to buy space from other
18 firms and leverage their connectivity into the matching
19 engine. And those prices are negotiated between the
20 third parties and the firms who are their customers and
21 the exchanges are not part of that at all.

22 So to stress, resiliency, redundancy are very
23 important. What really drives costs in terms of the
24 connectivity is increases in bandwidth. As I said, there
25 hasn't been very many price increases. But if you need

1 to take more bandwidth, you're consuming more
2 connectivity and that connectivity is what's really been
3 driving costs.

4 MR. REDFEARN: I think that there's certainly
5 an appreciation for all the investment and the, you know,
6 a lot of the technology evolution that's happened in the
7 marketplace and that's provided a lot of benefits to
8 investors. I guess the question is the connection
9 between the level of investment and the level of cost to
10 the participants in the marketplace.

11 So, Chris, would you characterize the -- sort
12 of how you see the pricing landscape as driven primarily
13 by the investments that are there? Is there some other
14 driver?

15 MR. ISAACSON: I think we've made market-based
16 pricing and it's also factoring in what our costs are.
17 Any commercial business does -- does this. And I think
18 it's, you know, disingenuous to think that anyone up here
19 is not a profit-seeking -- part of a profit-seeking
20 enterprise, as the exchanges are.

21 As James has said, there are tremendous
22 investments required that exchanges must make. And not
23 to say that esteemed colleagues at nonexchanges aren't
24 making investments. But there are some certain
25 investments that exchanges have to make because of Reg

1 SCI, for instance, and the incredible scrutiny we're
2 under from the SEC and other regulators to make sure that
3 we meet certain standards. So we have had to invest
4 millions and millions of dollars to meet the demand.

5 Even two weeks ago was a great example, when
6 you increase your capacity you have to -- you have to
7 scale for the peaks. You have to scale for multiples of
8 what the average day looks like.

9 So I think Chris mentioned earlier on the
10 panel, a couple weeks ago, October 11, 8.3 billion orders
11 in equities, well over 30 billion in options, more than
12 50 billion across our 15 exchanges or markets across the
13 world. That was about 50 percent greater than any day
14 previous to that.

15 And so now we're planning -- I've just come out
16 capacity planning meetings. We're planning for we have
17 to be at at least 2X that from an order count perspective
18 and multiples of whatever the messages per second,
19 because we can't slow down. Because if we do slow down,
20 there's likely an enforcement case coming against us
21 because we didn't submit our data to the SIP fast enough
22 or we weren't being resilient enough.

23 So that sort of standard -- which we don't
24 object to the high standards, we like high bars, because
25 we think it's very important to the national market

1 system. But that high standard has costs associated with
2 it.

3 And we also think we're providing a great
4 service and people, if they don't like the service, they
5 can vote with their feet. In fact, we've seen that with
6 -- we've had some pricing increases, we think respectful
7 but pricing increases on, for instance, physical or
8 logical ports. And again, we've seen some attrition
9 there, high single digit attrition when we've had pricing
10 changes.

11 So they can optimize their capacity to us, as
12 Chris said. Through a single physical connection and a
13 single logical port, you can get 2.5 billion orders into
14 one of our exchanges in a month. If you buy enough
15 logical ports, you can get a trillion orders in. So we
16 have to pay for that capacity. It's not the cable that
17 Doug had here. It's -- we have to handle all of that and
18 have a DR system that can handle all that as well. So
19 there's tremendous investment.

20 And I would also mention, regarding
21 transparency of costs, you know, we file audited
22 financials of every SRO, because we run six of those at
23 Cboe. Audited financials of every SRO, which includes
24 margins, of course, that the SEC gets every year. So
25 we'll stand behind those numbers. Of course, they're

1 audited. So we're being as transparent as need be on
2 what our costs are.

3 MR. KHANDROS: I just very quickly want to say,
4 just as a firm that operates an SCI entity which, I
5 agree, is extremely complex and costly and is something
6 that we obviously take very seriously, we still have to
7 earn that business. Firms can choose whether or not they
8 want to trade with us. I just think that's a fundamental
9 difference to keep in mind. Our clients choose to use
10 us. They choose it every day. They can't choose to
11 simply disconnect from an exchange, a protected exchange.

12 So, you know, there were comments from several
13 commissioners over the last week around the order
14 protection rule, which we would very much endorse
15 revisiting.

16 MR. WALD: I just want to jump in for a second,
17 as well, just to shed light on the order of magnitude
18 that this kind of -- someone referred to it as a moat
19 earlier -- is for smaller firms. In our first year of
20 operation, market data and market access related costs
21 represented 25 percent of our nonhuman capital operating
22 budget. That's like another rent.

23 You know, the exchanges are there to provide
24 fair and orderly, you know, access to the markets, not to
25 be an absentee landlord. So we're talking about orders

1 of magnitude that really just represent a tremendous
2 difficulty for small firms to in, start up and compete in
3 this structure that we've created.

4 MR. RYAN: Brett, can I jump in here? So I'll
5 start off by saying, obviously, IEX is a for-profit
6 entity, I agree.

7 When it comes down to connectivity and the
8 physical connectivity and specifically the cross-connects
9 within the data center, the fees that are charged and
10 levied for those products to me are offensive. So when
11 you look at the data center business as a whole, and I
12 agree with Chris, there's obviously much more cost than
13 just the physical cable that Doug -- it was pretty funny
14 -- but there is much more cost to that.

15 An average cross-connect in a data center that
16 you go to is like \$400 per month, and like \$250
17 installed. And if you talk to a company like an Equinix,
18 they'll tell you they have something like 98 percent
19 margin on that.

20 However, obviously, there is a piece of
21 equipment that the cross-connect needs to, you know, plug
22 into on the exchange side. And the exchange does bear
23 the cost for that.

24 But what I would say is when you look at NYSE
25 in particular, not to pick on James by any means, but if

1 you look at their infrastructure, a 10-gig cross-connect
2 and a 40-gig cross-connect plug into the same type of
3 switch. It's an Arista, I can't remember the name of the
4 model. I believe there is a different line card for the
5 40 gig, it makes it faster and, you know, it's nowhere
6 near market pricing in relation to what it costs, not
7 just to purchase the switch, to power the switch, to rack
8 the switch, to service the switch. It is absolutely,
9 unequivocally nowhere near the cost. It's actually --
10 cross-connects are bananas, what their charge is.

11 And then when you talk about its latency, it's
12 not latency it's capacity, I will tell you at the time
13 that exchanges -- specifically when NYSE was going from
14 10 gig to 40 gig, I had a conversation with -- I'll call
15 it a top five proprietary trading firm on the globe. And
16 they had told us, we don't need to go to 40 gig, 10 gig
17 would be fine. But unfortunately, at the time, 40 gig
18 was two microseconds faster. And if someone breaks the
19 union line and buys the 40 gigs, guess what? Everyone is
20 forced -- it's a strong word -- but forced to buy the 40
21 gig, if they want to compete in that nature.

22 So, yes, it's a competitive business. I think
23 exchanges is a competitive business. But maybe more so
24 on pricing of, you know, make or take or et cetera. But
25 when it comes down to things like cross-connects and the

1 need to connect to the exchange, it's not a competitive
2 business.

3 I mean, again, I've said it a few times, you're
4 hearing many people say they have to buy these cross-
5 connects, they have to have the fastest market data. And
6 no one can provide faster cross-connects within an
7 exchange than the exchange itself. No one can go into
8 Mahwah and provide a faster service to connect to the
9 exchange.

10 And I think like if anybody that is on the
11 stream is still awake, God bless you. But maybe go and
12 Google the word monopoly. And the word monopoly says
13 it's exclusive possession or control of the supply or
14 trade in a commodity or service. Cross-connects are a
15 commodity. This is a monopoly.

16 MR. DONOHUE: Chris, can I ask a follow-up with
17 that? So we talked before about half your customers take
18 the direct feeds. Do they all take the 40-gigabit line
19 or what? How does that work out?

20 MR. ISAACSON: So obviously, there's
21 differences between exchanges. So we don't offer 40 gig.
22 Let me talk a little bit more about the investment we're
23 making into technology. So a little bit of history here.
24 So when Bats purchased Direct Edge, we decided we were
25 going to aggregate data centers at Secaucus, which Simon

1 mentioned is a center for many brokers and exchanges in
2 the Jersey area, kind of right between Mahwah and
3 Carteret. We decided we were going to consolidate there
4 to try to keep -- keep costs reasonable for customers.

5 Well, instead of allowing a latency game within
6 data centers, we said we're going to latency equalize to
7 NY4 and NY5. So the person that's closest to our cage in
8 NY5 and the person that has the furthest cage in NY4 has
9 exactly the same latency, down to a variance of about 6
10 nanoseconds. So we spent a lot of money, more than a
11 shoebox worth of cable. Like there's a lot of cable.
12 And we terminate every connection and we shoot light
13 through it to verify that everyone is being fair. So
14 that takes time, effort, money, resources to make sure
15 we're doing it correctly. We don't offer 40 gig. We
16 didn't see a commercial or a technical need for it. At
17 which point we think there's a technical need for it, we
18 would consider it. But we have not seen a need for it.
19 So one 10-gig connection today, as Chris mentioned this
20 morning, gets you access to seven exchanges. And with
21 all due respect to Ronan, one connection that may be free
22 at IEX gets a connection to market that's less than 5
23 percent market share, one exchange. This gives you
24 connectivity to seven exchanges, four equities and three
25 options. And that's all over one 10-gig connection.

1 Now, just we have tried to be, honestly, Cboe
2 and previously Bats, as kind of down the middle as
3 possible as what we think is reasonable fees for the
4 service we're offering. And market -- market rates and
5 tremendous technology. But we have not gone the 40-gig
6 path.

7 MR. BROOKS: While we're on 40 gigs, I want to
8 jump in here, because there was a comment made about
9 this. When NYSE went to 40 gigs, we also introduced a 10
10 gig at the same speed and at the same price. So if
11 somebody is saying that there is a latency differential
12 of two mils or mics or whatever it was, that's just not
13 true. And they're at the same price. Why we did both is
14 they require different infrastructure for the firms so
15 you can take your choice of 10 or 40 but you don't have
16 to be on a 40. And if you want to move from a 10 to a
17 40, it is the same price. But that number is -- I don't
18 know what that latency number was thrown about. And
19 also, just as far as throwing around numbers, this 1,100
20 price increase for depth, I'll have to take a look at
21 that but I know the history of my pricing and that's a
22 pretty creative number.

23 MR. REDFEARN: I guess one of the --

24 MR. KHANDROS: I have a chart if you want to
25 look at it here. It's based on your own filing.

1 MR. BROOKS: I'll be glad to go through it.

2 MR. KHANDROS: It's on the SEC website.

3 MR. BROOKS: I'll be glad to go through that
4 with you. You're citing it and you didn't cite exactly
5 what you used for that. But I've seen a lot of different
6 creative interpretation of public filings and I wouldn't
7 deem what SIFMA says as the arbiter of truth, either.

8 MR. REDFEARN: I think you all know, we have
9 opened up a comment file. We're encouraging people to
10 submit their comments and their data and their potential
11 responses to whatever data might be submitted as well so
12 that we can really get a finer understanding of some of
13 these nuances.

14 I guess one of the -- you know, sort of there's
15 this underlying question here which is, you know, to what
16 extent do you need to pay more to get the good stuff, the
17 fastest thing, right, the stuff that is where the
18 competitive space is? And if you don't pay for it, does
19 that mean that you're inherently at a disadvantage in the
20 market? Because we're thinking about fair and
21 discriminatory, right? And we're trying to make sure
22 that the marketplace hasn't evolved to a point where
23 there is some question about, you know, has it evolved to
24 a point where maybe the precepts of fairness and, you
25 know, is it nondiscriminatory are in question, right?

1 So, to what extent -- James, if somebody is
 2 buying, I don't know, Ronan, what is it? The multicast
 3 cross-connect at, you know, 20 gigabytes versus 2
 4 gigabytes and you've got to pay this much more. And if
 5 you want to buy -- I don't know how many logical ports
 6 does a firm need to buy and how many do they have to buy
 7 at this? And what is it out to? We've heard a lot of
 8 numbers coming out here that start to make it sound like
 9 there's a significant cost and that that is difficult or
 10 more difficult for smaller firms.

11 And so I guess we're looking for sort of the
 12 response to how do we -- how can we be sure that there's
 13 not a scenario that's evolved in some respect that has
 14 started to bring into question whether or not, you know,
 15 at a reasonable price, that it's not -- it's not starting
 16 to challenge the concept of fairness or being
 17 nondiscriminatory?

18 MR. BROOKS: So what we've heard today is that
 19 market structure has evolved and, in some sense, it's
 20 evolved very rationally in response to regulations and
 21 market forces. Participants in the market consume
 22 different services. And there are some venues that say,
 23 well, we want a different marketing, different models.
 24 We want to wrap everything in a per share price. And of
 25 the NYSE Group's five exchanges, we have two exchanges

1 market data than others so they pay for it. They consume
 2 more bandwidth, they want more access to the exchange in
 3 microsecond bursts, they pay for it. And in a very
 4 competitive environment, you can see different pricing
 5 models, the venues marketing themselves very differently.

6 But I would think to some extent it is
 7 rational, it's not necessarily simple. But when you have
 8 fragmentation and liquidity spread across dozens of
 9 venues and multiple exchanges, it gets complex. You
 10 know, people have noted that there are three large
 11 exchange groups and IEX, so there are four different
 12 exchange groups. And some people have been looking at it
 13 like, gee, that's not many. Well, it actually used to be
 14 one. Things are really traded where they were listed.
 15 And what was traded away from a listed venue is largely
 16 internalization.

17 So there are more exchange models now than
 18 there have really been before. And there has certainly
 19 been healthy entry into the space. We've seen that with
 20 Archipelago, Direct Edge, Bats, IEX. Brad was joking
 21 about how hard it was for IEX to get in. Well, that's
 22 because it was a very different model. If this fixed
 23 cost gig is so good and you just want to do a me-too
 24 exchange, there's nothing stopping anybody else from
 25 entering the space.

1 that don't charge anything for market data and IEX
 2 doesn't charge anything for market data. Most of the
 3 ECNs and a number of the other exchanges, Bats Direct
 4 Edge never used to charge for market data.

5 And things evolve. And it has been
 6 acknowledged that the competition is fierce for order
 7 flow and it certainly all goes together and you need to
 8 look at the all-in cost, not just the cost of one piece.

9 And it's easy for a participant, and it's great
 10 marketing and people are allowed to use this, of course,
 11 to say, oh, we don't charge this one piece, don't look
 12 over here at our price per share or something else. You
 13 really need to look at it all in.

14 And one way to look at it is some firms may
 15 send a very high volume of orders, a very low percentage
 16 of them may execute. They may have huge bandwidth needs,
 17 so they are charging market-based pricing for the ability
 18 to send in everything they want to do. Another firm may
 19 have a much lower capacity need and doesn't need to pay
 20 for it.

21 If you use just a per share model, you're
 22 squeezing people that use totally different levels of
 23 service into a single cost paradigm and that's not
 24 necessarily rational. It's one way to go. But look at
 25 the evolution of services. Some firms consume more

1 So look at it from that evolution, that there's
 2 a very different consumption of services. And what is
 3 market-based pricing look for that? In a competitive
 4 environment, you would expect there to be multiple
 5 exchanges and you'd expect them to have different pricing
 6 models.

7 MR. FRIEDMAN: As a smaller firm, we would very
 8 much welcome kind of tiered pricing based on latency and
 9 order message volume so that we would be at a lower end
 10 of that. That's one of our frustrations with license
 11 fees for nondisplay, for example. You kind of jump from
 12 zero to 12 grand a month if you do the simplest
 13 computation, mathematical computation with the data. And
 14 there's no kind of tiered gradients of are you a Citadel
 15 or are you just checking your risk parameters.

16 MR. WALD: Just to add on to that, I mean,
 17 clearly you can't forget about the transaction fees and
 18 the way that they have been kind of used to subsidize
 19 those market data fees. I mean, we heard it earlier on
 20 the first panel. Some large firms get most if not all of
 21 their market data fee and access costs subsidized by the
 22 amount of volume that they do and the amount of tier
 23 rebates they get. In many cases, those tier rebates are
 24 not fair and equitable, either. They're negotiated firm
 25 by firm. If you took a look at -- and I don't think this

1 is something that's published at all. There's zero
2 transparency on who's receiving this plethora of
3 different fees and tiers across the board. And in many
4 cases, what you'd probably come to find out is that one
5 or two firms are the only beneficiaries of a particular
6 tier.

7 All of that is really a barrier to entry for
8 small firms. It's basically the cost is moved to the
9 many and subsidized by the few. I mean, it just doesn't
10 make any sense.

11 MR. KHANDROS: I just wanted to quickly the --
12 it was NYSE prop, nondisplay was a big contributor to the
13 prop. So I should have clarified that earlier.

14 And I also want to say, just in fairness to
15 James, there are multiple other exchange groups that are
16 not necessarily that different in increase in fees. It's
17 just that, from a public fee disclosure standpoint, the
18 third-party group that SFMA hired focused on several.
19 They're the one that was finished in time for the panel
20 was NYSE. So there are several others as well that will
21 be highlighted down the road. So just in fairness to
22 James.

23 MR. BROOKS: Okay. I'll be glad to look at
24 that. I'll respond later.

25 MR. KHANDROS: And then also, I think there is

1 just this question of what, in terms of fairness and what
2 is right for Mr. and Mrs. 401(k). I think on the one
3 hand, we want to be sure from a trading standpoint that
4 their brokers are directly using or are using other
5 brokers that are investing heavily in infrastructure and
6 best execution. I mean, that's really important. And
7 whether it's retail brokers or asset managers or other
8 types of clients, they are increasingly measuring our
9 performance extremely scientifically, more so than ever
10 before. And that will no doubt continue. I think a lot
11 of the question that we're probably struggling up here is
12 what is that right balance. And clearly, we've
13 established most firms cannot afford to provide best ex
14 on their own. And so that's why so many choose to
15 outsource it.

16 And so, you know, I think -- perhaps that's
17 okay for the market. But I think that's one of the core
18 questions, I think, that a lot of the panelists up here
19 are maybe struggling a little bit with in answering.

20 MR. ROESER: So just thinking back to our last
21 panel on SIP data and the use of SIP data, different
22 latencies versus prop and the content differences, Jamil,
23 you noted that you're relying on the depth-of-book
24 products, you have to have the fastest, the best. Are
25 there issues -- is the SIP just for eyeballs? Is there

1 information on the SIP that you need as well that factors
2 in?

3 MR. NAZARALI: Well, I wouldn't say the SIP is
4 just for eyeballs. But I would say that having the SIP
5 is not enough. Right? For a number of reasons. You
6 know, we talked about odd lots, we talked about depth of
7 book. And we also talk about speed.

8 Now, the SIP has gotten a lot faster. And we
9 have to just keep in mind that's processing speed. The
10 biggest reason why you have to have the direct feeds is
11 because, if you have a centralized process and you're
12 requiring all of the exchanges which are at different
13 locations to send you their transactions and then you
14 have to process it and, you know, most of the ATSS and
15 many of the broker-dealers are in Secaucus, you then
16 have, you know, data moving -- you know, could be from
17 Mahwah to Carteret to Secaucus. If you get that data
18 direct, you're only going to have one of those legs.

19 And so, no matter how fast you make this SIP
20 processing time, the fact that it's centralized is going
21 to make it slower in all cases than getting the data
22 directly. And so, and that length of time can be, you
23 know, several hundred microseconds.

24 So to answer your question, SIP is not enough
25 for a number of reasons, speed being a big part of that.

1 But also, it doesn't have all of the data that you need.

2 MR. RYAN: Also on the SIP, so I agree with
3 Jamil in that it tells only part of the story. But like
4 Adam said on the previous panel, there is a lot of
5 information you need from the SIP like limit up, limit
6 down. So it absolutely has a use more than eyeballs.

7 But not having depth of book, not having
8 imbalance info and, to Jamil's point again, just the way
9 in which you can have a GE trade in Carteret and that
10 trade has to be sent from Carteret to Mahwah and then you
11 take it from Mahwah back to wherever your trading
12 environment is. If -- I believe it was Blaugrund who
13 said it earlier, the distributed SIP, whereby GE could
14 actually come just directly out of Carteret and you do
15 put your own circuits from wherever your location is
16 directly into Carteret, much the same way as you would a
17 direct feed, if the SIP had that information, the
18 imbalance and depth, it could be much more useful in that
19 type of model.

20 But the way the SIP exists today, again, you've
21 heard so many people say it today, it's just usable in
22 its current construct for trading.

23 MR. REDFEARN: So this leads us to, I think,
24 another important question. One of the things that we're
25 contemplating during the course of these two days is what

1 should be the core data infrastructure? How should we be
2 thinking about what is core?

3 We've heard a lot of things already discussed.
4 We've heard odd lots should be added to the SIP
5 potentially but we have to figure out what the
6 obligations are related to that. We've heard the auction
7 information has been suggested. We've heard depth of
8 book potentially being suggested. We've heard microwave
9 connectivity might sort of level it out.

10 And again, back to the question about how do we
11 make it fair for all participants in the market so that
12 if you're not buying the, you know, all the bells and
13 whistles, you're still sort of coming in at a core --
14 with sort of a core, basic level without being sort of
15 potentially priced out to the point where you're not able
16 to necessarily -- so what are your thoughts? I'd like to
17 kind of get the views of different panelists here, what
18 are your thoughts on how should we think about what is
19 the core infrastructure?

20 Presumably, it's not the same thing as it was
21 in 19 -- you know, '74 or whatever it was when it was
22 initially conceived?

23 MR. ISAACSON: So if you don't mind, I'll take
24 that. So I think, from a core data perspective, what we
25 have on the SIPs today is quite good. I will make -- odd

1 lots have been talked about. So we would be open to
2 adding odd lots to quotes. It should be noted that odd
3 lots were added to the trade feeds on both SIPs two or
4 three years ago. So all odd lot trades show up already.

5 We would have to think about it from an order
6 protection rule, as was mentioned on the previous panel.
7 Are you going to protect those odd lots? Of course, we
8 should figure that out. But, you know, we would likely
9 be very in favor of that.

10 And then option information, you know, we too
11 are a listing exchange, primarily ETFs and then our own
12 stock. And we would likely be very much in favor of
13 considering putting that information on the SIP as well.

14 But I think providing depth on SIPs, we would
15 not go that far. I think there's potential for a lot of
16 confusion there, potentially, for the intended purpose.
17 You've heard multiple panels here where there's different
18 purposes for the SIP versus non-SIP feeds.

19 So I'd also step back, you know, as a person
20 who sat on the committee for many years in my role at
21 Bats and still have some visibility there. It's -- the
22 SIPs have come in a tremendous -- they've made a lot of
23 progress. When I first sat on those SIPs, we were
24 talking in milliseconds and we've talked about -- other
25 panels have talked about how much it has improved. But

1 the SIPs were in need of improvement and so many of those
2 improvements have happened.

3 Now, if we're talking about submission of data
4 or transmission of data between data centers in a more --
5 in a better protocol, and we're open to discussion about
6 distributed SIPs as well. It just has to -- we have to
7 understand that the exchanges are also responsible, have
8 obligations that are related to us as the people that are
9 in trouble, frankly, if the SIPs don't work.

10 So that's our views on core data. Odd lots and
11 auction information and continue the discussion on
12 improving the technology of the SIPs.

13 MR. REDFEARN: Joe, going down to your end,
14 what do you think should be the core?

15 MR. WALD: Yeah, core data, I think, you know,
16 it's nice that the SIPs have improved but they are just
17 not useful in terms of being able to be core data
18 products. They do have a number of things that continue
19 to be used in conjunction with the proprietary feeds.
20 But not having depth of book, not having the richness of
21 data that you need to be able to have effective order
22 placement and to be able to really go out and execute in
23 the marketplace the right way is a critical component
24 that's lacking.

25 The auction data is another one that I think is

1 just -- the way the market has evolved, with how much
2 passive investing goes on, with how important the opening
3 and the closes have become, I think that's another, you
4 know, area that has to be addressed, not only on the
5 market data side but clearly on the cost side. You know,
6 you spoke about monopoly a little bit. Well, you know,
7 the auctions are one area where there is a monopoly and
8 there isn't the type of competition that you have on
9 regular trading costs. And that's reflected pretty
10 clearly. The cost of an auction execution is probably
11 about 10X the cost of a normal execution in the regular
12 trading day.

13 So there are a number of conflicts here that
14 have to be managed. And one great solution would be to
15 bring the SIP up to speed and redefine what is core data
16 and how that data gets disseminated, who gets it, how
17 fast do they get it, what does it cost across the board.
18 I think that those are critical challenges that are
19 important for us to continue to discuss.

20 MR. REDFEARN: Ronan, do you have a view on how
21 we should think about core data going forward?

22 MR. RYAN: I agree with what Joe said. And
23 similar to what I said before, there is an opportunity to
24 potentially build a distributed SIP. I don't even think
25 you need to connect to it via microwave. I mean, fiber

1 can be fast enough from a distributed standpoint. If
2 it's not ping-ponging back between the data centers in
3 order for you to get a quote, the SIP -- and again, Mark
4 from Redline beforehand was giving percentage numbers on
5 performance of the SIP versus direct feeds. I can't
6 speak to it being that wide. But if it is, in fact, that
7 wide, then we need to do better on the SIP before we
8 would consider it being any form of replacement for
9 direct feeds.

10 Along with depth. And Chris is right, depth
11 can be fairly confusing. Maybe it can be a simpler
12 version of depth, just an aggregated amount at each level
13 rather than an order by order. But it's worth
14 investigation. But I do think we're a long way off. And
15 for now, direct feeds is the need. And transparency in
16 those costs, from soup to nuts, not the shell game of
17 this is this and this hasn't changed but this did, I
18 think it's really, really important.

19 MR. REDFEARN: Jamil.

20 MR. NAZARALI: Yeah, I think it's really
21 important, as we think about what data to include in the
22 SIP that we recognize there's really two reasons why
23 firms use the direct feeds. Number one is it contains a
24 lot of information that the SIP doesn't. All right? And
25 we can solve for that by including some of the

1 information that we discussed earlier.

2 But the second reason is because of the speed
3 reason. And that speed reason is going to exist always
4 if you have the SIP processed centrally, right? And so
5 we should be very careful in attempting to solve the
6 problem by just including more data. Because you will
7 still have a large number of firms needing to use the
8 direct feeds to ensure they're getting the most up-to-
9 date prices because, you know, as Ronan described, you're
10 not going to have that -- you're going to continue to
11 have that pinging across the different locations versus
12 taking it direct. And you really, if you want to make
13 the SIP a replacement or largely a replacement, you need
14 to solve both of those problems.

15 MR. REDFEARN: So your starting point, the
16 first thing you would say is solve for the geographic
17 latency issue with the central point of consolidation and
18 then take it from there?

19 MR. NAZARALI: Yes, because I think that that's
20 actually -- yes, that's right.

21 MR. REDFEARN: Vlad.

22 MR. KHANDROS: Yeah, for sure having
23 distributed SIP has a lot of merit to solve for the
24 latency differences that are inherent in the current
25 structure. And for sure, adding datasets such as odd

1 lots and revisiting order protection when doing that has
2 a great deal of merit as well.

3 That said, while I agree strongly with a lot of
4 the comments made, it's -- I do worry about kind of a
5 game of whac-a-mole here, which is if we start fixing
6 parts of the SIP or if we start fixing parts of
7 nondisplay fees, we still have a lot of other issues that
8 are being created over that process. And so, you know,
9 there were conversations over years past around having a
10 truly competitive process for the SIP and there's likely
11 a good argument to take a step back and have a truly
12 competitive process that gets revisited, so that
13 different industry players have the opportunity to
14 compete and innovate rather than having the same
15 established players constantly being the primary
16 providers.

17 MR. REDFEARN: Michael, your view on this one?

18 MR. FRIEDMAN: Just that CME, I think, has a
19 10-level depth product which is pretty standard. So
20 maybe you wouldn't need to add full depth if you were
21 doing depth in the SIP, just some abbreviated version of
22 it.

23 MR. REDFEARN: James.

24 MR. BROOKS: Yeah, since Michael spent so much
25 time on this, I'll say that I'd agree with the geographic

1 points. No matter how much the processor is sped up,
2 that's dwarfed by the geographical differences. In one
3 of our written comments, we've mapped that out on paper
4 and diagramed it out. It's been talked about so
5 extensively, I think, here, I'm not going to add on yet
6 another one.

7 MR. REDFEARN: I welcome back Commissioners
8 Jackson and Roisman. Just so you guys -- if you have any
9 questions before we get close to the end here, please --

10 COMMISSIONER ROISMAN: Is it safe down here?

11 MR. REDFEARN: What's that?

12 COMMISSIONER ROISMAN: Is it safe now?

13 MR. REDFEARN: It's safer.

14 (Laughter.)

15 MR. BROOKS: Yeah, we're happy --

16 MR. REDFEARN: We've got a happy Michael, happy
17 James, Chris is joyful, joyful Chris.

18 All right, let us know.

19 Listen, I only have one more question that I
20 wanted to ask, which gets back to, you know, just to dig
21 a little bit deeper on the question of fair and
22 reasonable. I asked this on the last panel and it is one
23 that we struggle with, right? Which is that when filings
24 are going in, we have a statutory obligation to examine
25 fair, reasonable and not unreasonably discriminatory when

1 we're looking at these things. And in the course of that
 2 process, we have to look at, you know, all of the market
 3 participants and we're trying to understand this.
 4 And I'd just -- I'm looking for any other
 5 insight you can provide in terms of how we -- how we
 6 manage that challenge.
 7 MR. KHANDROS: So in many ways, just to take a
 8 quick step back, the cost of trading, the performance of
 9 trading still seems quite key, and hopefully still one of
 10 the big themes we have, as in what is the cost of trading
 11 for retail, what is the cost of trading for institutions?
 12 And those broadly are going in the right direction. So
 13 I do want to make sure, towards the end, we have a
 14 positive note. Which is, you know, I think we are all
 15 here saying that things are working generally well. But
 16 there are pockets of the capital markets that we need to
 17 significantly improve, like market data.
 18 In terms of fairness, I think it goes to this
 19 question of we want to be sure that mom and pop, that Mr.
 20 and Mrs. 401(k) are getting access, are getting best
 21 execution. We want to be sure that's happening. I think
 22 the question is, does it need to happen with them
 23 accessing it directly or not? You know, we heard
 24 comments from a number of folks. You know, Matt from TD
 25 earlier said, you know, his comment was he doesn't

1 necessarily need to take in all of the top end market
 2 data feeds because he's closely measuring performance of
 3 brokers he's leveraging to do it and he expects they're
 4 investing heavily to do it. And so to me, his customers,
 5 in his comments, sound like they're still getting
 6 extremely competitive execution quality.
 7 And so in many ways, that sounds like the --
 8 like it's generally going well. That said, we need to
 9 make sure that we don't have fees going up at such
 10 significant levels where there is no ability to switch
 11 out, there is no ability to truly compete or move flow
 12 around based on those market data fee increases.
 13 MR. RYAN: Yeah, what I'd add to that is, you
 14 know, I guess it was echoed on this morning's panel as
 15 well that there just needs to be more transparency on
 16 cost. It's not a case of I'll show you mine if you show
 17 me yours. That's a little nonsensical. The role that we
 18 play as exchanges and as SROs, to an extent, are
 19 regulated oligopolies. It's our responsibility to share
 20 what our costs are.
 21 And when I look at our bills from other
 22 exchanges and, yes, we are all in on a per share basis, I
 23 can't even understand necessarily what we are paying
 24 other exchanges. The bills are like phonebooks with like
 25 spin ports and flux capacitors and rustproofing and all

1 this other kind of stuff.
 2 I think it is just fair to ask -- and of
 3 course, all the exchanges, obviously there's costs and I
 4 agree with Chris on the equidistant cables and everything
 5 like that. And you can make profit off them. But at
 6 least, I guess, to the regulatory bodies, it doesn't
 7 necessarily have to be public exactly what your costs
 8 are, but some expression of where costs are.
 9 And, you know, all-in costs, I know you have to
 10 run an exchange, I know you have to run a matching
 11 engine. I haven't seen really any exchanges who have a
 12 business model on paying more rebates than they charge
 13 for take fees on the whole. So there's money made there,
 14 too.
 15 So I just think it's a matter of full
 16 transparency. It's, you know, it's beating a dead horse,
 17 but it is pretty critical. And like, that's why we're
 18 here talking about this nonsense for two days. But very
 19 good idea to put it together.
 20 (Laughter.)
 21 MR. REDFEARN: Thank you for that, Ronan.
 22 MR. WALD: I'll keep beating that dead horse.
 23 Because transparency really is the best place to start
 24 first. Ultimately, things like having fee changes,
 25 filings that go in that are effective immediately are

1 counterintuitive to a process around justifying whether
 2 these costs are fair and equitable. That's probably a
 3 good place to start. But ultimately understanding the
 4 nature of these fees, why they've changed, who they
 5 benefit, what are they actually there for, who is
 6 subscribing to them, an overall kind of new structure
 7 around transparency overall, I think, is going to help
 8 really get us to the place we need to go.
 9 MR. ISAACSON: I just want to make a point on
 10 transparency though. If you look at the entire order
 11 flow life cycle, what part of it has the most
 12 transparency around fees that have to be filed with the
 13 SEC? It's really at the exchange. And there's a whole
 14 lot of steps from Matt at TD Ameritrade and that order or
 15 Met, where the fees aren't nearly as transparent as they
 16 are at the exchange.
 17 So I just want to make it clear, we're held to
 18 obviously very different regulatory standards than a
 19 large part of the rest of the order life cycle here. And
 20 if we're going to change that standard -- sorry about
 21 that, didn't mean to hit you, Michael -- so if we're
 22 going to change that standard materially, do you want a
 23 competitive landscape for exchanges or not? Or do you
 24 want to freeze the landscape with your standard?
 25 MR. FRIEDMAN: I think you could go a long way

1 towards fair and reasonable by segmenting the world of
2 exchange members into, I mean, the Virtus and the
3 Citadels have one set of needs, the big banks have a
4 different set of needs, the Clearpools and the Trilliums
5 have a different set of needs. And we don't all need to
6 get the same menu of options and the same prices, as long
7 as we're on a level playing field with our peers. I
8 think that might help things.

9 MR. DONOHUE: Can I ask this question? And I
10 think Stacey may have brought this up earlier, the all-in
11 costs idea. And, James, you walked through a number of
12 issues that seemed could be relevant to evaluating the
13 fairness and reasonableness of fees. Can we do that
14 effectively on a one-off basis? Or do we need to look at
15 the reasonableness and fairness of fees as all-in fees?

16 MR. BROOKS: Looking at one individual fee by
17 itself doesn't make sense because they are all related.
18 And it makes sense that there's different competing
19 models, different marketing around the models. So I
20 think it's something that needs to be approached very
21 carefully. And it's going to evolve over time and it
22 needs to be allowed to evolve over time.

23 I definitely believe in pricing for the value
24 of products and the market-based approach. And as Chris
25 said, we don't want to freeze what's happening.

1 I'd say that we're all servicing the end
2 investor here. And that's something we've heard a lot.
3 Everybody is representing the investor. And that's true.
4 Exchanges do, wholesalers do, retailers do, institutions
5 do. So I don't think there's anybody up here that isn't
6 servicing or focused on the investor. And everybody is
7 saying the investor has it very well now.

8 But one thing to note, there is no end investor
9 up here on any of these panels. None. None of us are
10 end investors. And this really is Wall Street and
11 exchanges. It is not Main Street.

12 And when I hear some participants talking about
13 cost going up, it's their costs going up. If it's been
14 better for the investor than ever before, you know, is it
15 really about the end investor? And I do want to point
16 that out, because everybody here is doing their best to
17 serve the end investor. And everybody up here is for
18 profit. And in a very competitive environment, that
19 works. And I don't think that should be lost.

20 So that's a long way of saying, getting back to
21 your question which I think is very pertinent, you do
22 need to look at the whole ecosystem and the services
23 provided. And if you look at just one, other things are
24 going to evolve around that. You knock one fee out,
25 that's going to pick winners and losers and charges will

1 be done in a different way. And maybe that's good for
2 some models and bad for other models.

3 And people talk about the complexity of
4 pricing. To some extent, complexity is rational. If it
5 was very simple, that's not rational. And, look, you can
6 even go into an ice cream store and it's one scoop, it's
7 two scoop, there's half-priced Tuesday and you get a
8 banana split and if you get the deluxe sundae you get two
9 free toppings, otherwise you pay per topping. There's
10 lots of businesses with complex pricing. I don't think
11 this is actually unique to our industry at all. And it
12 does need to be considered very carefully if we just have
13 this myopic, one-off approach, let's just look at one
14 thing and not the all-in model and ecosystem, that would
15 be a mistake.

16 MR. REDFEARN: Does anybody have any final
17 comments before we wrap up?

18 (No response.)

19 MR. REDFEARN: Okay, let me just say this.
20 Before we wrap up, I just wanted to make a brief
21 announcement.

22 So the purpose, a lot of the purpose of today's
23 discussion was to really dive into getting a lot of -- a
24 different array of views about the whole market data and
25 market connectivity infrastructure. We got a very high-

1 level view in the first panel. It was a deeper dive
2 specifically on the SIPs in the second one, and this one
3 on proprietary data products and access. I think we have
4 turned up a lot of interesting and very useful,
5 insightful points from an array of perspectives and a
6 variety of participants.

7 I think tomorrow, the intention is to be
8 focused on areas where we can sort of pick up from here
9 and talk about are there any policy areas that we as a
10 Commission should be contemplating? So the panels
11 tomorrow are going to be focused on, really, again, what
12 should the core infrastructure be, how should it be
13 built, sort of picking up on those issues. The second
14 one is going to be looking at the governance issues
15 associated with the SIPs, where we will be addressing
16 possible conflicts and confidentiality policies and
17 executive sessions. And there have been a lot of remarks
18 related to that. There will be a discussion about --
19 deeper on funding of the core data infrastructure and how
20 we look at the cost model and how we deal with some of
21 these challenges around figuring this stuff out.

22 And last but not least, talking about
23 transparency, what are the areas where public
24 transparency will be helpful for us to be able to make
25 better policy, better policy decisions and be able to

1 sort of evaluate a lot of what's coming across our desks
2 a little bit better.

3 So I just wanted to put that out. We will be
4 starting tomorrow at 9:00 a.m. And with that, I am going
5 to wrap up and thank you.

6 Unless, do you guys have any final comments you
7 want to make before we wrap up, Commissioners?

8 COMMISSIONER JACKSON: No, just very briefly
9 want to thank all the participants for the insights. We
10 know you're all busy and you all have demanding roles.
11 And I have to tell you, to a person, for all my
12 colleagues, we are delighted that you took the time to
13 come and share these insights. And we're looking forward
14 to tomorrow's conversations. So thank you very much.

15 MR. REDFEARN: All right, thank you all very
16 much.

17 (Applause.)

18 (Whereupon, at 4:26 p.m., the meeting was
19 adjourned, to reconvene at 9:00 a.m. the following day.)

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1 REPORTER'S CERTIFICATE

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3 I, Jemima Euell, reporter, hereby certify that the
4 foregoing transcript is a complete, true and accurate
5 transcript of the matter indicated, held on
6 __10/25/2018_____, at Washington, D.C., in the
7 matter of:
8 ROUNDTABLE ON MARKET DATA AND MARKET ACCESS.
9 I further certify that this proceeding was recorded by
10 me, and that the foregoing transcript has been prepared
11 under my direction.

12
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14 Date: 10/25/2018

15 Official Reporter: Jemima Euell

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1 PROOFREADER'S CERTIFICATE

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3 In the Matter of: ROUNDTABLE ON MARKET DATA AND MARKET
4 ACCESS

5 File Number: OS-1025

6 Date: Thursday, October 25, 2018

7 Location: Washington, D.C.

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9 This is to certify that I, Christine Boyce
10 (the undersigned), do hereby certify that the foregoing
11 transcript is a complete, true and accurate transcription
12 of all matters contained on the recorded proceedings of
13 the investigative testimony.

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