

**CONFLICTS OF INTEREST, INVESTOR LOSS  
OF CONFIDENCE, AND HIGH SPEED  
TRADING IN U.S. STOCK MARKETS**

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**HEARING**

BEFORE THE

PERMANENT SUBCOMMITTEE ON INVESTIGATIONS  
OF THE

COMMITTEE ON  
HOMELAND SECURITY AND  
GOVERNMENTAL AFFAIRS  
UNITED STATES SENATE  
ONE HUNDRED THIRTEENTH CONGRESS

SECOND SESSION

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JUNE 17, 2014  
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# CONTENTS

Opening statements:	Page
Senator Levin .....	1
Senator McCain .....	4
Senator Johnson .....	6
Prepared statements:	
Senator Levin .....	55
Senator McCain .....	59

## WITNESSES

TUESDAY, JUNE 17, 2014

Robert H. Battalio, Professor of Finance, Mendoza College of Business, University of Notre Dame, Notre Dame, Indiana .....	7
Bradley Katsuyama, President and Chief Executive Officer, IEX Group, Inc., New York, New York .....	9
Thomas W. Farley, President, New York Stock Exchange, New York, New York .....	31
Joseph P. Ratterman, Chief Executive Officer, BATS Global Markets, Inc., Lenexa, Kansas .....	33
Joseph P. Brennan, Principal and Head of Global Equity Index Group, The Vanguard Group, Inc., Malvern, Pennsylvania .....	35
Steven Quick, Senior Vice President, Trader Group, TD Ameritrade, Omaha, Nebraska .....	36

## ALPHABETICAL LIST OF WITNESSES

Battalio, Robert H.:	
Testimony .....	7
Prepared statement .....	61
Brennan, Joseph P.:	
Testimony .....	35
Prepared statement .....	87
Farley, Thomas W.:	
Testimony .....	31
Prepared statement .....	77
Katsuyama, Bradley:	
Testimony .....	9
Prepared statement .....	69
Quick, Steven:	
Testimony .....	36
Prepared statement .....	93
Ratterman, Joseph P.:	
Testimony .....	33
Prepared statement .....	79

IV

APPENDIX

Page

EXHIBIT LIST

1.a. <i>Maker-Taker Conflict</i> , chart prepared by the Permanent Subcommittee on Investigations .....	102
b. <i>Payment for Order Flow Conflict</i> , chart prepared by the Permanent Subcommittee on Investigations .....	103
c. <i>Conflict for Brokers Trading for Institutional Investors</i> , chart prepared by the Permanent Subcommittee on Investigations .....	104
d. <i>Conflicts for Retail Brokers Trading for Retail Investors</i> , chart prepared by the Permanent Subcommittee on Investigations .....	105
2. Letter from the Securities and Exchange Commission to the Senate Permanent Subcommittee on Investigations, dated June 18, 2014, regarding the impact of high-frequency trading on the efficiency, stability, and integrity of the U.S. capital markets .....	106
3. Letter from the Securities and Exchange Commission to the Senate Permanent Subcommittee on Investigations, dated August 5, 2014, regarding conflicts of interest in the U.S. equities markets, including “maker-taker” fee schedules and payment for order flow by wholesale brokers to retail. ....	123
4. Letter from TD Ameritrade, dated June 19, 2014, clarifying June 17, 2014 testimony of Steven Quick. ....	125
5. Response of Steven Quick, TD Ameritrade, Inc., to supplemental questions for the record of Senator Carl Levin .....	126
6. Response of Joe Ratterman, BATS Global Markets, Inc., to supplemental questions for the record of Senator Carl Levin .....	127
7. Response of Thomas Farley, NYSE Group, to supplemental questions for the record of Senator Carl Levin .....	128
8. Response of Joseph Brennan, The Vanguard Group, Inc., to supplemental questions for the record of Senator Carl Levin .....	129

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**TUESDAY, JUNE 17, 2014**

U.S. SENATE,  
PERMANENT SUBCOMMITTEE ON INVESTIGATIONS,  
OF THE COMMITTEE ON HOMELAND SECURITY  
AND GOVERNMENTAL AFFAIRS,  
*Washington, DC.*

The subcommittee met, pursuant to notice, at 9:35 a.m., in room SH-216, Hart Senate Office Building, Hon. Carl Levin, Chairman of the Subcommittee, presiding.

Present: Senators Levin, McCain, and Johnson.

Staff present: Elise J. Bean, Staff Director and Chief Counsel; Mary D. Robertson, Chief Clerk; Daniel J. Goshorn, Senior Counsel; Joseph Bryan, Robert Heckert, and Timothy Everett (Sen. Levin); Adam Henderson, Professional Staff Member; Henry J. Kerner, Staff Director and Chief Counsel to the Minority; Jack Thorlin, Counsel to the Minority; Brad M. Patout, Senior Advisor to the Minority; Scott Wittmann, Research Assistant to the Minority; John Lin, Law Clerk to the Minority; Joel Churches, Detailee (IRS); Admad Sarsour, Detailee (FDIC); Jacob Rogers, Law Clerk; Rebecca Pskowski, Law Clerk; Michael Avi-Yonah, Intern; Amy Dreisiger, Law Clerk; Owen Dunn, Law Clerk; Josh Katz and Richard Drucker (Sen. Levin); Ritika Rodrigues and Meris Petek (Sen. Johnson); and Myles Matteson (Sen. Ayotte).

**OPENING STATEMENT OF SENATOR LEVIN**

Senator LEVIN. Good morning, everybody. Most Americans' image of the U.S. stock market is shaped by a single room: the trading floor of the New York Stock Exchange, where traders await a ceremonial bell to kick off the day's activity, then trade shares worth millions on scraps of paper.

In reality, most shares are traded not on a floor in Manhattan, but in racks of computer servers in New Jersey. Trades happen not at the speed of a human scribbling on paper, but in the milliseconds it takes for an order to travel through fiberoptic cables. And, increasingly, the money made on stock markets comes not from thoroughly assessing companies for their investment potential, but from exploiting infinitesimal advantages at unfathomable speeds, earning billions off price differences measured in pennies.

We are in the era of high-speed trading. I am troubled, as are many, by some of its hallmarks. It is an era of market instability,

as we saw in the 2010 “flash crash,” which this Subcommittee and the Senate Banking Committee explored in a joint hearing, and in several market disruptions since that flash crash. It is an era in which stock market players buy the right to locate their trading computers closer and closer to the computers of stock exchanges—conferring a minuscule speed advantage yielding massive profits. It is an era in which millions of trade orders are placed, and then canceled, in a single second, raising the question of whether much of what we call the market is, in fact, an illusion.

Many, including this Senator, question whether the rise of high-speed trading is, overall, a good thing for markets and investors. But without question, this era has seen a rise of conflicts of interest. These conflicts will be my focus today. Other Senators may focus on this or other aspects of high-speed trading.

New technologies should not erase enduring values. Financial markets cannot survive on technology alone. They require a much older concept: trust. And trust is eroding. Conflicts of interest damage investors and markets—first, by depriving investors of the certainty that brokers are placing the interests of their clients first and foremost; and, second, by feeding a growing belief that the markets are simply not fair.

In fact, polling shows that roughly two-thirds of Americans believe the stock market unfairly benefits some at the expense of others. This distrust may be a factor in the fact that just over half of Americans, according to a Gallup survey earlier this year, own stock or mutual funds, which is down from more than two-thirds of Americans who owned stock or mutual funds in 2002. That lack of faith—if allowed to fester and grow—will undermine a very important public purpose of stock markets: to efficiently raise capital so that businesses may grow, create new jobs, and add to America’s prosperity.

In previous hearings and investigations, this Subcommittee has shown that our financial markets have become plagued by conflicts of interest. We have uncovered investment banks willing to create securities based on junk assets, tout them to their clients, and then bet against those same securities, making a fortune at the expense of their clients. We have seen credit rating agencies assign artificially high ratings to securities in order to keep or gain business. Now, with that history in mind, those who argue that the conflicts we will explore at this hearing are manageable or acceptable have a mighty high burden of proof.

What seems to your average investor to be a simple stock market trade is usually a complicated series of transactions involving multiple parties, complex technology, and an ever-increasing number of order types and payment arrangements. There are retail brokers, like the ones found in Main Street offices across the country and on TV advertisements. There are wholesale brokers who buy orders from retail brokers. And there are dozens of trading venues where shares are bought and sold. Most Americans know the New York Stock Exchange, but there are now 11 public exchanges, plus more than 40 alternative trading venues including “dark pools,” which are essentially private exchanges run by financial institutions.

As that complex structure has emerged, so have a number of conflicts of interest. I will focus on two. The first conflict occurs when

a retail broker chooses a wholesale broker to execute trades. The second occurs when a broker, acting on behalf of either a retail client or an institutional investor that manages pension funds and retirement accounts, chooses a trading venue, often a public exchange, to execute a trade. At both of these decision points, the party making the decision should only be influenced by the best interest of the investor. That is what ethics demands, and it is what the law requires.

But there is another factor in play. At both decision points, the current structure gives brokers an incentive to place their own interests ahead of the interests of their clients. And here is how.

The first conflict, which is illustrated in that chart,<sup>1</sup> occurs when retail brokers receive payments from wholesale brokers for their orders. This money, known as “payment for order flow,” can add up to untold millions, and almost every retail broker keeps these payments rather than passing them on to clients. The reasons wholesale brokers are willing to pay for order flow are complex, but one big one is that wholesale brokers can fill many of those orders out of their own inventory and profit from the trade—a practice known as “internalizing.”

The second conflict, shown on the second chart,<sup>2</sup> arises when a broker decides to use a public trading venue and then chooses which venue it will send orders to for execution. Under what is known as the “maker-taker” arrangement, there is an incentive for the broker to choose the trading venue based on the broker’s financial interest, rather than the client’s.

Now, “maker-taker” can be complicated, but here is a simplified explanation. When a broker makes an offer on an exchange to buy or sell a stock at a certain price, the broker is classified as a “maker,” and most exchanges will pay the broker a rebate when that offer to buy or sell is accepted. A broker who accepts a maker’s offer to buy or sell is called a “taker” and will generally pay a fee to the trading venue. The important thing to remember is that brokers, by maximizing maker rebates and by avoiding taker fees, can add millions of dollars to their bottom line, giving them a powerful incentive to send the order to the trading venue that is in their best interest even if it is not in their client’s best interest.

It is significant that earlier this year, speculation that regulators were considering restrictions on payment for order flow sent shares of some brokerage firms significantly lower.

Obviously, there is a lot of money at stake in preserving these conflicts of interest.

Even if firms disclose these payments, disclosure does not excuse them from their legal and ethical obligations to clients. Their legal obligation is to provide clients with what is known as “best execution.” Whether they are meeting that obligation is a subjective judgment. The outcome of this subjective judgment affects the way tens of millions of trades are executed.

Now, some who profit from these payments argue that seeking this revenue does not interfere with their obligation to seek best execution. However, one of our witnesses today, Professor Robert

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<sup>1</sup>The chart titled “Payment for Order Flow Conflict,” appears in the Appendix on page 103.

<sup>2</sup>The chart titled “Maker-Taker Conflict,” appears in the Appendix on page 102.

Battalio of the University of Notre Dame, has done research indicating that when, given a choice, four leading retail brokers send their orders to the markets offering the biggest rebates at every opportunity. The research further suggests that exchanges offering the highest rebates do not, in fact, offer the best execution for clients. These brokers argue that they can pocket these rebates while still meeting their obligation to provide clients with best execution. So while they make a subjective judgment as to which trading venue provides best execution, on tens of millions of trades a year, that subjective judgment always just happens to also result in the biggest payment to brokers. I find it hard to believe that this is a coincidence.

Many market participants are worried about the conflicts of interest embedded in the current market structure. In addition to Professor Battalio, today's first panel will include Bradley Katsuyama, the president and CEO of IEX and a prominent Wall Street advocate for market reform. Our second panel will include four witnesses. They are Thomas W. Farley of the New York Stock Exchange, whose corporate owners have described conflicts as having a "corrosive impact" on stock markets. The next person on the second panel is Joseph Ratterman of BATS Global Markets, which operates exchanges that compete with the New York Stock Exchange and has a different view. The third witness on the second panel is Joseph Brennan of Vanguard Group, a major mutual fund company that has expressed concerns about these conflicts. And the fourth witness on the second panel is Steven Quirk of TD Ameritrade, a retail broker that derives significant revenue from payment for order flow from wholesale brokers and rebates that they receive from exchanges.

The duty of lawmakers and financial regulators is to look out for the interests of investors and the wider public. There is significant evidence that these conflicts can damage retirement savings, pension holdings, and other investments on which Americans rely. And even Americans without a single share of stock or a mutual fund account have something at stake because stock markets exist to foster investment, growth, and job creation. Conflicts of interest jeopardize that vital function.

Americans do not shy from innovation or technology; indeed, we embrace them. But Americans are understandably suspicious when technology can be turned against them and their families' financial interests. They are rightly concerned when technology and innovation are used to undermine basic, enduring principles such as trust and duty to a client. Our goal is to advance the protection of investors and our free markets by promoting those enduring values.

I want to thank Senator McCain and his staff for their close cooperation in this matter, as has always been the case in all matters. Senator McCain.

#### **OPENING STATEMENT OF SENATOR MCCAIN**

Senator MCCAIN. Thank you very much, Mr. Chairman, and I think this is a very important hearing, and I appreciate the hard work that you and your excellent staff have done on it. And I want to thank the witnesses for being here today.

When Michael Lewis' book "Flash Boys" came out, the public knew very little about high-frequency trading. Important questions were raised: Is the stock market "rigged" by unethical high-speed traders with faster access to market information, advanced technology, and sophisticated trading algorithms? Is high-frequency trading adding costs for other traders without contributing any real value to the market? Will stock markets face another flash crash like in 2010 when the Dow Jones temporarily lost \$1 trillion in market value in 20 minutes?

These concerns about high-frequency trading have fueled suspicions that Wall Street may well have become the ultimate insiders' game, where the average investor can no longer meaningfully participate. Consumers see firms that can make trades in fractions of a second using cutting-edge technology and wonder if the stock exchanges are still a place where their interests matter. Hopefully, this hearing will shed light on the high-frequency trading practices used on Wall Street and help restore confidence in our financial system.

The Subcommittee interviewed many industry participants, academic researchers, and key financial regulators. While the problems facing the market are complex, we can address them with a few commonsense solutions. For example, one of the most predatory high-frequency trading practices depends on the unintended consequences of the SEC's Regulation National Market System, or Reg NMS. That regulation essentially mandated that investment firms must buy or sell stocks at the best price available. While that might sound like a reasonable requirement, high-frequency trading firms can take advantage of the rule by putting out offers to buy or sell small amounts of stock at attractive prices. When a large investor, seeking to make a big order, accepts the high-frequency trading firm's offer because it is the best price available, the high-frequency trader can predict that the large investor will have to go to another exchange to purchase the rest of his order. The high-frequency trader can then race ahead of that investor to the other exchanges, buy up all available shares, and sell them to the large investor at a higher price. Changing Reg NMS so that investment firms are no longer legally required to take the high-frequency traders' bait is an easy, clear first step to cleaning up the worst high-frequency trading practices.

Another key tactic used by high-frequency trading firms is co-location. This practice involves trading firms literally renting space for their computers in the same room as the computers that run the stock exchanges so that they can receive market information directly from the exchanges' computers as fast as possible. The investors that do not buy this direct connection to the exchanges receive market data via a government-established system using out-of-date technology called the Securities Information Processor that compiles market data much more slowly. But as experts told the Subcommittee, there is no reason why public data feeds like the Securities Information Processor cannot be improved so that they are effectively as fast as private data feeds acquired through co-location. Updating the technology in the Securities Information Processor is another helpful measure that can be quickly adopted to shore up consumer confidence in the market.

In addition to high-frequency trading, “Flash Boys” also described how stock exchanges often pay rebates, as Senator Levin pointed out, to stockbrokers to entice them to trade on those exchanges. Those rebates, again, as Senator Levin pointed out, called “maker-taker payments,” create an apparent conflict of interest for the stockbrokers, who must choose between sending their clients’ orders to exchanges offering a higher rebate or to exchanges that would fill the orders as quickly as possible. While many trading firms argue that those payments spur more market activity and reduce costs for consumers, some experts have argued that these benefits are minimal and that investors are harmed by their brokers’ conflict of interest.

The Subcommittee has found that there is a lack of publicly available data regarding maker-taker payments, leading to difficulties in determining whether the payments actually have an adverse effect on the market. A logical first step would be to have more transparency in the payments, allowing neutral researchers to study the issue in greater detail.

I hope this hearing will educate the public about high-frequency trading and broker conflicts of interest, and I hope that as a result of this hearing and the information that we will obtain from our expert witnesses that action will be taken to restore investor confidence, which has clearly been eroded in recent months, especially since the publication of Michael Lewis’ book.

I thank you, Mr. Chairman.

Senator LEVIN. Thank you very much.

Senator JOHNSON.

#### **OPENING STATEMENT OF SENATOR JOHNSON**

Senator JOHNSON. Thank you, Mr. Chairman. I also want to thank you for holding this hearing. It was very interesting getting prepared for it.

Both Chairman Levin and Senator McCain mentioned the word “complex,” and there is no doubt about it. What is happening in terms of trading is highly complex.

From my standpoint, having been an individual investor, I think the primary solution is increased competition and transparency so that we really understand what is happening. But because it is complex, it is difficult to fully understand. I am hoping this hearing will really lay out the reality of the situation, and, again, as an individual investor who has bought stocks for literally decades, the competition has increased in the marketplace. I used to pay hundreds of dollars to buy 100 shares of stock. Now I pay about \$10.

So I really do hope that this hearing conveys exactly what is happening in the marketplace, what benefits have come to consumers over the years, what dangers may be out there, but the bottom line is that this hearing should be about restoring confidence. I do not think it restores confidence if we try and create a state of fear and set up straw men in terms of the bogeymen out there trying to game the system. The best way to ensure confidence and to ensure best price, is through maximum competition and transparency in the marketplace. I am hoping that is certainly what this hearing reveals, and, again, I just want to thank all the witnesses. I am looking forward to the testimony.

Senator LEVIN. Thank you, Senator Johnson.

We will now call our first panel of witnesses for this morning's hearing: Professor Robert Battalio, Professor of Finance at the Mendoza College of Business at the University of Notre Dame in Notre Dame, Indiana; and Bradley Katsuyama, President and CEO of the IEX Group in New York.

I appreciate both of you being with us this morning, and we look forward to your testimony. And pursuant to Rule 6, all witnesses who testify before the Subcommittee are required to be sworn. So at this time, I would ask both of you to please stand and raise your right hand. Do you swear that the testimony you are about to give before this Subcommittee will be the truth, the whole truth, and nothing but the truth, so help you, God?

Mr. BATTALIO. I do.

Mr. KATSUYAMA. I do.

Senator LEVIN. We will be using a timing system today. Please be aware that 1 minute before the red light comes on, you will see the light change from green to yellow, giving you an opportunity to conclude your remarks. All of your written testimony will be printed in the record in its entirety, and we would ask that you try to limit your oral testimony to 5 minutes.

Professor Battalio, we will have you go first. Thank you again for coming today and for your work.

**TESTIMONY OF ROBERT H. BATTALIO,<sup>1</sup> PROFESSOR OF FINANCE, MENDOZA COLLEGE OF BUSINESS, UNIVERSITY OF NOTRE DAME, NOTRE DAME, INDIANA**

Mr. BATTALIO. Good morning. Chairman Levin and Ranking Member McCain, thank you for inviting me to testify today. It is an honor to have the opportunity to present my views on conflicts of interest in U.S. equity markets to the Senate Permanent Subcommittee on Investigations. My expertise is the relationship between order flow inducements offered by dealers and exchanges and the quality of trade execution.

Before discussing my current research with Shane Corwin and Robert Jennings, I would like to provide a bit of context. Orders used by retail investors can be broadly classified into two categories.

Investors who want to trade quickly at the best available price use marketable orders. These orders demand or take liquidity from the market. Investors who are willing to buy or sell stock but not at the prices that are currently prevailing in the marketplace use nonmarketable or standing orders to express their trading interests. Nonmarketable orders do not immediately execute when they arrive in the market. Exchanges use electronic order books to keep track of their nonmarketable orders, and they typically use price-time priority to determine which nonmarketable order trades when a marketable order arrives. The nonmarketable orders resting on the electronic books make or supply liquidity for other market participants.

Several exchanges use make or liquidity rebates to attract nonmarketable orders. A make rebate is paid to an investor or her

<sup>1</sup>The prepared statement of Mr. Battalio appears in the Appendix on page 61.

broker when her nonmarketable order trades. To fund the make rebates, the same exchanges charge marketable orders a take fee when they trade with nonmarketable orders. As a result of competition, exchanges offering high make rebates also tend to charge high take fees, and those offering low make rebates tend to charge low take fees.

The incentives created by the maker-taker fee structure suggest marketable orders will tend to be first routed to venues that have low take fees and, thus, low make rebates. As a result, nonmarketable orders on high-fee, high-rebate venues are likely to trade last at a given price and, thus, can miss out on profitable trading opportunities. All else equal, this suggests that the likelihood that nonmarketable orders trade is lowest on the exchanges with the high make rebates.

NASD Notice to Members 01–22 states that brokers must take into account differences in the likelihood of execution when determining where to route nonmarketable orders and that brokers must not allow inducements to interfere with the duty of best execution. The conflict of interest associated with make-take fee schedules arises from the fact that most brokers do not pass fees and rebates directly through to their customers, but instead charge fixed commission rates that reflect fees, rebates, and other costs of doing business.

Thus, while investors prefer that their orders be routed to the venue offering the highest possibility of trade, a broker may have an incentive to route orders to the venue offering the highest liquidity rebate. It may seem that economics and competition should align the incentives of a broker and its customers; however, this alignment of incentives is hampered by an important agency problem. Brokers that maximize rebates may be able to charge lower commissions. If investors choose brokers based primarily on commissions—perhaps because they lack the sophistication and/or the necessary information to evaluate limit order execution quality—it may be profit maximizing for brokers to focus on liquidity rebates rather than the likelihood of execution when deciding where to route their nonmarketable orders. Unfortunately, investors whose orders do not execute do not receive the benefit of the low commission.

In our paper, we examine two issues. We begin by exploring whether make rebates appear to influence the routing decisions of retail brokers. We present evidence from SEC-mandated Rule 606 filings that four popular retail brokers route nonmarketable orders in a manner that is consistent with the goal of maximizing make rebates. Our Rule 606 data are from the fourth quarter of 2012, but subsequent Rule 606 filings suggest these brokers have not significantly altered their routing of nonmarketable orders.

After establishing that rebates appear to impact the order routing decisions of some brokers, we next analyzed the relationship between make rebates and several measures of execution quality, including the likelihood that and the conditions in which nonmarketable orders trade. Our analysis makes use of a proprietary data set of nonmarketable orders that represent about 1.5 percent of average daily volume and a publicly available data base that contains all trades and quotes.

As hypothesized, we find that nonmarketable orders routed to venues with low make rebates are more likely to trade, trade faster, and suffer less adverse selection than nonmarketable orders routed to venues with high make rebates. Our results suggest that when deciding where to route nonmarketable orders, situations frequently arise in which brokers must decide whether to maximize the likelihood of an execution or to maximize make rebates.

Thanks for the opportunity to discuss my research with Shane and Bob today.

Senator LEVIN. Thank you very much, Professor Battalio.

Mr. Katsuyama.

**TESTIMONY OF BRADLEY KATSUYAMA,<sup>1</sup> PRESIDENT AND CHIEF EXECUTIVE OFFICER, IEX GROUP, INC., NEW YORK, NEW YORK**

Mr. KATSUYAMA. Good morning, Chairman Levin, Ranking Member McCain, Senators, staff, ladies and gentlemen. Thank you for the opportunity to participate in this hearing and share our thoughts on issues affecting the U.S. equity markets. My name is Brad Katsuyama, and I am the President and CEO of IEX Group.

Since October 2013, IEX has been operating as an alternative trading system for U.S. equities, and we intend to pursue registration as a national securities exchange with the Securities and Exchange Commission later this year.

IEX was founded on the premise of institutionalizing fairness in the market through the use of technology and by offering a balanced, simplified, and transparent market model. IEX believes strongly in a market's responsibility to ensure just and equitable principles of trade as required by Section 6 of the Securities and Exchange Act of 1934.

With that in mind, IEX deliberately sought to build a platform that would eliminate conflicts of interest in the operation of our market. Specifically, IEX is owned by a consortium of mutual funds, hedge funds, family offices, and individuals, but only has registered broker-dealers as trading participants. IEX does not pay rebates or provide any other payment for order flow, and as a result, we have a very limited number of order types.

IEX has instituted a time buffer that applies to all of our trading participants to neutralize certain structural inefficiencies that we have discovered. IEX uses direct market data feeds from all U.S. exchanges rather than the slower SIP to price orders and trades in our market. And IEX was the first ATS to publicly publish our confidential form ATS in an effort to promote transparency.

It is important to recognize that IEX was created within the current regulatory framework, serving as evidence that the spirit of the rules governing our current market do allow for innovative free market solutions to emerge. We believe that the U.S. equity markets have improved dramatically over the past 20 years as participants can now trade less expensively and faster than they did in the past. But we believe this was mainly due to the inevitable improvements that technology has delivered across many industries, with financial markets being no exception.

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<sup>1</sup>The prepared statement of Mr. Katsuyama appears in the Appendix on page 69.

Despite those benefits, it has become apparent to our team and our supporters that the U.S. equity markets are also far from perfect, and these imperfections that we have discovered over the last several years are the reason we started IEX and the reason I am sitting here today.

We believe that the number of independent equity trading destinations across exchanges, dark pools, and other internalizers, each having their own unique technology, products, rule sets, and pricing schedules, creates a tremendous amount of complexity. This complexity, combined with the lack of clear language disclosure, has created structural inefficiencies which allow unfair advantages and disadvantages to various market participants.

This complexity has also put the health and stability of the overall market at risk without contributing to the market's ability to serve its core function—capital formation.

There are four main conflicts of interest that we would like to highlight.

First, due to the complex fee and rebate structure of trading venues, brokers have perverse incentives when deciding where and how to route customer trades. Many high-quality studies, including the one from Professor Battalio, have demonstrated the direct relationship between a broker attempting to harvest rebates and worse execution quality for their customers. Based on our team's prior experience, we can confirm these findings.

Second, to avoid high fees for taking liquidity on exchanges, many of the largest brokers created their own private dark pools to internalize order flow, in the process isolating client orders away from the broader market. Although many of these broker pools are interconnected, at times brokers are unwilling to route orders to other broker pools to avoid improving the performance of a competitor, even though it may be in the best interests of their client to do so.

Third, trading venues, including exchanges and dark pools, naturally seek to maximize profits by increasing their own trading volumes, and as a result, there are many predatory, high-volume trading strategies that are left unattended—intermediating between venues—as certain market centers prioritize market share over protecting the interests of client orders.

And, fourth, markets that offer co-location and different speeds of market data and connectivity have a direct conflict in the profits garnered from selling these services versus the structural inefficiency created when those same products enable a participant to trade faster than the market itself to the detriment of any participant who relies on the market to fairly price trades.

Although many of these issues are deeply embedded in our market structure, IEX believes that the best policies to address these conflicts are those that promote transparency and disclosure. The SEC's Midas website and FINRA's ATS reporting rule are recent positive steps, and we would encourage further pursuit of transparency, specifically these three points: first, standardization of data collection and reporting; second, disclosure of both routing and trading information in a standardized form between brokers and clients; and, third, full disclosure of rules, products, and services from all market centers.

The most important implication of transparency is that it brings accountability to all participants in our market. Heightened forced transparency will give participants the information they need to ask critical questions and to make better decisions. This will allow the market to self-regulate.

We respectfully ask that if Congress or the Commission looks to further modify the structure of the equity markets, careful consideration is given to deciding which issues are better solved through regulation and which issues are better addressed through free market solutions.

In closing, IEX would like to echo SEC Chair White's recent statement that, "The secondary markets exist for investors and public companies, and their interests must be paramount." As the financial services work through this period of change, none of us should forget why the market exists in the first place.

Thank you.

Senator LEVIN. Thank you very much, Mr. Katsuyama.

Let us try a first round of 8 minutes, if that is all right, and we will have as many rounds as we need. And that is true with both panels. We have four votes that are going to begin at 11 o'clock. I will stay here at least through the first two votes and miss those votes as currently planned, and others can come and make the votes should they wish.

Professor Battalio, let us talk about the nonmarketable orders. These are the ones that do not have an immediate match and that add or make liquidity.

Now, under the maker-taker pricing, most exchanges are willing to pay brokers for sending them nonmarketable orders. Is that correct so far?

Mr. BATTALIO. Yes, sir. Very good.

Senator LEVIN. Some retail brokers send virtually all nonmarketable orders to exchanges that pay a rebate. Is that correct?

Mr. BATTALIO. That also appears to be true.

Senator LEVIN. OK. Now, your paper looked at where retail brokers routed nonmarketable customer orders and stated that Ameritrade, E\*Trade, Fidelity, and Scottrade route orders in a way that suggests that they may be focused on liquidity rebates. How often did those retail brokers route nonmarketable orders to the exchange offering the highest rebate?

Mr. BATTALIO. Those four brokers—well, three of the four brokers either route things called—the SEC reports are not good enough to distinguish between marketable and nonmarketable limit orders, OK? But based on an assumption that is pretty solid, three of the four either route limit orders to people that pay for order flow—and those are probably marketable orders—or to the high-fee venue, nowhere else.

Senator LEVIN. And the high-fee venue are the exchanges.

Mr. BATTALIO. It is one venue offering the high make rebate.

Senator LEVIN. All right. So when it comes to order flow, they go to the wholesale brokers generally. Is that correct?

Mr. BATTALIO. With the marketable stuff, they go to the wholesalers.

Senator LEVIN. With the marketable stuff, and they are paid for that.

Mr. BATTALIO. Yes, sir.

Senator LEVIN. And they always go to the high rebate exchange—

Mr. BATTALIO. The one high—

Senator LEVIN [continuing]. For the nonmarketable ones?

Mr. BATTALIO. Yes, sir.

Senator LEVIN. OK. Now, your paper assessed whether the decision by retail brokers to route nonmarketable customer orders to exchanges that pay the highest rebate was consistent with the broker's obligation to obtain best execution of their customers' orders. And this is now quoting from your paper: "The results of our analysis suggest that routing all nonmarketable orders to a single exchange that offers the highest liquidity rebates is inconsistent with maximizing nonmarketable order execution quality." Is that quote correct?

Mr. BATTALIO. Yes, sir.

Senator LEVIN. All right. Now, the decision, your paper says, "to use a single venue that offered the high liquidity rebates does not appear to be consistent with the objective of obtaining best execution." Did I quote you correctly?

Mr. BATTALIO. Yes. It results in diminished fill rates.

Senator LEVIN. All right. That is the reason why, but, nonetheless, I quoted you accurately.

Mr. BATTALIO. Exactly.

Senator LEVIN. All right. Now, is that then evidence of a conflict that harms consumers?

Mr. BATTALIO. We certainly think that the routing could be done better, yes.

Senator LEVIN. Well, to put it in terms that I understand, is that then evidence of a conflict that would harm consumers?

Mr. BATTALIO. Yes, sir.

Senator LEVIN. And your data then shows and your conclusion shows that the highest rebate and best execution do not go together.

Mr. BATTALIO. Yes, sir. In certain circumstances, they do not go together. Not always, but in certain circumstances.

Senator LEVIN. Would that be in most circumstances where these orders are routed to an exchange?

Mr. BATTALIO. So in the most actively traded stocks where the lines to trade are the biggest, that is where it matters the most.

Senator LEVIN. And that would be true, what I just said?

Mr. BATTALIO. Yes.

Senator LEVIN. Now, Mr. Katsuyama, I expect that some of the retail brokers that are named in Professor Battalio's paper would claim that the fact that they directed all of their nonmarketable orders to the exchange that pays them the most is not inconsistent with providing best execution to their customers. What is your view of that?

Mr. KATSUYAMA. So from a practitioner's standpoint, prior to IEX, I worked and ran trading at a large broker-dealer. You know, I think there are two ways to look at it. The first is that the exchange that pays the highest rebate will have the longest queue because people that are posting liquidity let us just say on the bid,

they want the rebate, so more people will line up because of that inducement.

The first thing to consider—that getting in the longest line will lower your probability of getting filled because there are more people in front of you in line. The second thing to consider is the inducement of, let us say in this instance, the seller. Where is the seller most likely to go when selling stock, looking to sell stock on the bid? The seller is most likely to go to the place that either pays them a rebate or definitely to attempt to avoid those who charge the highest fees. So getting in the longest line, posting in the highest rebate venue, exposes you to larger competition, reducing the probability of fill, and it also makes you the least likely venue to get filled on because the seller on the other side of the order is not incentivized to go there first.

So it hurts you in two ways. We have run a series of tests on this using our own capital back when I was at RBC, and the tests confirmed the findings that Professor Battalio outlined in his paper.

Senator LEVIN. And can you repeat that finding in your words?

Mr. KATSUYAMA. Sure, that routing specifically with the goal of maximizing your rebate lowers the probability of getting filled and leads to adverse execution quality or worse execution quality for the client's order who you are representing or even your own order if a bank is routing on its own behalf.

Senator LEVIN. Does that create a conflict of interest?

Mr. KATSUYAMA. Yes.

Senator LEVIN. Let me just go back to Professor Battalio for one moment. Is best execution a subjective determination, at least in part?

Mr. BATTALIO. At least in particular. We would argue more so subjective for market orders because a lot of determinants go into figuring out whether you have a good trade price or not. With standing orders or these nonmarketable limits, it seems like getting filled is paramount. And we came across the Nasdaq Notice to Members 01-22 after we submitted this draft to a journal, and we will incorporate—and we will certainly use that to buttress what best execution means for nonmarketable limits. Fill rate is paramount.

Senator LEVIN. But are there also subjective factors in that determination for both?

Mr. BATTALIO. You are pushing the bounds of what I—

Senator LEVIN. All right. If you cannot answer it, you cannot answer it.

Mr. BATTALIO. I cannot answer it.

Senator LEVIN. Mr. Katsuyama.

Mr. KATSUYAMA. Can you repeat the question?

Senator LEVIN. Are there subjective factors in determining which market to go to for the ones for the orders which are non—let me get the right word here—the nonmarketable?

Mr. KATSUYAMA. Sure. So at times there are. For example, if there are—if you are establishing a new price, meaning that you will be the only person on the bid at that price, bidding on an exchange that pays a high rebate, since you are the only person on the bid, it is justifiable; it makes sense. If you are joining a queue

that is very thick, that has multiple exchanges represented, and you choose to get at the end of the longest line to get a rebate, I would say that that would be a conflict.

Senator LEVIN. Would that be a subjective factor? Are there subjective factors in that determination?

Mr. KATSUYAMA. Yes. It is based on what is currently on the bid, which would primarily be determined by the stock. So there are factors where, a broker looking to get a rebate is not necessarily in conflict with their duty to their client. So it is subjective based on the conditions of the stock when you come into—sorry if this is a complicated answer, but based on what is happening in the stock, there are different decision points, and there are times when you could be getting the highest rebate, but also serving your client's interest.

Senator LEVIN. And there are times when that is not true.

Mr. KATSUYAMA. Yes.

Senator LEVIN. Senator Johnson.

Senator JOHNSON. Thank you, Mr. Chairman.

Professor Battalio, I am hearing terms—"adverse execution quality," "conflict of interest," "dark pools." It all sounds pretty sinister. What I want is an example of a trade, so we can really put this all in perspective. So let us talk about 100 shares at \$20, just a retail customer placing that with a broker. Now, if you are using one of the online brokers, it is costing you \$10.

Mr. BATTALIO. Yes.

Senator JOHNSON. So if you are basically buying \$2,000 worth of stock, you are paying \$10 to buy \$2,000 worth of stock. Twenty years ago, I know I would be paying \$20, \$30 commission, correct?

Mr. BATTALIO. Yes.

Senator JOHNSON. Now we are paying \$10. So if this is going into one of these dark pools or if this is to go into one of these maker-taker arrangements, how much additional money could it cost the consumer if there is a conflict of interest, if it is routed to a situation where there is a higher maker-taker fee?

Mr. BATTALIO. So imagine you have two orders to buy—one here, one there. This one is the high-fee venue; this is the low-fee venue. Only one trades. So they want to buy at \$10. One is going to trade, and then the price is going to rise to \$20. Which one trades? The one on the low-fee venue.

Senator JOHNSON. First of all, how many times in the stock market do you try and buy a stock for \$10 and it goes up to \$20?

Mr. BATTALIO. OK, make it go to \$11, \$10.50.

Senator JOHNSON. I mean, again, realistically, when I put in a trade, I say I want to buy a stock. I have made a decision that this company is worth \$20 a share. And I put in an order for 100 shares. I am going to get that executed at \$20, aren't I?

Mr. BATTALIO. So Goldman Sachs and others have done studies kind of with better data than we have, so data is a big problem to do these types of analyses. To really get at what you asked, we need to have data that we do not have. All right? So Goldman Sachs, the claim would be that you would lose three basis points, five basis points over the course of a day by making an inferior order routing—

Senator JOHNSON. No, no. I am talking about a retail investor like myself, I buy 100 shares of stock at \$20. I am going to pay \$2,000 to buy the stock. OK? I am going to get that stock at \$20, aren't I? If I put in an order that I say I want to buy that stock at \$20, I get it at \$20.

Mr. BATTALIO. No. It will not trade. One person——

Senator JOHNSON. So what do I—well, if an order——

Mr. BATTALIO. You are going to cancel——

Senator JOHNSON [continuing]. Is on the books——

Mr. BATTALIO. You are going to cancel and chase the market up. That is the point. Does this happen always? No.

Senator JOHNSON. Listen, I cannot remember a trade that I have put in where I say I want to buy 100 shares at \$20 where I do not get it at \$20, because I put in a stop loss. I am only going to buy it at \$20.

Mr. BATTALIO. So your trade——

Senator JOHNSON. And I get it at \$20.

Mr. BATTALIO. You are trading volatile stocks that do not have long queues. That is my answer to you. The data——

Senator JOHNSON. That is what most people do. So, anyway, again, I am trying to get—forget the price movement, OK? Let us talk about just the dollar value of this maker-taker fee. On a \$2,000 trade, how much is that maker-taker fee? On 100 shares of stock at \$20 a share, how much is that maker-taker fee?

Mr. BATTALIO. Thirty cents per hundred.

Senator JOHNSON. Thirty cents per hundred what, dollars or shares?

Mr. BATTALIO. Shares.

Senator JOHNSON. So if there is a maker-taker fee that is just outrageous at, what, 50 cents?

Mr. BATTALIO. The maximum is 30 cents per hundred that they can charge, the taker fee.

Senator JOHNSON. For a hundred shares. So we are talking about on a \$2,000 trade that is a conflict of interest, a broker is going to push a trade into a maker-taker arrangement where he gets 30 cents——

Mr. BATTALIO. So an accurate——

Senator JOHNSON [continuing]. Versus what—I mean, what is the high range of this: 30 to 50, 30 cents to—what is the range of pricing on this maker-taker arrangement per hundred shares?

Mr. BATTALIO. Negative 14 cents, maybe, to 32 cents per hundred. These are all per hundred.

Senator JOHNSON. So you have a maximum range of 40 cents, so if I am doing a \$2,000 trade, you are concerned about a conflict of interest where I might have to pay an additional 40 cents on a \$2,000 trade. Is that what this is about really?

Mr. BATTALIO. No. It is about the fact that you did not get to trade. So your assumption that you trade is wrong.

Senator JOHNSON. But I always have been able to trade.

Mr. BATTALIO. Maybe you have.

Senator JOHNSON. How many times do people not get to trade?

Mr. BATTALIO. The difference for certain types of stocks in certain circumstances, the difference in fill rate is 25 percent. Sanford Bernstein puts out reports since 2010 highlighting the stocks in

which this type of routing has a huge impact on whether or not you trade at a price.

Senator JOHNSON. Now, how much of that is the institutional investor and the high-frequency trader versus the standard retail guy that—again, I am looking—I am a very long-term investor, and I am looking at a stock, and I go, really, I think this thing is worth \$20 and I am willing to buy it at \$20, but if not, no harm, no foul. So there are definitely different investors, right? So when you are talking about 25 percent of trades not being executed—is that in all the institutional, the very high volume, or is that really individuals like myself that say—I want to buy that hundred shares of stock, I will pay any price, or I will put a stop order and say I am only going to buy it at \$20?

Mr. BATTALIO. So is Schwab a retail broker? Because they do not make this decision. They do not do what these four brokers do. Interactive brokers, a retail—

Senator JOHNSON. So let me ask you, how many—and I will surely ask in the next panel, of those folks. How many trades in to retail brokers like Schwab, like TD Ameritrade do not get executed? Do you have any idea on that?

Mr. BATTALIO. We have asked for their data, and they have never responded to give us the data. We cannot answer.

Senator JOHNSON. So where did you get your data from then?

Mr. BATTALIO. From a major iBank.

Senator JOHNSON. And, again, what is the data on?

Mr. BATTALIO. Orders. They get routed to two different venues. They show up at the marketplace at exactly the same time, and we watch what happens. And then we use data from the entire marketplace, all trades and quotes.

Senator JOHNSON. So I did see TD Ameritrade revealed how much they are making on these maker and taker, this order flow fee, something like \$200 million. It sounds like an awful lot of money, but isn't it true that the market trades almost \$27 trillion per year?

Mr. BATTALIO. Sure.

Senator JOHNSON. So what is \$200 million in relation to \$27 trillion—

Mr. BATTALIO. We are not—

Senator JOHNSON [continuing]. As a percentage?

Mr. BATTALIO. What we are here to speak to is the poor investor, not like you, that wanted to buy at \$10 and did not get to because the market moved away and the broker chose to route—make sure that—so the broker routed the order—

Senator JOHNSON. Again, I am trying to figure out how—

Senator LEVIN. Let him finish.

Senator JOHNSON [continuing]. Often that is. OK. I am sorry.

Senator LEVIN. Do you want to finish the answer?

Mr. BATTALIO. With better data I could answer that. In our data set, it can be as big as 25 percent difference in getting the trade done.

Senator JOHNSON. OK. I will just finish by saying what I am concerned about is, again, just creating this sinister atmosphere with words like “dark pool” and “conflict of interest,” and what we are talking about literally, I think, is 30 or 40 cents on a \$2,000 trade

or maybe a \$30,000—or a \$3,000 trade. I mean, we are really talking about minuscule amounts. And, again, what I am looking at is over time of investing, I have looked at my cost of a trade going from hundreds of dollars down to \$10. And now we are arguing over if it should be \$10.30 or \$10.40. I do not know. I am just trying to put it into perspective and trying to figure out where the problem is here that I guess we are talking about potentially government regulation intervention, which I think might have very harmful unintended consequences versus letting the free market competitive system drive transparency, drive competition, and that is what has happened certainly over my lifetime of investing over 20 years. It has gotten, from my standpoint, more transparent and a whole lot cheaper.

Mr. BATTALIO. I am not arguing with that.

Senator JOHNSON. OK. Well, thank you. I will be back.

Senator LEVIN. Thank you.

Senator McCain.

Senator MCCAIN. Do you want to give a more elaborate response to that really this hearing does not matter, either you, Mr. Battalio, or you, Mr. Katsuyama?

Mr. KATSUYAMA. So I guess just to respond to that—the fact that it is 30 cents for a hundred shares and it is a \$2,000 trade, I think that is exactly the point. I mean, we are talking about conflicts where there is evidence that their brokers are routing to get this 30 cents, and they are representing a \$2,000 order. It can be used on both sides of the argument. You can view it as trivial, but you can view the trivial nature of why is the broker doing that in the first place if they are representing a \$2,000 trade? So it is one where the conflicts are real, and I think that even though the harm is diffuse, there are more retail investors invested in large pension funds and mutual funds who also are affected by this practice.

So I think that, just trying to say that since it is a small amount it could be used to deny that the conflict exists, is wrong. I think that it needs to be a principle-based argument.

The other part on costs, costs have come down. Of course they have. Technology has delivered that cost reduction. There is a Harvard Business Review study titled, “How to Win a Price War,” and it talked about “electronic brokers are changing the competitive terrain of financial services with their extraordinarily low [-priced] brokerage services. The prevailing price for discount trades has fallen from \$30 to \$15 to \$8 in the past few years.” That report was written in 2000. So when you look at the costs of technology since the year 2000, it has fallen even further.

So I think that it is one where competitive forces—I agree with the fact that competitive forces should be setting prices. The problem is that the inducement is so great, we do have a prisoner’s dilemma, where if every exchange pays an exchange rebate, the one that moves away from the exchange rebate if brokers are still incentivized to go after that rebate—they will lose market share.

So I do think when you look at payments, it is something to say there is a known conflict in the market and lets just address it. The size of the conflict relative to the notional amount traded is not a reason just to ignore the issue.

Senator MCCAIN. And with that increasing technology, hasn't that facilitated to a significant increase in volume of trades as well?

Mr. KATSUYAMA. I think the fact that advances in technology have been harnessed by certain participants, that is part of free market competitive forces, and there is absolutely nothing wrong with that. I think the challenge that the market was faced with was one of the biggest confusions out there is that the person that buys co-location and pays for this service has an unfair advantage versus the person sitting at home trading over a retail account. There will always be asymmetries—

Senator MCCAIN. See, I think that is the key to this problem, that there are certain players that have made this an unlevel playing field, whether it is 30 cents or whatever.

Mr. KATSUYAMA. Sure. In order for the person at home to get disadvantaged by the person that has spent all of the money on high-speed technology, in order for them to be disadvantaged, they have to trade, and that trade has to happen on a market. The market's responsibility, at least in our view, is that knowing that different parties will have different access to technology and different levels of resources, different levels of information; but when the trade happens, that the condition with which this trade happens is done—is fair, meaning that we have no bias one way or another what happens when this trade occurs. And the problem is that as technology has evolved, the exchange or the dark pool, the market itself should have advanced their own technology to ensure that we are investing in technology and building solutions with technology that maintains this fairness. And the problem is that as the markets have evolved, people got in the business of selling technology. People got in the business of actually enabling participants rather than creating and maintaining their neutrality. And I think as that happened, the conditions for fair trading changed. When your participants understand the market, what is happening in the market, faster than the market itself, that creates a pretty significant situation that we believe is unfair.

Senator MCCAIN. Well, sir, many commentators, including the editors of the *Wall Street Journal*, have noted that Reg NMS has enabled or exacerbated a number of predatory, high-frequency trading practices. Do you think that Reg NMS should be reformed? And if so, what would you recommend?

Mr. KATSUYAMA. Sure. So I think Reg NMS, the spirit of Reg NMS, as was indicated, makes sense. You have multiple competitive markets, and you want to try to attempt to tie them all together. I think if you eliminate some of the conflicts in how orders are routed, that brokers have invested heavily in technology that can get around this issue of liquidity disappearing. At RBC we had this problem from 2007 to 2009, and then we solved the problem. So I think that free market solutions can emerge to address the issues with Reg NMS. I think undoing Reg NMS runs the risk of, again, further unintended consequences, how exactly do you address those?

I think that it is something that definitely warrants review. It just depends on what regulation comes out of redefining what Reg

NMS does, and that is something that obviously I cannot comment on.

Senator McCAIN. Do you have any suggestions, Mr. Battalio?

Mr. BATTALIO. If you do anything to Reg NMS, do it with a pilot study and study it very carefully.

Senator McCAIN. Have you got other solutions to this issue?

Mr. BATTALIO. With regard to high-frequency trading, that is not something I have extensively studied, no.

Senator McCAIN. Mr. Katsuyama, Michael Lewis in his "60 Minutes" interview regarding his excellent book, "Flash Boys," said that the stock market is "rigged." Is that an accurate description?

Mr. KATSUYAMA. We have discovered that investors are systematically disadvantaged in the way that the markets have been set up. I think "rigged" is a word that can be used to describe that. I think it is loaded. But I think at the same time, the investment process is not broken. I am still an investor in this market. You know, "rigged," what it did is it kind of gave our critics and people who are part of the problem a reason to talk about something else other than what we were actually talking about, which are these—a much more precise way to put it or a much more precise question, which is these systematic disadvantages and how they are created.

So, it was a distraction, which was unfortunate. I guess the interesting part is that the people who took most offense to that word were people on Wall Street. We have a tendency to talk to ourselves on Wall Street, and I think that the response we have seen from the general public is anything but. The claim that we hurt investor confidence in the things that we brought to light everything that we have seen I think would be exactly the opposite of that in terms of the general public and their reaction to what we have said and what we have done.

Senator McCAIN. On this issue of co-location, how do you address something like that? Somebody rents a place or rents a computer somewhere, they are free to do that. That is America. How do you address that issue since co-location seems to be one of the facilitating aspects of this whole system?

Mr. KATSUYAMA. Sure. I do not think you can regulate co-location. If you say to an exchange you cannot sell space next to your matching engine, cottage industries will pop up and buy real estate across the street from the exchange and throw cables over the fence. So I think it is every market's choice to decide how they would like to set their market up.

At IEX, what we have done is we have introduced almost the opposite of co-location where we have put 350 microseconds of latency in between us and all of our customers, which essentially means that we have coiled 38 miles of cable in a data center, and we do that for all of our participants. The opposite of getting close is pushing everyone an equal distance away.

Senator McCAIN. I understand what you have done, but what is the remedy to this?

Mr. KATSUYAMA. I think the remedy is, we keep harping on transparency and disclosure, and I think that there are distinctive—

Senator McCAIN. It should be disclosed if they are co-locating.

Mr. KATSUYAMA. It should be disclosed, but also things like anonymous listings of participants on venues, meaning does one participant represent 35 percent of your trading volume or 50 percent of your trading volume on any dark pool or exchange? And if they do, do they represent 50 percent of the volume on every other market? Because if they are an outsize portion of your own order flow, then that would indicate something.

Are the message rates across certain participants so much higher than others? I think that we lack, as Professor Battalio said, the data. What we learned—and we learned from experience, we learned from talking in the industry, but we lack the data. And I think, again, the SEC's Midas website, the FINRA ATS report, we learned a lot in basically two attempts to provide clearer understanding of what is happening in the market. We could learn so much more.

The thing about co-location is that, just discussing and understanding what the advantage is of being 5 or 10 microseconds away from a matching engine, you get information quickly, and you can react quickly to getting information. As we push that boundary farther out to 350 microseconds, what we found is that we did have certain high-frequencing traders that did show up to IEX. But the number of those high-frequency traders was small, right now three. There are dozens and dozens of firms who have decided not to connect. I cannot speculate as to why that is, but clearly we have taken away something that some high-frequency trading firms they found valuable.

So it is every market's choice to do something. It becomes a very hard practice to regulate. But I think with the increased transparency and disclosure, people can make better decisions on whether they want to trade in venues that do offer such services.

Senator MCCAIN. Thank you.

Thank you, Mr. Chairman.

Senator LEVIN. Thank you very much, Senator McCain.

You made reference to disclosure on things like co-location, but when it comes to the best execution obligation, I gather that cannot be waived. Is that correct?

Mr. KATSUYAMA. Yes, absolutely. Best execution, I think it might need some further refinement. It is a pretty subjective—I guess it is a pretty subjective term. I think it is used fairly liberally. One thing that we definitely think—

Senator LEVIN. That is a legal obligation. Is that correct?

Mr. KATSUYAMA. It is.

Senator LEVIN. So you cannot disclose—"we do not engage in best execution in this firm." That does not fly. Is that correct?

Mr. KATSUYAMA. That would not fly, no.

Senator LEVIN. Do you agree with that, Professor?

Mr. BATTALIO. Yes, sir.

Senator LEVIN. Going back to best execution as to who determined—did I interrupt you?

Mr. KATSUYAMA. No.

Senator LEVIN. Who determines best execution for a broker? Is it the broker himself?

Mr. BATTALIO. The broker, my understanding, is supposed to—based on what I read—have monthly meetings and just evaluate

where they are routing, can it be done better where should we alter things around the edges?

Senator LEVIN. But it is the broker who determines best execution?

Mr. BATTALIO. Yes.

Mr. KATSUYAMA. Yes.

Senator LEVIN. OK. Now, I believe, Mr. Katsuyama, that you indicated that the maker-taker system creates a conflict of interest, and I think the testimony of both of you is that this is a significant matter. Let me just ask you, Mr. Katsuyama, should the maker-taker system be eliminated?

Mr. KATSUYAMA. I think that steps should be taken to address what happens to the market if it is eliminated. I know that a pilot study has been proposed—

Senator LEVIN. You mean—say that again?

Mr. KATSUYAMA. The pilot study that has been proposed, I think that it should have—

Senator LEVIN. Which eliminates it?

Mr. KATSUYAMA. Which eliminates maker-taker in certain stocks, I think that it should be given the chance to prove that eliminating maker-taker will not harm the quality of the markets.

Senator LEVIN. All right.

Mr. KATSUYAMA. So, yes, I definitely think that that step should be taken. It should be analyzed, and then we should—

Senator LEVIN. At least that step ought to be taken.

Mr. KATSUYAMA. Definitely.

Senator LEVIN. Professor.

Mr. BATTALIO. I am not a risk taker. I am an academic.

Senator LEVIN. OK.

Mr. BATTALIO. So my view would be maybe not push to eliminate maker-taker because you might push things underground into the soft-dollar world where it would be even less able to kind of see what people are doing.

Senator LEVIN. OK.

Mr. BATTALIO. So our view would be, with Shane Corwin and Jennings, perhaps what you should do is push disclosure back onto the broker so it is easier to tell, so you do not have to do the studies we just did to map how is your broker doing regarding routing your orders. Since the SEC took a first step with this in 2000 and 2001, we think that you could do a better job of that now.

Senator LEVIN. Would you support that test case that Mr. Katsuyama talked about?

Mr. BATTALIO. If you insist of doing away with maker—

Senator LEVIN. Not me. I am not—

Mr. BATTALIO. A pilot is—

Senator LEVIN. A lot of other people are insisting on it, and I happen to agree with that, but it is not—

Mr. BATTALIO. A pilot is better than going all-in.

Senator LEVIN. All right. Some have argued that the maker-taker system is beneficial and that it has led to tighter spreads, and I think you indicated, did you not, Mr. Katsuyama, that that was technology that did that long before—

Mr. KATSUYAMA. Yes, I think decimalization and technology both contributed to the lowering of spreads.

Senator LEVIN. All right. Now, does IEX make a similar distinction that some high-frequency trading may be predatory?

Mr. KATSUYAMA. So I think not all high-frequency trading is predatory, but some practices are, yes.

Senator LEVIN. Do you make a distinction that some high-frequency trading may be predatory?

Mr. KATSUYAMA. Yes.

Senator LEVIN. And that that would hurt regular investors while others may benefit the market?

Mr. KATSUYAMA. Yes.

Senator LEVIN. And has the maker-taker system led to the creation of more exchanges in trading markets and more complex order types, Mr. Katsuyama?

Mr. KATSUYAMA. Yes.

Senator LEVIN. Has the proliferation of trading venues and order types created opportunities for predatory high-frequency traders to take advantage of investors?

Mr. KATSUYAMA. At times, yes.

Senator LEVIN. And what are those opportunities? What kinds of opportunities?

Mr. KATSUYAMA. Sure. I think given the structure, a quick example is if there are 10,000 shares on offer to sell Intel at \$21 a share, a high-frequency trading firm could be offering stock across multiple markets. One of those markets where they are offering stock might be what is called a taker-maker venue that actually charges someone to post liquidity and will pay a rebate to the other side of the trade who comes to access that liquidity. So this inducement, what it does is it—if a broker is going to follow that inducement, it causes them to route orders and remove liquidity from Intel, in a very predictable and systematic way, starting at the highest rebate market for taking liquidity and working its way down to the venue charging the highest fee. This predictable pattern of routing leads to lower fill rates and ultimately worse execution for the client being represented.

So, it is a combination of fast technology, a combination of inducements, and a combination of the broker falling for those inducements. So that would be a series of events.

Senator LEVIN. You have been quoted as saying that people have lost confidence that the markets are fair and that they are working in their best interest. Would charging a standard fee, regardless of whether the order adds or removes liquidity, increase investors' confidence that they are getting a fair deal?

Mr. KATSUYAMA. I think it is a step—at IEX we charge a flat fee, regardless of whether you are making or taking. Price competition is something that is hard to regulate, so if some people want to charge a lesser or higher fee and justify it through their service, I think that is acceptable. But I think eliminating a conflict, most of the general public do not even know this conflict exists. I think that as we talk through it, as we try to regain the trust of the general public, talking through these issues and admitting to the fact that they exist, and then addressing these conflicts, that is the way to restore that confidence. So I think that, yes, addressing this issue will help restore confidence, or at least it is a step in the right direction.

Senator LEVIN. And eliminating the conflict would help restore confidence?

Mr. KATSUYAMA. Without question.

Senator LEVIN. Professor.

Mr. BATTALIO. Yes, sir.

Senator LEVIN. Would it?

Mr. BATTALIO. Yes, sir.

Senator LEVIN. Critics of your paper, Professor, said that the data that you used to assess whether retail brokers were getting best execution does not accurately reflect typical retail order flow and that your results cannot be generalized to judge the best execution performance of retail brokers. How do you respond to that?

Mr. BATTALIO. In a couple ways. So those critics seem to kind of ignore the back third of our paper where we use all trades and all quotes in the U.S. equity market over the same time horizon to demonstrate the results that we find with our limited data generalized to the marketplace.

Second, as we have been pushing the paper around, we have seen lots and lots—we wrote the major exchange that operates two different fee structures, and they showed us that for the retail orders resting on their exchange for a couple weeks, they get the same results we get. You know, Sanford Bernstein, we came across a report, same results we get.

So you can argue that our most detailed data analysis comes from specialized data, but the results generalize with a lot of different data sets. So we are quite comfortable.

Senator LEVIN. Now, would you be willing to run your analysis using data from the retail brokerages identified in your paper if they were willing to give you that?

Mr. BATTALIO. Of course. Anybody. The hard part for an academic, we spent 2 years asking for data to test this, because people—and it is just very, very hard. So, yes, that is a standing offer that we make. It has become—we thought we were going to be able to work with a guy who is starting to do this with institutions, and, unfortunately, the sell side is pushing back and threatening. So the executing venues have threatened that if this guy shares data with us, they will stop doing business with their buy side clients. So it is very hard to get data to do the analysis that we did. We were very lucky to find these data.

Senator LEVIN. Some argue that 30 cents on an order is a tiny, minuscule amount, you have given a very strong answer or response to that, by the way, in terms of the orders that are not filled. And, also, Mr. Katsuyama, you have given a pretty strong answer to that as well. These 30 cents also add up to hundreds of millions of dollars for a broker, do they not?

Mr. BATTALIO. Yes, they do. Compare the payment revenue of the brokers that do this practice to the ones that do not, and you will see a marked difference at the aggregate.

Senator LEVIN. Mr. Katsuyama.

Mr. KATSUYAMA. Yes, I think it is—

Senator LEVIN. It is a big revenue source for the broker, is it not?

Mr. KATSUYAMA. Yes. Well, some brokers. I think we cannot paint them all in the same brush. Some brokers end up paying the high take fee, and that high take fee is subsidizing payments to

other players. So some are hurt worse and some benefit, depending on who the broker is.

Senator LEVIN. Thank you.

Senator JOHNSON.

Senator JOHNSON. Thank you. I have a little more time here, so I do want to go back and really explore exactly what is happening and exactly what type of harm could be happening.

When you are talking about 25 percent of trades that just simply are not executed, can you describe that a little bit more to me in terms of the volatility of that, what is being missed? And aren't those trades basically because people put in stop orders and say, "I will buy a stock at this price"? I mean, just tell me how that does not work?

Mr. BATTALIO. So you have people that maybe place an order before they go to work, and they say, I want to buy a share of stock at \$20, a hundred shares of stock at \$20, and it is just a standing order—not a stop or anything like that, just a standing order. What we identify in our paper is that some brokers are routing that order so that they trade last at a price. And so if throughout the day the market goes through your limit price, you trade. It does not matter where you were routed. That is true a large part of the time. Right? And that would be, what I would argue, that is your trading experience. OK.

But some stocks are much less volatile throughout the trading day, and not all of the people looking to trade at a price get to trade. Some do not, and they miss out. Why? Because the price trades a little bit and moves up. The ones that do not trade missed out.

Senator JOHNSON. So, I mean, part of the problem is some investors have a lot of time to just be watching this in real time 100 percent of the time.

Mr. BATTALIO. That is right.

Senator JOHNSON. Most investors, like myself, you look at it about once a year, and you put a trade. So that is always going to be the case, right? I mean, if you were watching this 100 percent of the time, if you were putting in the right type of order, you could make sure that you were going to have an executed trade, just about, I mean, couldn't you? Can't you, as an investor, make sure that you get that stock purchased no matter what?

Mr. BATTALIO. Not if all the interest at a given price does not trade, no, because of the way they route. They are putting you at the back of the line at a price all the time. And so if the line does not fully exhaust, you go wanting.

And is this—this happens in certain—is this all stocks all the time? No. But measurable time, 10, 20 percent of the time, certain stocks, yes.

Senator JOHNSON. Again, I am trying to get my head around the magnitude of this problem.

Mr. BATTALIO. OK. I guess—

Senator JOHNSON. Because it is true—I mean, we are using all these sinister figures, and I agree with the Senators, this is about restoring confidence in the market. And I am concerned by throwing out those types of terms and making it seem like everybody is in this business and they are just really trying to stick it to the

individual retail investor. That is not what I have seen. I am not saying—

Mr. BATTALIO. And I would hope—

Senator JOHNSON [continuing]. That I have been pleased with the transparency within the investment banking community during my lifetime. But it just seems like we are moving in the right direction, greater competition, lower prices, far easier trading today than it was 20 years ago where you just kind of call your broker and you did not know what was pulling off. Now you have the computer. Now you can plug it in, and say how come I did not get that—right now it is almost instantaneous, isn't it, on online brokers? You put in an order—

Mr. BATTALIO. Or a market order, yes.

Senator JOHNSON [continuing]. And, boom, it comes right back.

Mr. BATTALIO. For a market order, yes. And I am not going to sit here and argue that we have not made great gains over the past 20 years. That is not what our paper is about. Our paper—and we are not crying “Fire” in a theater.

Senator JOHNSON. Well—

Mr. BATTALIO. No. Have you read our paper carefully? I think we are very caveated, OK? We are pointing out certain circumstances where routing only to the high-fee venue is going to disadvantage investors. So statements that get made like, “We employ sophisticated order routing technology and processes to seek best execution for client orders,” how can that be if you are routing always to the high-fee venue? That is what got us interested as academics in this problem.

Senator JOHNSON. And, again, you may not be shouting “Fire,” but I think the way that it is recorded in the press, I think it really is. Do you disagree with that?

Mr. BATTALIO. I think there are some people out there yelling “Fire,” but I would hope that we would not be characterized—

Senator JOHNSON. Good. So, again, that is what I appreciate about this hearing. It is about trying to lay out the reality of the situation, put this all in perspective. And, again, I want to get back to the overall dollar value of these maker and taker arrangements, that type of thing, in relationship to total trades—

Mr. BATTALIO. All right. So I can give you—

Senator JOHNSON [continuing]. In terms of—if at all possible, if you had some sort of historical perspective in terms of how much trading commissions there were 20 years ago versus what we are talking about today.

Mr. BATTALIO. I will give you one stat, and then I will give it to Brad. So if you eliminated all the rebates and inducements, Bernstein Research predicts that one broker would have a 16-percent earning-per-share decline.

Senator JOHNSON. But what—

Mr. BATTALIO. That is real time now, and then I have to say I do not know the answer to your question and give it to Brad.

Mr. KATSUYAMA. I think there is no question that price per trade has come down with technology. I think that—again, I read this last time. I will read it again. Harvard Business Review report, which is titled, “How to Win a Price War,” talks about “electronic brokers are changing the competitive terrain of financial services

with their extraordinarily low-priced brokerage services. The prevailing price for discount trades has fallen from \$30 to \$15 to \$8 in the past few years.” And that report was written in the year 2000. Here we are in 2014, and my tech team sent me this, but the price of a gigabyte worth of storage in 2000 was \$10, today it is 10 cents. So when we talk about lower fees, lower commissions, yes, they have come down. But they stopped going down, and I think that they could probably come down further. The notion that if a payment goes away then the price will go up, I think that would be hard to justify. And, again, as you said, competitive forces will force that out of the market. If you double your price per share or price to trade, then new entrants will come into the market.

So I think that it is one where they have come down, but that is not an excuse, I think, for what is happening right now.

Senator JOHNSON. Are there competitors in the marketplace that actually conduct trades the way you want to see the trades conducted? And compare those to some of the online models of companies that we are familiar with what they provide with their service. Because, one of the things I value in the online is I have got research, There is just an awful lot within those online platforms that are very helpful to a competitor—or to an investor.

Mr. KATSUYAMA. Sure.

Senator JOHNSON. Do those competitive systems have similar types of things? Is that part of the reason—again, I am a business guy. It does not bother me that people make money. They need to make money to provide different products and services.

Mr. KATSUYAMA. So, I am not as familiar with each individual retail platform, what they offer. I do know Interactive Brokers routes in a way that would be consistent with how I would route. You know, they are connected to IEX. They trade with us. So I think that there are examples, and they have been pretty vocal about that. I look at institutional brokers. As Professor Battalio has noted, my experience at RBC or Bernstein or even working with the people at Goldman Sachs, people have spent a tremendous amount of time in understanding this conflict, where you can route for a rebate and not harm your client and where you route for a rebate and you do harm your client. And it is one where, because it can toggle—for example, there are 100,000 shares on offer in Intel at \$21 [inaggregate, across the markets], and a market will pay me a rebate to route there and is offering 10,000 shares, and I have 200 shares to buy, I can route it there, buy the 200, get the rebate, and no one is harmed. If I have 100,000 shares to buy, I cannot route the 100,000 to that one venue that is going to pay me because they are only showing 10,000, because I will ruin my experience with the rest of the venues, because of the signals.

So there are times when you can get a rebate and fulfill your obligation, and there are times where you cannot, and I think it is up to every broker to understand where that inflection point is and to be very transparent in terms of how they route.

Senator JOHNSON. So I guess my point is if those companies are already present in the marketplace that trade the way you are suggesting without a conflict of interest, so that an individual investor, if they are buying \$2,000 worth of stock, does not have to worry about being charged 40 cents versus 30 cents—OK?—those plat-

forms exist, those competitors—the marketplace, the free market competitive system have already provided that investing model with that level of transparency. And kind of getting back to part of your opening statement, you said, well, this is a question of whether we need government regulation to force the transparency, the competition, or the free market competitive systems doing it.

I guess based on your answer, you are saying the free market competitive system has already reacted to it, and that possibility exists. If you are concerned—as an individual investor, you are concerned about not being able to have your trade executed or paying another 10 cents on a \$2,000 trade, there are people out there and they just need to do a little more advertising so Americans understand it, right? Or maybe this hearing will help out and more investors will take a look at finding companies like yours.

Mr. KATSUYAMA. So, yes, I totally agree with you. I think that, first off, you have to—

Senator JOHNSON. I like that answer.

Mr. KATSUYAMA. First off, you have to make people aware that the conflict does exist, and you have to educate them on what that conflict means to them, and now they can make a better informed decision versus before, when they did not even know that the conflict existed in the first place. I think disclosure and transparency will let people make better decisions, and then the market sorts it out. It is one where with increased disclosure and increased transparency, everyone knows exactly how the game works and things still happen. Then you can kind of look back and say, OK, I guess the inducement was enough or warranted the fact that they made this decision. But right now a lot of it is opaque.

And as Professor Battalio noted, it is really, really hard to get data, and the data you get is not standardized. So it is very hard to synchronize data across multiple places because the data comes back, I have seen client data where they have got them from different brokers or even brokers from different venues, and it is coming back in all sorts of forms. So I think that standardization and transparency, forced disclosure, people will just ultimately make better decisions. That is the most proactive way to advance this discussion.

Senator JOHNSON. OK. Thank you.

Thanks, Mr. Chairman.

Senator LEVIN. Professor, do you have a comment?

Mr. BATTALIO. So the reason this is an agency problem was first pushed for—

Senator LEVIN. When you say “agency,” what do you mean?

Mr. BATTALIO. Agency—and I will describe. So two former chief economists, Chester Spatt and Larry Harris—OK, Larry was around with Reg NMS, so was Chester—and then a guy who is on the board of Direct Edge, Jim Angel, put forth—it is their theory that we test in our paper, and they claim that the retail investors, maybe not you, are able to shop on commission. So the broker that offers the lowest commission will get the retail trade. OK? The brokers that maximize rebates are able to offer the lowest commissions. In fact, anecdotal evidence suggests that Interactive Brokers, at least during our sample period, had a higher commission than these other four brokers. So these four brokers attract the retail in-

vestor by offering low commission, and the retail investor trusts the broker because of the best execution obligations, and it does not have the tools—you could look at our paper and decide how hard it is to figure out what we did. They do not have the tools to understand, gee, in this instance did my broker route to the right venue to maximize the likelihood of execution like NASD 01-22 says? That is the agency problem.

You can shop on commission. You cannot evaluate the execution quality. And so they are doing things that may compromise execution quality. They have the lowest commission. And they are going to attract a swath of customers that way.

And if you talk to people on the board of Interactive Brokers, they will complain about this. So certainly competition is forcing commissions lower, but people who do the practice of routing all the nonmarketable to the high-fee venue and selling the marketable to the wholesalers, they get more revenue that could be used to push back through commissions, right? And so it is hard—this would be a case where maybe the market cannot fix things unless you can educate the investor to evaluate this decision of routing nonmarketable orders, which is tough.

Senator LEVIN. So you are saying maybe it cannot be solved in this case—

Mr. BATTALIO. I am all about free markets, trust me.

Senator LEVIN. Of course. In this case, it may not and has not so far worked, is what you are saying.

Mr. BATTALIO. That is what we think.

Senator LEVIN. Do you agree with that, Mr. Katsuyama?

Mr. KATSUYAMA. IEX is a new venue. Before the SEC published the Midas data and before FINRA had their ATS reporting rule, we had no idea how we compared to other markets. So other markets would make claims that could or could not be substantiated. So as you are competing, how do you compete in a market that is completely opaque and, is primarily dictated by word of mouth or self-generated reports? I do not think we fully had a chance to solve this problem from an industry standpoint because the data was just not available for people to make good decisions, or better decisions.

Senator LEVIN. But do you think the average investor can make a decision on where a broker is going to get best execution?

Mr. KATSUYAMA. That is a good question. I would say probably not. But the key part is that the people that do spend the time to look at it, some people in the media are very sophisticated. They understand the heart of this issue. And I think that as they report on things that are happening as the retail investors who do look at it start to make decisions, it does create the right amount of momentum so that someone who does not have time or inclination to understand market structure understands that people are looking out for their best interests and they can make decisions that way.

Senator LEVIN. How do they make a judgment on best execution, is it a subjective judgment? How does your average investor just looking at the fees, the commission, think that is lower, that is pretty attractive? This is what the professor is saying. Is that not right, Professor?

Mr. BATTALIO. That is correct.

Senator LEVIN. So now how does that average investor do what you think needs to be done, make some kind of assessment on best execution? How does he do that?

Mr. KATSUYAMA. Sure. You have to put in the requisite amount of time to understand it, to make that judgment. Most people will not. So, again, I think that the more that this is discussed and reported on, hopefully the venues that are doing the right things get the right amount of credit.

Senator LEVIN. If transparency is the answer, should the government force transparency?

Mr. KATSUYAMA. I do believe there are cases where that would definitely help.

Senator LEVIN. The government actually would have to force transparency?

Mr. KATSUYAMA. I think outlining the types of metrics that need to be reported and the way those metrics need to be calculated and presented would definitely be helpful, yes.

Mr. BATTALIO. The government has done this one, and it is not a big step, what they would have to do to kind of clean things up.

Senator LEVIN. But the market has not done that yet. It would take the government forcing that. Is that correct?

Mr. KATSUYAMA. There has been no attempt by the market to try to solve this issue and just standardize across themselves and to say let us make this easier for people to understand. We have not seen evidence that that is happening.

Mr. BATTALIO. And indeed—

Senator LEVIN. And, therefore?

Mr. KATSUYAMA. And, therefore, I think the government would be very helpful in helping to get the industry to coordinate to a level to make these issues easier to identify.

Senator LEVIN. And it would be helpful if the government required that?

Mr. KATSUYAMA. Yes.

Senator LEVIN. Thank you.

Mr. BATTALIO. The options market tried to do it on a voluntary basis back in 2010, and the numbers they put out were garbage, mostly, so yes.

Senator JOHNSON. Just a quick comment. Again, as an individual investor, the way I evaluate best execution is I put in an order for \$20, I got it for \$20. Again, this is so incredibly complex, and there are so many esoteric terms of art here. You have got to bring it back—I am trying to bring it back to just the simplicity of what is happening in the marketplace with individual retail investors, and if I put in an order for 100 shares at \$20 and if I get it and I am only paying \$10, I am reasonably satisfied.

Now, occasionally, there may be some very strange circumstances where I do not get that share, but I kind of shrug and go, OK, well, I did not get it. Maybe there is some harm, but I am highly concerned about government interference in the marketplace. If there is a very minimal amount of transparency legislation in terms of this is the data that we want everybody to report, again, minimal, not a huge overall regulation that harms the market, that is something I would be willing to support.

But, again, I really want to put this in perspective, what is the real harm being caused, and let us make sure we do not do more harm in trying to solve a problem that right now this is really a solution looking for a problem in many respects.

Mr. KATSUYAMA. Yes, I definitely would say that focusing on disclosure will create the least amount of harm and implementation risk rather than diving into things such as co-location and the actual mechanics of the market. So, if we are going to move forward, I think that—

Senator LEVIN. Professor.

Mr. BATTALIO. I agree 100 percent.

Senator LEVIN. OK, with what he just said.

Mr. BATTALIO. Yes, and what Mr. Johnson said.

Senator LEVIN. OK. That you want to have disclosure, you want to have transparency, but you would agree it may take government action to get that transparency?

Mr. BATTALIO. Yes, and push it back on to the brokers.

Senator LEVIN. Push it on the—thank you.

Senator MCCAIN. And this is just a minor issue that we should not be concerned about in the overall scheme of things. Is that correct?

Mr. BATTALIO. My view is the reason academics are around and reporters are around is if the retail investors cannot understand it, we study it, bring it to light, and then things get cleaned up, somewhat.

Senator MCCAIN. Is it a serious issue?

Mr. BATTALIO. We think it is. But we also think it is an easy one to fix.

Senator MCCAIN. Thank you.

Senator LEVIN. Mr. Katsuyama, is this a significant issue?

Mr. KATSUYAMA. I think it is significant it is a principle-based issue. I think that you can try to minimize it by trying to relate how much it is pennies, etc., and people are holding stocks for years. But this is a principle-based issue, and it comes down to the foundation of why the markets exist and people's trust in those markets. Trust is really about saying: "Without me paying attention, I believe that the right things are happening in my best interests," and when you find out that they are not, those are instances which undermines trust.

In your opening statement, discussing the fact that we have had a tremendous rally from 2009, yet the amount of households owning equities [participating in that rally] has not followed that trend. So, I would argue that a series of events over the last number of years have lead to a decrease in investor confidence which led us to quit our jobs and start IEX. And I think that, from an investor confidence standpoint, my hope is that March 31 [publication date of Michael Lewis' "Flash Boys"] becomes a low point. We have received a tremendous amount—thousands and thousands of calls and emails and letters from people who are actually looking to get back into the market.

If there are people that feel like we did the wrong thing by speaking about it, we have not heard from them, we have not heard from the general public. We have gotten a lot of anger from Wall Street—not all—but, again, people embedded in the status

quo do not want to see change happening. And I think that those who do want change have been very supportive of us.

Senator LEVIN. Thank you. Thank you both. I appreciate your coming.

Mr. KATSUYAMA. Thanks a lot.

Mr. BATTALIO. Thank you.

Senator LEVIN. Let us see. What time is it now? Have the votes started? I think the votes have started.

We are checking to see if the votes have begun. Again, I am going to stay here through these first two roll call votes, so my colleagues here, you can adjust how you wish.

We will now call our second panel of witnesses: Thomas Farley, the President of the New York Stock Exchange Group in New York; Joseph Ratterman, Chief Executive Officer of BATS Global Markets in Lenexa, Kansas; Joseph Brennan, Principal and Head of Global Equity Index Group at the Vanguard Group in Malvern, Pennsylvania; and Steven Quirk, Senior Vice President of the Trader Group at TD Ameritrade in Omaha, Nebraska.

We appreciate all of you being here today, and under our Rule 6, as I think you heard, all of our witnesses are required to be sworn, so we would ask you to please stand and raise your right hands. Do you swear that the testimony you are about to give to this Subcommittee will be the truth, the whole truth, and nothing but the truth, so help you, God?

Mr. FARLEY. I do.

Mr. RATTERMAN. I do.

Mr. BRENNAN. I do.

Mr. QUIRK. I do.

Senator LEVIN. Thank you, and we will use, again, the timing system. A minute before the red light comes on, you will see the light change from green to yellow, giving you an opportunity to conclude your remarks. Your written testimony will be printed in the record in its entirety. Please try to limit your oral testimony to no more than 5 minutes.

Mr. Farley, we are going to have you go first, followed by Mr. Ratterman, then Mr. Brennan, and then Mr. Quirk. Thank you all for being with us.

**TESTIMONY OF THOMAS W. FARLEY,<sup>1</sup> PRESIDENT, NEW YORK STOCK EXCHANGE, NEW YORK, NEW YORK**

Mr. FARLEY. Thank you. Chairman Levin and Senator Johnson, we appreciate your interest in the regulatory structure of the U.S. capital markets. My name is Tom Farley, and I am the President of the New York Stock Exchange. I have been in the business of running exchanges for most of my career including as President and COO of ICE Futures US—formerly the New York Board of Trade.

As market operators, we have come to the view that the U.S. equities market is highly fragmented—making it overly complex and opaque. The regulations and structures in place today incentivize participants to make it more complex and more opaque. Numerous surveys and recent history have shown that this struc-

<sup>1</sup>The prepared statement of Mr. Farley appears in the Appendix on page 77.

ture does not contribute to investor confidence or high systems reliability.

As the dominant rule setting the boundaries of equity market structure, Regulation NMS set out to accomplish several objectives. The first was to increase competition among markets and among orders. While the rule did an excellent job of increasing competition among markets, we believe competition of orders has been severely damaged, particularly in recent years, due to the record level of off-exchange trading and increased levels of order fragmentation. In fact, just last week, off-exchange trading reached a record high of 40.5 percent across all Regulation NMS securities. This means that despite someone taking a risk to establish the National Best Bid or Offer on a displayed market—fully regulated exchange—brokers decided to execute the trade away from the displayed, or fully regulated, market 40 percent of the time rather than rewarding the people who established the NBBO—national best bid or offer—with an execution. We find this troubling and damaging to price discovery.

The second objective of Regulation NMS was to design a structure to the benefit of long-term investors and public companies. Long-term investors have benefited in many ways from the implementation of Regulation NMS; however, data now shows that some of these benefits, such as lower costs, might be reversing. In addition, we consistently hear from large institutional investors that there are too many conflicts in the current market structure and that they would like to see those conflicts eliminated or, at least, reduced.

Perhaps most importantly, we hear from listed companies and entrepreneurs that they believe the market is not designed for them but rather for the trading community, and as a result, they have lost confidence in the market. Newly listed companies via the IPO process are the lifeblood of our economy and our markets.

The New York Stock Exchange will take a leadership role in bringing about beneficial change. Our goal is simple: reduce the level of complexity and fragmentation of the U.S. stock market. To accomplish this goal, there are several unilateral steps that we are committing to take and that we would welcome our industry colleagues to also adopt. To start, we are self-imposing a 6-month moratorium on any new, or novel, order types that further segment the market. In addition, we have already announced the elimination of more than a dozen existing order types. We believe these are first steps toward reducing complexity and toward a more efficient market structure, and we will look for other steps that we can take along these lines.

At an industry level, we are seeking support for the elimination of maker-taker pricing and the use of rebates. Broad adoption of this policy would reduce the conflicts inherent in such pricing schema and further reduce complexity through fewer order types and fewer venues. In conjunction with the elimination of maker-taker and rebates, we believe regulation should require that deference be given to displayed quotes on fully regulated exchanges. There is risk involved in displaying a quote on such a venue, and we believe strongly that the person taking that risk should be rewarded with an execution at that price. Unfortunately, in today's environment,

those displayed quotes are used to inform trading on dark markets which are not contributing to the price discovery process. The original investors who posted these public quotes are all too often left with no trade at all. Several countries, including Canada and Australia fairly recently, have adopted rules that establish this type of primacy of public quotes. In the cases of Canada and Australia, the regulators have established that this policy has simplified and even improved their markets.

Last, as you heard on the first panel this morning, there are questions as to whether or not some market participants are able to build an advantage over others by using high-speed data feeds and co-location services. While it should be noted that both of these services are regulated and made available to all investors equally, we believe that if something results in a loss of investor confidence, we should find a way to change it. NYSE is willing to put all options on the table as it pertains to the delivery of market data; however, we highlight that this cannot be done in a vacuum, and any changes must be applied equally to all exchange and dark pool venues.

Thank you for your time, and I look forward to answering any questions you may have.

Senator LEVIN. Thank you very much, Mr. Farley.  
Mr. Ratterman.

**TESTIMONY OF JOSEPH P. RATTERMAN,<sup>1</sup> CHIEF EXECUTIVE OFFICER, BATS GLOBAL MARKETS, INC., LENEXA, KANSAS**

Mr. RATTERMAN. Good morning. My name is Joe Ratterman, Chief Executive Officer of BATS Global Markets and one of the founding employees. I want to thank Chairman Levin, Ranking Member McCain, and Senator Johnson for inviting me to participate in today's proceedings.

I was encouraged with the sentiments recently expressed by SEC Chairman Mary Lou White who said that our markets are "not broken, let alone rigged." I agree with her. The automation of the U.S. equity markets has resulted in significant enhancements in market quality for long-term investors. Importantly, however, I also recognize that our markets are not perfect and that efforts to improve them should never let up and never cease. Our current market structure is a product of Congress' 1975 amendments to the Exchange Act and subsequent rulemaking by the SEC to implement a national market system.

The SEC, working in significant part through the exchanges and other SROs, has created a system that allows market competition while at the same time, and just as vital, fostering price competition.

Today our equity markets are widely considered to be the most liquid, transparent, efficient, and competitive in the world. Costs for long-term investors in U.S. equities are among the lowest globally and declining. These gains have been noted by investors and experts alike.

In April 2010, Vanguard confirmed estimates of declining trading costs over the previous 10 to 15 years, ranging from a reduction of

<sup>1</sup>The prepared statement of Mr. Ratterman appears in the Appendix on page 79.

35 percent to more than 60 percent, savings which flowed directly to investors in the former of higher returns.

Three respected economists recently found that between 2001 and 2013, the spread paid by investors had decreased by more than 70 percent for NYSE-listed stocks.

In April 2014, BlackRock noted that, since 1998, institutional trading costs had declined and are among the lowest in the world.

Earlier this month, ITG reported between 2009 and 2013, implementation shortfall costs decreased from roughly 45 basis points to 40 basis points, following a drop from 63 basis points in 2003.

Further, our market is able to handle volume and message traffic considered astronomical only a short time ago. The efficient operation of our market structure throughout stress of the 2007–09 financial crisis indicates the systemic risks that have been reduced as a result.

Efforts to address infrastructure risks since the flash crash of 2010 are producing further beneficial results. For example, the number of erroneous executions occurring on our markets is pace this year to be nearly 85 percent lower than the previous 5-year average, results that stem from the success of the recently enacted limit-up/limit-down plan.

In addition, exchange systems issues as measured by self-help declarations have dropped by more than 80 percent since the first years after Regulation NMS. We must, nonetheless, remain squarely focused on improving market quality and stability in a coherent and responsible way. We are also keenly aware that investor confidence is important not only to help Americans realize their investment and retirement goals, but it plays directly into the overall health of our country's economy.

Simply put, when investors are confident enough to put their hard-earned capital to work in our stock market, entrepreneurs and corporations can grow and thrive as well. As such, we are fully supportive of the SEC's plan for a comprehensive market structure review, and we look forward to actively participated in that process.

Among other things, I see the following four areas as offering potential benefits without disrupting existing market quality gains.

First, institutional investors could benefit from incremental transparency related to the ATSS that their brokers route orders to, including the publication of Form ATS, which some of the ATSS have already done. Consistent and thorough reporting standards will create the greatest level of investor confidence, so additional regulatory direction may be required here.

Second, I support reviewing current SEC rules designed to provide execution quality and routing transparency. For example, Rule 606 could be amended to require disclosure about the routing of institutional orders as well as separate disclosures regarding the routing of marketable versus nonmarketable orders.

Third, to strengthen the confidence of the investing public in market data, I continue to support initiatives to make the SIPs, also known as consolidated tapes, as fast as possible. This is a position that BATS has advocated since becoming an exchange in 2008.

And, finally, I support the eliminate of the ban on locked markets, part of Reg NMS, which we believe is a primary driver of excessive complexity in our national market system.

Thank you for the opportunity to appear before you today, and I would be happy to answer your questions.

Senator LEVIN. Thank you very much, Mr. Ratterman.

Mr. Brennan.

**TESTIMONY OF JOSEPH P. BRENNAN,<sup>1</sup> PRINCIPAL AND HEAD OF GLOBAL EQUITY INDEX GROUP, THE VANGUARD GROUP, INC., MALVERN, PENNSYLVANIA**

Mr. BRENNAN. Thank you, Chairman Levin, Ranking Member McCain, and Members of the Subcommittee for inviting me to participate today. My name is Joe Brennan. At Vanguard, I am responsible for overseeing the management of our equity index mutual funds.

Vanguard serves more than 20 million investors who entrust us with \$2.6 trillion of their retirement and education savings. Vanguard's core mission is simple: to take a stand for all investors, to treat them fairly, and to give them the best chance for investment success.

Before getting into specific comments on potential improvements to our current equity market structure, I would like to make two fundamental points.

First, the markets are not rigged. We have a high degree of confidence in the markets as a safe place for investors to place their assets.

Second, all investors have benefited from improvements to our equity market structure. Through regulatory initiatives over the past two decades, most notably Regulation NMS, our equity markets have evolved to a competitive marketplace that is connected through highly advanced technology. Over time, this structure has led to lower transaction costs for all market participants. Individual investors who access the equity markets through asset managers like Vanguard have benefited from the market structure improvements that have been made over the past 20 years. Additional improvements can be made, and we are very pleased to discuss those issues with the Committee today.

We also commend SEC Chairman White for initiating a comprehensive review of ways to further strengthen the markets. We look forward to working with the Commission in this regard.

I will now briefly discuss a topic that has garnered considerable public attention recently: high-frequency trading. While the term "high-frequency trading" has become shorthand for disruptive trading, there is a significant amount of legitimate activity, such as market making, which also falls under this broad umbrella. Today's market structure contains many venues in which trades can be executed. Professional traders and technology are the yarn that knits these venues together.

Our efforts should not be focused on banning high-frequency trading; rather, we suggest examining our market structure holis-

<sup>1</sup>The prepared statement of Mr. Brennan appears in the Appendix on page 87.

tically to ensure it is providing the incentives for the type of activity we would like to see.

To accomplish this goal, Vanguard supports efforts by regulators to comprehensively reevaluate Reg NMS. As time has passed and the markets have changed, most would agree that it is time to reassess whether this regulation continues to further the goals of our national market system. We would suggest the most important goal of a national market system is to create a structure that encourages market participants to publicly display limit orders. Such a structure promotes price discovery and lowers transactions costs for all investors.

In that light, Vanguard supports regulatory efforts to revisit the current maker-taker pricing model of the exchanges. Fundamentally, it is important to understand that these models did not develop from any nefarious intent. They are the exchanges' response to the proliferation of market centers enabled by Reg NMS and a way for the exchanges to continue to attract liquidity. However, the models have become unnecessary complex, and the decision to submit orders to the public markets should not be driven by the desire to capture a rebate or avoid a fee.

Any reevaluation of the maker-taker models must be connected to an analysis of other ways to encourage publicly displayed orders. Specifically, we support a pilot of a "Trade-At" rule under Reg NMS. Today a market center can execute an order at the best publicly displayed price without actually contributing to the public price discovery process. Generally speaking, those that publicly display their interest first should be first in line for any execution at that price across the markets.

A well-designed pilot of a "Trade-At" rule under Reg NMS could help strike the appropriate balance between promoting public competition of orders while still encouraging competition among a variety of market centers. Regulators and industry participants have been working diligently over the past few years to take steps to continuously improve the manner in which our markets operate. The equity markets are extremely complex, and it is vitally important to examine all of the potential consequences of any changes to our structure.

We believe the SEC and FINRA are well equipped to continue to evaluate ways to improve our markets, and we commend them for the work they have already performed.

I thank you for allowing me to participate in this discussion, and I welcome your questions.

Senator LEVIN. Thank you very much, Mr. Brennan.

Mr. Quirk.

**TESTIMONY OF STEVEN QUIRK,<sup>1</sup> SENIOR VICE PRESIDENT,  
TRADER GROUP, TD AMERITRADE, OMAHA, NEBRASKA**

Mr. QUIRK. Good morning, Chairman Levin, Ranking Member McCain, and Members of the Subcommittee. My name is Steve Quirk. I am Senior Vice President with TD Ameritrade. I appreciate the opportunity to appear before you today. I thought I would

<sup>1</sup>The prepared statement of Mr. Quirk appears in the Appendix on page 93.

spend a brief moment on TD Ameritrade and the clients that we serve so you have a better understanding of what we do.

We are a financial services company serving primarily retail investors. We have over 6 million client accounts with \$600 billion in assets, including custodial services for 4,500 individual representative registered investment advisors and their clients. We are based in Omaha, Nebraska, and we were one of the first firms to offer discounted commissions to retail investors. Since our founding in 1975, we have also pioneered innovations such as touch-tone trading, Internet trading, and most recently mobile trading.

We have been on a quest to level the playing field between Wall Street and Main Street investors for almost 40 years. As a result of that, our clients have entrusted us with approximately a quarter trillion in net new assets since 2007. We interact with these clients daily and do third-party surveys to better understand their market sentiment. Based on this and other data, we do believe that the current U.S. equity market structure has never been better for those retail investors. In fact, the number of our firm's accounts that are trading is up 31 percent on a year-over-year basis.

Our retail clients tell us they want their entire orders filled quickly and inexpensively at the price quoted or better. In each of those areas, we have seen significant improvement in the last decade, as detailed in the written testimony.

When it comes to order routing, brokerage firms have two options: they can internalize and trade against that, or they can route that to the market centers and destinations. Based on our open architecture and unbiased and unconflicted business model, we believe it is in the best interest of our clients to send their orders to a mix of market centers, including exchanges, wholesale market makers, and ECNs. While these market destinations serve a variety of purposes, we think they are all vital in driving the competition, which ultimately benefits investors.

The Subcommittee has asked for our views on conflict of interests for brokers obligated to obtain best execution for client orders but also receive payments or rebates based on where that flow is directed. We strongly believe that with compliance with best execution obligations and proper disclosure, brokers can effectively manage any conflict that may arise from payments. Furthermore, we strongly believe that we effectively manage any such conflict.

Brokers are required to seek the most favorable terms reasonably available under the circumstances for client orders. At our firm we consider the opportunity to obtain a better price than currently quoted, the speed of execution, and the likelihood of execution, amongst other factors when making that assessment.

We also give our clients a choice. Their orders can be routed using our proprietary order routing logic, or they can choose from a list of direct routing destinations.

Finally, we work with multiple market destinations. Rather than internalize our client flow, we believe that routing all orders to the market is more transparent and better aligned with the needs of our clients. We select these market centers based on rigorous due diligence where execution quality is the top priority. After, and only after, a market satisfies our standards for best execution do we consider transaction costs or revenue opportunities. This proc-

ess complies with SEC rules enacted after thoroughly reviewing this issue on numerous occasions.

The payments or rebates that brokers receive are transparently disclosed as an average per share in our quarterly 606 reports; they are also on our account Statements and are on confirmations, which are all required by SEC rules.

Finally, we have provided the Subcommittee with a list of recommendations that we believe could enhance our Nation's current market structure without compromising many of the benefits retail investors have realized in the past years. Just as we constantly seek to improve our client experience, our industry should do the same. But let us not lose sight or compromise many of the improvements that have been made.

We appreciate the opportunity to be part of the conversation. Thank you.

Senator LEVIN. Thank you very much, Mr. Quirk.

Let me start first with you, Mr. Farley. Jeff Sprecher, the head of the Intercontinental Exchange, which owns the New York Stock Exchange, which you represent here today, has said that the maker-taker system misaligns the interests of brokers and their customers and hurts everyone in the market. "We should get rid of it," he said. Do you agree with him?

Mr. FARLEY. Yes. Jeff also says—and let me start by saying, Senator, that the U.S. capital markets are indeed the best in the world, but for 225 years the New York Stock Exchange has advocated on behalf of customers and stood for improving markets and not just accepting a flawed status quo.

To answer your question directly, there are really two areas where we are most concerned about the markets today: one is the appearance of conflicts, primarily because we think that undermines confidence in the markets; and the second is undue cost and complexity in the markets that we have heard a lot about today. Maker-taker gets to the heart of both of those issues and concerns that we have, and it is for those reasons that we have advocated eliminating maker-taker in its entirety in the equity markets in this country.

Senator LEVIN. Well, very significant testimony when an exchange which has been here as long as you have been here makes that point. And you have said in your testimony that we are seeking support for the elimination of maker-taker pricing and the use of rebates. And then you said, "Broad adoption of this policy would reduce the conflicts inherent in such pricing schema . . ." Explain that now to the Subcommittee. I happen to agree with you that those conflicts are inherent, but tell us in your words why elimination of the maker-taker pricing would reduce conflicts that are inherent in such pricing.

Mr. FARLEY. Sure. And if I may, if I could just provide a little bit of context, I came from a company called Intercontinental Exchange, and we agreed to acquire the New York Stock Exchange on Thanksgiving of 2012. And so we came to this with a perspective of other markets like the futures markets, which are deep and liquid and people generally will acknowledge that those markets function properly. And there is no such thing in those markets as

maker-taker pricing, for example. So it was something we very quickly wanted to understand more about.

The first thing that we noticed was that the maker-taker schema results in many more order types in the equities markets than you have in other markets, such as, for example, the futures markets. And many of those order types are simply in existence to help market participants capture the maker-taker spread.

And so we realized while this pricing schema introduces a good deal of complexity, with respect to the conflicts issue that you described in particular, it has been frustrating to us that in a period of rising stock prices we have not seen more participation in the equities markets from investors. In fact, data shows that the participation in terms of percentage participation of U.S. citizens is at a 16-year low. And we think a reason for that, an important reason for that, is just confidence in the markets. Markets rely on confidence. We cannot say that enough.

And irrespective of whether or not there is an actual conflict or a conflict that is resulting in some sort of bad behavior, the appearance of conflict matters. And it is for that reason that we look at maker-taker pricing, and we say there may be an appearance of conflict there if a broker-dealer's interests are not aligned with their customers, and that is something that can potentially arise with maker-taker pricing.

Senator LEVIN. Well, the appearance of a conflict is obviously important because of the confidence issue and also because underneath the appearance there may be more than an appearance. But your testimony actually is even clearer than that. As you say, you support elimination of maker-taker pricing and the use of rebates, and that broad adoption of that policy would reduce the conflicts inherent—you use the word “inherent.” Explain that.

Mr. FARLEY. So any reasonable business person does not like to be in a position of having their interests not aligned with their customers'. When you have maker-taker pricing, there are examples, as Professor Battalio described this morning, where a broker-dealer has an incentive to post a price on a high-make rebate venue even if the execution quality on that particular venue is not as high as another venue. That arises specifically because of—or it is certainly exacerbated because of maker-taker pricing.

Senator LEVIN. And that is why there is a conflict inherent in that pricing schema.

Mr. FARLEY. That is right.

Senator LEVIN. Now, Mr. Ratterman, I will give you a chance now to—first of all, before we ask you to comment or react to that, you said earlier this year, I believe, that businesses offer incentives for customers to be in their ecosystem all the time. Who are the customers you were referring to? Are they brokers?

Mr. RATTERMAN. Yes, our customers are all brokers.

Senator LEVIN. All right. Now, let me give you an opportunity to respond to Mr. Farley's testimony.

Mr. RATTERMAN. Sure. So from my perspective, in our firm we do not believe that there should be a ban on maker-taker. We are certainly open, if there is a pilot, to looking at the data, but my answer stems from my concern for the potential benefits and spread reduction that maker-taker may have produced over the

last 10 or 15 years, not for any commercial purpose about the way we run our exchange. Our exchange is in the business of matching buyers and sellers, fair and orderly markets. When we have a trade, we are going to deserve revenue for that trade as it happens. How we do that, there is today a significant amount of flexibility, and I believe that flexibility has allowed for innovation in pricing and markets, and that incrementally the rebates that are offered in many cases to market makers to take the risk to put bids and offers in the market has yielded tighter spreads over time.

I also do not believe that eliminating maker-taker would eliminate a conflict. I am thinking, as Senator Johnson walked through an example earlier, a broker's evaluation of a trade, examining where he would get a rebate for 30 cents or maybe pay 15 cents, he is looking at a spread of 45 cents in relation to the likelihood or not likelihood of getting an execution where he actually does get paid, and when he does not trade or his order does not fill, there is no commission to the broker.

So by eliminating maker-taker, you would only compress the range of the conflict, but the conflict would still exist as long as there is differential pricing between exchanges. So I think the only way to potentially eliminate the conflict then is to mandate exchange pricing at a fixed level for all exchanges all the time.

So the conflict will remain unless there is a significant intervention, and I believe disclosure, as we have talked about earlier today in the hearing, is the right answer to provide the information so that not only brokers but their customers can evaluate whether these conflicts have actually been managed well in favor of the client or not. But I do not see any path by which the elimination of the conflict can be achieved.

Senator LEVIN. Mr. Farley, do you want to comment on that?

Mr. FARLEY. Sure.

Senator LEVIN. Can we reduce the conflict that is inherent that you talked about? And can we reduce the appearance by removing the maker-taker pricing? Or have you changed your mind after hearing Mr. Ratterman? [Laughter.]

Mr. FARLEY. I actually found more areas of agreement with Mr. Ratterman than maybe I would have otherwise expected from the way his answer started. I think he—if I am putting words in your mouth, Joe, correct me. But he said, look, that may reduce the conflict, but it would not eliminate it. And so we are both agreeing directionally that it would have an impact on conflict or the appearance of conflict in the market.

But I also want to highlight that, again, the reasons why we have been focused on this are twofold: one is around this conflict issue, and the second is around complexity in the markets, additional order types and venues. And it is worth noting that, at the New York Stock Exchange, I have three equities trading venues, Mr. Ratterman has four. We have a competitor that also has four. A lot of those venues exist really principally because of maker-taker pricing, and those venues are creating different pricing schemas using maker-taker pricing for our customers.

And then, finally, and I will conclude briefly, I agree with Mr. Ratterman about another point he made, which is that we have to be careful about the elimination of maker-taker to make sure that

there are not wider spreads on fully regulated exchanges, which is why it is very important to us that such a move would be tightly coupled with giving what we call primacy of the public quote on lit exchanges to the participants who made those quotes. And that is something that does not exist today, and people are able to trade in dark markets at the same price as is posted on an exchange.

Senator LEVIN. And reducing the conflict would be valuable even if you cannot eliminate it?

Mr. FARLEY. Yes.

Senator LEVIN. Mr. Sprecher, your boss, in January said the following: “The price that we see as a bid-offer price in the market is really not the price because there are rebates and other discounts that are applied. . . . So we do not have a view of the actual price which I think is to a certain degree false advertising when you have a public ticker.”

Do you agree that maker-taker fees are distorting market prices?

Mr. FARLEY. I agree with what Jeff said. He is my boss, after all.

Senator LEVIN. If he were not your boss—he is not listening. [Laughter.]

Do you believe that maker-taker fees are distorting market prices?

Mr. FARLEY. Well, if I can just address the comment that Jeff made, I think it is a matter of fact that posted prices on exchanges—and also there are posted prices that go out through our own raw data feeds or public feeds—do not include the fees associated with them. So that is accurate that they do not include all-in prices.

So to the extent somebody is viewing that data and assuming that it does include the various make rebates and take fees, from their perspective it would be distorted. If somebody understands that it is not included, they are just receiving a different data set.

Senator LEVIN. Did anything that you hear Mr. Ratterman say change your view that the maker-taker schema, as you put it, creates an inherent conflict?

Mr. FARLEY. No.

Senator LEVIN. Now, Mr. Sprecher also said the following, Mr. Farley, that maker-taker “creates false liquidity.” Do you agree with that?

Mr. FARLEY. I suppose I have a slightly different perspective on it.

Senator LEVIN. Give us your perspective.

Mr. FARLEY. So, again, I come from a career mostly spent in the futures markets, and the type of liquidity and market making we most value comes from participants who will show up and buy from sellers and sell to buyers and actually engage in risk transference where they will hold a position for a period in time.

Fairly new to the equities markets now—a year and a half in—what I see is there is a whole swath of market making that is essentially stitching back the 50-plus venues you mentioned earlier this morning, and there are many examples of participants who are buying and selling at the exact same price at the exact same time on different venues, in part to capture maker-taker rebates. That is a different form of liquidity. I would choose different words than

Jeff did, “false liquidity,” but it is not as valuable as the type of liquidity that we have always valued at ICE in building markets.

Senator LEVIN. It is a different kind of liquidity which is not as valuable as the kind of liquidity which is created where there is a real shifting of risk.

Mr. FARLEY. No question. And it is a blanket of cost on the industry, stitching back together those—50 is a conservative number, but stitching back together those 50 venues.

Senator LEVIN. I think we have all heard about a recent survey of equity market participants that suggested that the majority of those surveyed thought that the equity markets were not fair for all participants. Is there a lack of confidence? Would you agree, Mr. Farley? And do the conflict of interests fuel that lack of confidence?

Mr. FARLEY. I look at statistics such as the one that I believe you cited, Senator, that two-thirds of Americans had equities in their account not too long ago, maybe a decade ago, and now it is half; that participation in the equities markets is at a 16-year low; and I look at that empirical data. I also look at the anecdotal data, and I am sure you, like I, have conversation about the equity markets with your friends and family. I grew up down the road here in P.G. County, and when I go back home, inevitably people ask me, “What is going on in the equities markets? Tell me about these high-frequency traders.” And there is a sense, it is unfortunate, but there is a sense that we do not have as much confidence in the markets as we once had, which is why we as the New York Stock Exchange, from the moment ICE agreed to acquire the New York Stock Exchange, has been standing for what can we do to increase confidence, what can we do to simplify the markets. Because as simple as you can make—to inspire confidence, you would to make the market as simple as you possibly can and as transparent as you possibly can.

Senator LEVIN. And as free of conflict of interests as you possibly can?

Mr. FARLEY. Yes.

Senator LEVIN. Mr. Brennan, your main business is investment management, and you offer mutual funds and other investment opportunities for your customers. Do you believe that the maker-taker pricing creates a conflict of interest between a broker’s duty to seek best execution and the money a broker can make by pursuing rebates?

Mr. BRENNAN. Yes, we think the maker-taker pricing model creates an appearance of a conflict of interest and adds additional complexity to the market. We are in favor, as we have stated, of looking at maker-taker as part of a comprehensive review of Reg NMS in our market structure.

Senator LEVIN. Do you think that that should be eliminated?

Mr. BRENNAN. I think we should test any changes with a pilot. I am not sure elimination is the answer. I think pilots and data-driven analysis are the best way to really make decisions on changes in market structure.

Senator LEVIN. And the pilot would be to remove maker-taker in a particular pilot area?

Mr. BRENNAN. Sure. I think—

Senator LEVIN. What area would you suggest that maker-taker be eliminated on a pilot basis? How would you describe the pilot or how would you define the pilot area?

Mr. BRENNAN. I think experts at the SEC should work with industry participants to define the pilot. I think all market participants should be involved in the definition of the pilot.

Senator LEVIN. And the reason that you want to move in that direction is because you believe, and your company believes that there is an appearance of a conflict?

Mr. BRENNAN. Yes, maker-taker does create an appearance of a conflict. I think we are all in agreement.

Senator LEVIN. Now, Mr. Brennan, some of the conflicts that we discussed today are the result of payments that are a penny a share or a few cents a share. Why does it matter to you that a conflict or an appearance of a conflict be removed if it is a few pennies a transaction?

Mr. BRENNAN. Well, we generally stand for what is in the best interests of our clients, and we are—for transparency and a fair market, and conflicts—eliminating conflicts and reducing conflict of interests in our market is something that would benefit our clients.

Senator LEVIN. Does it also create a problem for you to check on execution?

Mr. BRENNAN. It does not create a problem for us.

Senator LEVIN. Do you spend time looking at the execution of brokers?

Mr. BRENNAN. Yes, so—

Senator LEVIN. If maker-taker were eliminated, would that result in less time being spent by you and your company reviewing the execution of brokers?

Mr. BRENNAN. Our approach to our counterparties is probably four- or five-fold.

Senator LEVIN. When you say “counterparties,” who—

Mr. BRENNAN. Brokers, to the use of brokers, our choice of brokers. We have a lot of choices in who we can transact with. We really scour the marketplace looking for the best place to execute our transactions. We have highly skilled traders who manage our portfolios on behalf of our clients. And we have choice to eliminate a broker if they are not living up to our needs.

Along with that skill and expertise, we also have a trust but verify mode of operation where post-trade analytics are performed to see that our brokers are actually living up to our requirements.

Senator LEVIN. And I think your company told our staff that monitoring brokers to ensure or try to ensure best execution is a significant effort and that they would rather not have to do so in a conflicted environment. Is that true?

Mr. BRENNAN. We think it would be a significant effort, whether maker-taker existed or not. To be honest, we do a lot of trading, \$1 billion, \$2 billion of trading a day, 6 million trades a year. I think we owe it to our clients to do everything to ensure their execution is top-notch.

Senator LEVIN. And even though the amount of money per transaction may be 30 cents, or whatever it is, is that still true? Do you worry about that being added to a transaction?

Mr. BRENNAN. The 30 mil cap?

Senator LEVIN. Yes.

Mr. BRENNAN. Yes, so that is a pricing model, and that is a cap on a pricing model. What actually happens with our transactions is not necessarily 30 mils. We have a lot of control over our trades. We do not just hand them over to a broker.

Senator LEVIN. You spend time, as you said, reviewing this.

Mr. BRENNAN. We spend time in the actual trading and the review of the trades.

Senator LEVIN. And the review of them.

Mr. BRENNAN. Yes.

Senator LEVIN. And if there were less of a conflicted environment, would you have less need to review?

Mr. BRENNAN. I think we would still review, to be honest with you.

Senator LEVIN. But would you rather be in a nonconflicted environment?

Mr. BRENNAN. It might make the complexity and the review process a little easier in the data that comes back.

Senator LEVIN. Would you rather review the trading in a nonconflicted environment?

Mr. BRENNAN. Sure.

Senator LEVIN. Now, as a retail broker, does Vanguard accept payments from wholesale brokers, so-called payments for order flow?

Mr. BRENNAN. Vanguard has a retail brokerage. That is not the area of the company that I am associated with.

Senator LEVIN. Do you know whether or not Vanguard accepts payments from wholesale brokers?

Mr. BRENNAN. Vanguard in its retail brokerage does not accept payments for equity flow.

Senator LEVIN. Do you know why?

Mr. BRENNAN. We would have to talk to that area of our company. I am quite separate from our retail broker.

Senator LEVIN. All right. Here is what the person in that area told our staff. Tell me whether or not you disagree with this. They told us that they could make money by selling their retail order flow, but they believe accepting payments would create a conflict, so they do not do so.

Do you have any reason to not believe that or—

Mr. BRENNAN. I have not talked to the person that runs that area of our company, so I cannot confirm or deny that.

Senator LEVIN. That would be fine. Would you take back to your company that request?

Mr. BRENNAN. Sure.

Senator LEVIN. And give us an answer for the record—

Mr. BRENNAN. Absolutely.

Senator LEVIN [continuing]. As to whether or not what the staff Vanguard folks told us that they believe accepting payments would create a conflict, so they do not do so? Would you let us know for the record if that, in fact, is the case?

Mr. BRENNAN. Yes, sir.

Senator LEVIN. Mr. Quirk, I understand that your company, TD Ameritrade, sends marketable orders which would incur a fee if sent to an exchange to a wholesale broker-dealer. Is that correct?

Mr. QUIRK. That is correct.

Senator LEVIN. And that the broker-dealer pays Ameritrade for those orders. Is that correct?

Mr. QUIRK. That is correct.

Senator LEVIN. And that you send nonmarketable orders, which are the ones that are eligible for rebates to exchanges. Is that correct?

Mr. QUIRK. That is correct.

Senator LEVIN. And is it correct that TD Ameritrade receives payment either from a wholesale broker as payment for order flow or from an exchange as a rebate on nearly every trade completed?

Mr. QUIRK. I would not say on every trade completed—

Senator LEVIN. I said “nearly every.”

Mr. QUIRK. Nearly every trade, yes.

Senator LEVIN. All right. On nearly every trade, TD Ameritrade receives two payments: one is the commission paid by the customer, and another is from the venue where the trade is executed. Who decides whether an exchange or a wholesaler has provided best execution? Is it TD Ameritrade itself? Do you make that decision?

Mr. QUIRK. We would have committees that would make that decision.

Senator LEVIN. So a best execution committee?

Mr. QUIRK. We do. We have a best execution committee.

Senator LEVIN. All right. Can different brokers reach different conclusions about which venue offers the best execution?

Mr. QUIRK. Yes, I think—yes. The answer to the question is yes. But I think what is going to drive the decision as to what is the best execution is the client, and what I mean by that is if a retail client puts in a market order, they are telling us they want a quick, timely execution at or better, at the current price or better, in its entirety.

Senator LEVIN. If there is a market order?

Mr. QUIRK. If it is a market order.

Senator LEVIN. Other than that?

Mr. QUIRK. If it is a limit order, they are telling you they want that order to be visible. They have picked a price, they have determined where their interested in purchasing that stock, and they want it to be visible.

Senator LEVIN. But basically the question is still the same: Could different brokers reach different conclusions about which venue offers the best execution?

Mr. QUIRK. Yes, but I think the determinant factor would be what is in the best interests of their client or what is their client looking for. Our clients are not going to look like, for example, your clients, so we are going to have different needs with respect to execution.

Senator LEVIN. But the answer to the question is different brokers, even with the same clients, can reach different conclusions about the best venue. That is why you have a committee.

Mr. QUIRK. Yes.

Senator LEVIN. Would you all agree with that? Are you shaking your heads yes, that different brokers—

Mr. RATTERMAN. Yes.

Senator LEVIN [continuing]. Can reach different conclusions as to which venue offers the best execution?

Mr. FARLEY. Yes.

Mr. BRENNAN. Yes.

Senator LEVIN. All right. Now, for Mr. Quirk, back in 2009, Chris Nagy, who is TD Ameritrade's managing director of order routing strategy, said the following: "With maker-taker, there is a higher cost to retail investors."

Now, that is not your position today. Is that correct?

Mr. QUIRK. No, and I do not know what that is in reference to.

Senator LEVIN. All right. But that is not your position today.

Mr. QUIRK. No.

Senator LEVIN. And he also—that was in *Forbes Magazine*, September 10, 2009, and he was the managing director of order routing strategy, and he said the following in the September 21, 2009, edition of *Securities Technology Monitor*: "We felt it would become deleterious to the retail investor if maker-taker were allowed to proliferate." That was in 2009. Is that your position?

Mr. QUIRK. No, it is not.

Senator LEVIN. Do you know what changed?

Mr. QUIRK. I do not know what his position was, so I actually was not involved with the order routing.

Senator LEVIN. Were you there in 2009?

Mr. QUIRK. I was there, but not in this capacity.

Senator LEVIN. OK. Do some trading venues, Mr. Quirk, offer higher rebates than others?

Mr. QUIRK. Yes.

Senator LEVIN. Is the size of the rebate offered by an exchange a factor in determining where you route nonmarketable customer orders?

Mr. QUIRK. The way that our committees and the people responsible for order routing approach this is they start with the best execution, and they would go through a list of variables that we should consider as hurdles. And in order to get to a point where the revenue sharing is even considered, those hurdles have to be cleared.

Senator LEVIN. And the revenue sharing that you are talking about is the rebate?

Mr. QUIRK. Correct, sir.

Senator LEVIN. When you get to that point—

Mr. QUIRK. Yes.

Senator LEVIN [continuing]. After you say you have looked at the other factors, and then you look at the rebate issue, my question is: Is the size of the rebate offered by an exchange a factor in determining where you route those nonmarketable customer orders?

Mr. QUIRK. Yes. It would be the last factor. All things being equal, that would be a factor.

Senator LEVIN. And so the greater the rebate, that would be where you would go if it is otherwise best market.

Mr. QUIRK. Yes.

Senator LEVIN. How many trades does Ameritrade route to exchanges in a typical quarter?

Mr. QUIRK. We route—about 37 percent of our flow would go to an exchange on a daily basis, so I am assuming that 40—I will call

it 40 percent of, let us call it, 400,000 trades a day, so we are talking about—

Senator LEVIN. 150,000 trades a day?

Mr. QUIRK. 150,000 trades a day times—you said a quarter, right? So that is going to be about—let us see.

Senator LEVIN. Well, a week it would be about—let us round it off, say half a million a week?

Mr. QUIRK. Yes.

Senator LEVIN. And so maybe in a month that would be about 2 million. A quarter that would be about 8 million. How does that sound?

Mr. QUIRK. That sounds good.

Senator LEVIN. Round it off, OK.

Mr. QUIRK. We did about 90 million trades last year.

Senator LEVIN. OK. Well, then, why would it be only 8 million?

Mr. QUIRK. You asked—

Senator LEVIN. Well, that is through exchanges.

Mr. QUIRK. Yes, and you asked per quarter.

Senator LEVIN. OK. So that is about 8 million, to exchanges in a typical quarter.

Now, we looked at your Form 606 quarterly order routing disclosures for the quarter that was covered in the Battalio paper, and I am going to have to go vote. I apologize. We are going to have to recess here for about 15 minutes. That will give you all a chance to do something else that you might need to do.

We will reconvene at 12:15. Thank you all.

[Recess.]

Senator LEVIN. We will come back into session. We thank our witnesses for their patience and understanding with the Senate.

Let me pick up where we left off, Mr. Quirk. I guess we were talking about how many trades Ameritrade routes to exchanges in a typical quarter, and I think we rounded it off to about 8 million, something like that. Is that correct?

Mr. QUIRK. That is correct.

Senator LEVIN. Now, we looked at your Form 606 quarterly order routing disclosures for the quarter covered in the Battalio paper, and according to those disclosures, for the quarter covered in that paper, which was the fourth quarter of 2012, TD Ameritrade directed all nonmarketable customer orders to one venue in that quarter, Direct Edge. Is that correct?

Mr. QUIRK. That is correct.

Senator LEVIN. Now, among all the exchanges, Direct Edge paid the highest rebate during the fourth quarter of 2012, which is, again, the period covered by the Battalio paper, and you say that the orders, it was your policy, are directed first and foremost on the basis of best execution. But as we have learned today, best execution is a subjective judgment.

So your subjective judgment as to which market provided best execution for tens of millions of customer orders a year, about 8 million in a quarter, allowed you to route all of the orders to the market that paid you the most. Now, I find that to be, frankly, a pretty incredible coincidence.

Now, you directed all your orders for that quarter to Direct Edge because what you have said is that that exchange offered your com-

pany the best execution. The disclosure did not show a single order being directed to the New York Stock Exchange, for instance.

So, Mr. Farley, was the New York Stock Exchange just consistently worse than Direct Edge in getting best execution on retail orders?

Mr. FARLEY. No.

Senator LEVIN. And, Mr. Quirk, how much did TD Ameritrade receive in rebates from exchanges last year for routing orders to venues that pay maker rebates? Do you know how much you made just from payment for order flow and rebates?

Mr. QUIRK. I can estimate it was based on what we have discussed. It would be about \$80 million.<sup>1</sup>

Senator LEVIN. About \$80 million?

Mr. QUIRK. Yes.

Senator LEVIN. And that would be just the part that goes to the venues that pay maker rebates?

Mr. QUIRK. Maker-taker.

Senator LEVIN. Maker-taker, right. Well, how much did TD Ameritrade pay in fees to exchanges last year for routing orders to venues that charge taker fees?

Mr. QUIRK. I do not know the answer to that question, but I can get it.

Senator LEVIN. Well, I think it is close to zero, isn't it?

Mr. QUIRK. No, it is not close to zero, but I do not know what the answer is. It would not be significant.

Senator LEVIN. All right. Will you get the answer for the record?

Mr. QUIRK. Yes.

Senator LEVIN. So, anyway, for virtually every trade, your customers you say were better off by your routing their orders to the exchange that paid you a rebate rather than a venue that TD Ameritrade would have had to have paid a fee. Is that true?

Mr. QUIRK. I would say in the subsequent 24 months, you will note in our 606s that we have routed to a number of exchanges in one quarter, and some of those exchanges would not be the exchanges which were paying the highest rate.

Senator LEVIN. Well, let me go into that. In your 606 disclosures, for the first quarter of 2014, TD Ameritrade routed all disclosed nonmarketable orders to either Direct Edge or Lavaflow, the exchanges that appear from our review of your disclosures to have offered the highest rebates available in the market. Is that true?

Mr. QUIRK. That would be true.

Senator LEVIN. And so, again, your subjective judgment as to which market provided best execution for tens of millions of customer orders virtually always led you to route orders to the markets that paid you the most.

Mr. QUIRK. No, it would not have always led us——

Senator LEVIN. I said “virtually always.”

Mr. QUIRK. Virtually, yes.

Senator LEVIN. Senator McCain.

Senator MCCAIN. I want to thank the witnesses for coming.

<sup>1</sup> See Exhibit No. 4, June 19, 2014 letter from TD Ameritrade to the Permanent Subcommittee on Investigations, revising \$80 million to \$36 million, which appears in the Appendix on page 125.

Mr. Ratterman and Mr. Farley, what effect would banning maker-taker payments have on your stock exchanges? Mr. Ratterman?

Mr. RATTERMAN. Thank you, Senator McCain. The effect would have us, as a commercial operation, change the way in which we charge our broker-dealer customers to access our market. As I mentioned earlier today, we take on the order of 2 cents for every hundred shares traded as revenue for conducting the services of an exchange. So if you take away the maker-taker rebate, we will simply reconfigure the pricing mechanism that we have so that we can continue to operate our business. So it is not fundamental to the way we do business, and so related to your question, we would simply adjust our pricing to whatever framework that the law allowed.

Senator MCCAIN. Mr. Farley.

Mr. FARLEY. We would have fewer order types, which would reduce complexity in the market. We would likely have fewer venues, Senator, as well. We have three separate equities trading venues, and we would not need all three of those in a world where we did not have maker-taker, and I suspect some of our competitors would also reduce the number of venues they have.

However, I do want to point out that if we ban maker-taker in isolation, it is also probable that more business would move away from fully regulated exchanges into dark markets. Therefore, we would need to couple it with what is called a trade-at provision, which would establish the primacy of public quotes.

Senator MCCAIN. I guess I have a question for all four of you. In your business and ours, perception is reality and reality is perception. And I think you would agree that we would not be having this hearing if it was not for significant questions out there about whether you do business fairly or unfairly, if there is favoritism, if there is, even as was charged in Michael Lewis' book, that there is real corruption. I think you would agree that there is a problem out there. Would you agree with that, all of you? Or you do not think there is a problem of public perception?

Well, first of all, I guess beginning with you, Mr. Farley, and going down the line here, do you believe there is a public perception problem? And if there is, what do you think we ought to do? What measures ought to be taken? If you think there is no PR problem out there, then just say, "I do not think there is a problem." But if you think there is a problem, what do you think we ought to do?

Mr. FARLEY. Markets are built on confidence and perception, as you point out, and I think the perception could be a lot better, the perception of the equities markets in this country. We are talking a lot about trading businesses. At the New York Stock Exchange, the most important part of our business is actually our listings business—in other words, that part of our business where entrepreneurs come to market to raise capital to help create jobs, and that is built entirely on perception. And so we want to do whatever we can to improve the perception of the equities markets.

We have proffered several suggestions. We actually think doing away with maker-taker, coupling it with a trade-at rule would improve perception by itself because of some of the aftereffects, reducing complexity, reducing order types, reducing messaging, reducing

venues. And when you bring that sort of simplicity to the markets, that breeds confidence because people can understand it. It is more tangible.

Senator MCCAIN. Would co-location be part of that reform? I think we all would agree transparency is. Would co-location, elimination of that, also be a positive effect or no effect?

Mr. FARLEY. Eliminating co-location would go in the other direction. I actually think that would be a perception problem. But bringing more transparency to the practice of co-location I think is a great idea, to whatever extent we can.

Senator MCCAIN. Mr. Ratterman.

Mr. RATTERMAN. In my mind there is no question that these questions about market structure have entered into the mainstream and that people are wondering how the markets work. I think that to address that, maybe a few things.

First, there are probably some areas of immediate transparency that can be brought into the market, and I think we are seeing market forces to some extent start to do that. IEX and Credit Suisse and Goldman Sachs I believe are three dark pool operators that have all released their Form ATS as an example. Prior to recent months, those were forms that were not made available to the public.

So I think you are seeing a trend in the direction of transparency. In our testimony we have talked about areas of Rule 606 and 605 and other areas of operation of dark pools where transparency, I think, would yield a lot of insights and potentially some additional confidence in the markets. So that is the immediate response.

The medium-term response I believe is to let the SEC do the holistic review that SEC Chairman White has articulated to the industry. This holistic review will be fully comprehensive. It will cover every tenet of market structure as we understand it today, put everything on the table. And some things will undoubtedly change through that process. They will find ways to optimize and improve what are already some pretty good attributes for today's market. But also, even things that we do not change, there will be a recent mark where the regulator will have said, "We looked at this, we got the data, we have concluded that this is a good tenet of market structure, and we are going to leave it in place."

And so I think every element of our market structure will be addressed in this holistic review, and nothing will be left out. And I think that process will be very healthy for our markets.

Senator MCCAIN. Mr. Brennan.

Mr. BRENNAN. Thanks, Senator McCain. As to whether the markets—there is a perception problem or not and a confidence issue, the only thing I can judge that on is generally our business and our customers and our clients. At Vanguard we have seen record interest over the last few years in our products. The majority of the flows we have seen have been into our equity market-based products. Vanguard had \$138 billion of client assets come in the door last year and \$76 billion in the first 5 months of this year. And, again, the vast majority of those sums have been going to our equity products.

Senator MCCAIN. Well, Mr. Brennan, I think it is like the old story of a guy in a small town who said to the other guy, "What are you going to do on Saturday night?" And he says, "I am going to the poker game." He said, "Why are you doing that? Because you know the game is crooked." And the guy said, "It is the only game in town."

So, Mr. Brennan, I do not accept your allegation that everything is fine. But if that is your view, I respect it, but I do not agree with it.

Mr. Quirk.

Mr. QUIRK. I would probably have a closer view to Mr. Brennan's. When I discuss the view, I am going to discuss the view of our 6 million clients and just tell you in the behaviors that they have exhibited in the last couple years, again, it would be consistent with Mr. Brennan's. We have seen, trading accounts increase 31 percent, and we have a proprietary index which we created a couple years ago which indicates how much exposure people are taking in the market. In other words, are they participating in the rally that has happened over the course of the last couple years? And a significant portion of them have.

That being said, I would agree with you that there is a perception problem in a segment of these clients. Those would be the clients that are probably closest to this. Most of mom-and-pop, really these terms do not mean anything to them. "Co-location" and "HFT," they are just terms to them.

The problem for us is in that segment trying to make sure, as I think Senator Johnson pointed out, that we do not spook them. We do not want them to think that they are being treated unfairly.

Senator MCCAIN. Thank you. I thank the witnesses.

Thank you, Mr. Chairman.

Senator LEVIN. Thank you, Senator McCain.

Mr. Brennan, earlier this year, you said that some high-frequency traders play a role in knitting back together a fragmented market structure, but that other high-frequency traders "may be unfairly taxing the system through their behaviors."

Now, when you mentioned that some high-frequency traders unfairly taxed the system, were you talking about firms that engage in practices like rebate arbitrage where they try to capture rebates without actually providing liquidity?

Mr. BRENNAN. That would be one example, yes.

Senator LEVIN. And, therefore, the maker-taker system contributes to that problem.

Mr. BRENNAN. I think the market structure as a whole has improved dramatically over the past 20 years.

Senator LEVIN. I am talking about the part that has not improved. I am talking about what you just said, that some high-frequency traders unfairly tax the system and that you agreed, you were referring to those firms that engage in rebate arbitrage. And then I just asked you whether or not the maker-taker system is obviously, by definition, contributing to that problem.

Mr. BRENNAN. I think the maker-taker in combination with the lack of a trade-at, in combination with differential data speeds contribute to potential issues.

Senator LEVIN. And can you have rebate arbitrage without rebates?

Mr. BRENNAN. No.

Senator LEVIN. So, therefore, rebates contribute to the problem. I did not say it is the whole problem. I am just saying, does it contribute to the problem?

Mr. BRENNAN. Yes.

Senator LEVIN. Mr. Quirk, I think you were critical of the Battalio testimony, and I am wondering whether you would be willing to provide Professor Battalio with TD Ameritrade's order routing data so that he could analyze it.

Mr. QUIRK. Yes, we were actually asked by Professor Battalio after his paper was published or the draft of that paper was published if we would be willing to share data, and I think we would be willing to share data. Of course, with security, we would have to ensure that that was not going anywhere.

Senator LEVIN. And when you were asked, what was your answer?

Mr. QUIRK. To be honest with you, I am not entirely sure. I believe that he was told that it was being considered, but I am not certain.

Senator LEVIN. Let me conclude by very briefly saying the following:

We have had a good hearing today, I think a very constructive hearing, a very illuminating hearing. And we have heard a consistent message, and that is that there is a lack of confidence in the markets. The conflict of interests that we have discussed contribute to that lack of confidence. Both the actual conflicts as well as the appearance of conflicts contribute to that lack of confidence. And they may lead also to regular investors, average investors, being worse off. That is what Professor Battalio told us today, and what his study shows.

All these problems should be and can be addressed, and one of the ways we have got to do it is to remove the conflict of interests. This Subcommittee has looked at other conflicts, some of which have been very dramatic, in earlier hearings, and we have to rid our market of conflicts of interest to the extent it is humanly possible if we are going to restore confidence in our markets. And it is very important that we do have confidence in our markets.

And so hopefully the regulatory agencies are going to take action. SEC Chairman White, as a number of you have mentioned, has said that they are going to look at structural issues, long overdue, and hopefully they will not take as long as they take on a whole lot of other things that sometimes just fester at the agency, the regulatory agency, for years.

And I think there may be also a role for Congress. These things sometimes happen, hopefully more often than not through the operations of a free market, but some of them just do not happen without government saying, "You have got to change your ways, folks. You have got to take Steps A and B if you are going to restore confidence."

Now, we may disagree perhaps as to what those steps are, but there are steps which must be taken either by regulators or by Congress to deal with conflicts and to deal with the other kinds of

problems which exist in the current market, because it is clear there can be improvements.

We very much appreciate your testimony. We are sorry that it was interrupted by two votes of the Senate, but that is the way our life works around here. I wish we could pass a law to end interruptions in hearings or have some regulatory agency perhaps figure out a way that we could avoid these kind of interruptions. But that is not yet in the cards.

Thank you all. We will stand adjourned.

[Whereupon, at 12:44 p.m., the Subcommittee was adjourned.]



## A P P E N D I X

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**Opening Statement of Senator Carl Levin (D-MICH)  
Before  
Permanent Subcommittee on Investigations  
On  
Conflicts of Interest, Investor Loss of Confidence, and  
High Speed Trading in U.S. Stock Markets  
June 17, 2014**

Most Americans' image of the U.S. stock market is shaped by a single room: the trading floor of the New York Stock Exchange, where traders await a ceremonial bell to kick off the day's activity, then trade shares worth millions on scraps of paper.

In reality, most shares are traded not on a floor in Manhattan, but in racks of computer servers in New Jersey. Trades happen not at the speed of a human scribbling on paper, but in the milliseconds it takes for an order to travel through fiber-optic cables. And increasingly, the money made on stock markets comes not from thoroughly assessing companies for their investment potential, but from exploiting infinitesimal advantages at unfathomable speeds, earning billions off price differences measured in pennies or less.

We are in the era of high-speed trading. I am troubled, as are many, by some of its hallmarks. It is an era of market instability, as we saw in the 2010 "flash crash," which this Subcommittee and the Senate Banking Committee explored in a joint hearing, and in several market disruptions since. It's an era in which stock market players buy the right to locate their trading computers closer and closer to the computers of stock exchanges – conferring a minuscule speed advantage yielding massive profits. It's an era in which millions of trade orders are placed, and then canceled, in a single second, raising the question of whether much of what we call the market is, in fact, an illusion.

Many, including this Senator, question whether the rise of high-speed trading is, overall, a good thing for markets or investors. But without question, this era has seen a rise of conflicts of interest. These conflicts will be my focus today. Other Senators may focus on this or other aspects of high-speed trading.

New technologies should not erase enduring values. Financial markets can't survive on technology alone. They require a much older concept: trust. And trust is eroding. Conflicts of interest damage investors and markets – first, by depriving investors of the certainty that brokers are placing the interests of their clients first and foremost; and second, by feeding a growing belief that the markets are simply not fair.

In fact, polling shows that roughly two-thirds of Americans believe the stock market unfairly benefits some at the expense of others. This distrust may be a factor in the fact that just over half of Americans, according to a Gallup survey earlier this year, own stock or mutual funds, down from more than two-thirds of Americans who owned stock in 2002. That lack of faith – if allowed to fester and grow – will undermine a very important public purpose of stock

markets: to efficiently raise capital so that businesses may grow, create new jobs, and add to America's prosperity.

In previous hearings and investigations, this Subcommittee has shown that our financial markets have become plagued by conflicts of interest. We have uncovered investment banks willing to create securities based on junk assets, tout them to clients, and then bet against those same securities, making a fortune at the expense of their clients. We have seen credit rating agencies assign artificially high ratings to securities in order to keep or gain business. With that history in mind, those who argue that the conflicts we will explore at this hearing are manageable or acceptable have a mighty high burden of proof.

What seems to your average investor to be a simple stock market trade is usually a complicated series of transactions involving multiple parties, complex technology, and an ever-increasing number of order types and payment arrangements. There are retail brokers, like the ones found in Main Street offices across the country and on TV advertisements. There are wholesale brokers who buy orders from retail brokers. And there are dozens of trading venues where shares are bought and sold. Most Americans know the New York Stock Exchange, but there are now 11 public exchanges, plus more than 40 alternative trading venues including "dark pools," essentially private exchanges run by financial institutions.

As that complex structure has emerged, so have a number of conflicts of interest. This hearing will focus on two. The first conflict occurs when a retail broker chooses a wholesale broker to execute trades. The second occurs when a broker, acting on behalf of either a retail client or an institutional investor that manages pension funds and retirement accounts, chooses a trading venue, often a public exchange, to execute a trade. At both of those decision points, the party making the decision should only be influenced by the best interest of the investor – that's what ethics demands, and it's what the law requires.

But there's another factor in play. At both decision points, the current structure gives brokers an incentive to place their own interests ahead of the interests of their clients. Here's how.

The first conflict, as illustrated in this chart, occurs when retail brokers receive payments from wholesale brokers for their orders. This money, known as "payment for order flow," can add up to untold millions, and almost every retail broker keeps these payments rather than passing them on to clients. The reasons wholesale brokers are willing to pay for order flow are complex, but one big one is that wholesale brokers can fill many of those orders out of their own inventory and profit from the trade – a practice known as "internalizing."

The second conflict, shown on this second chart, arises when a broker decides to use a public trading venue and then chooses which venue it will send orders to for execution. Under what is known as the "maker-taker" arrangement, there's an incentive for the broker to choose the trading venue based on the broker's financial interest, rather than the client's.

"Maker-taker" can be complicated, but here's a simplified explanation. When a broker makes an offer on an exchange to buy or sell a stock at a certain price, the broker is classified as

a “maker,” and most exchanges will pay the broker a rebate when that offer to buy or sell is accepted. A broker who accepts a maker’s offer to buy or sell is called a “taker,” and will generally pay a fee to the trading venue. The important thing to remember is that brokers, by maximizing maker rebates and by avoiding taker fees, can add millions of dollars to their bottom line, giving them a powerful incentive to send the order to the trading venue that is in their best interest even if it’s not in their client’s best interest.

It is significant that earlier this year, speculation that regulators were considering restrictions on payment for order flow sent shares of some brokerage firms significantly lower. Obviously, there is a lot of money at stake in preserving these conflicts of interest.

Even if firms disclose these payments, disclosure does not excuse them from their legal and ethical obligations to clients. Their legal obligation is to provide clients with what is known as “best execution.” Whether they are meeting that obligation is a subjective judgment. The outcome of this subjective judgment affects the way tens of millions of trades are executed.

Now, some who profit from these payments argue that seeking this revenue does not interfere with their obligation to seek best execution. However, one of our witnesses today, Professor Robert H. Battalio of the University of Notre Dame, has done research indicating that when given a choice, four leading retail brokers send their orders to the markets offering the biggest rebates at every opportunity. The research further suggests that exchanges offering the highest rebates do not, in fact, offer the best execution for clients. These brokers argue that they can pocket these rebates while still meeting their obligation to provide clients with best execution. So while they make a subjective judgment as to which trading venue provides best execution, on tens of millions of trades a year, that subjective judgment always just happens to also result in the biggest payment to brokers. I find it hard to believe that this is a coincidence.

Many market participants are worried about the conflicts of interest embedded in the current market structure. In addition to Professor Battalio, today’s first panel will include Bradley Katsuyama, the president and CEO of IEX and a prominent Wall Street advocate for market reform. Our second panel will include four witnesses. They are Thomas W. Farley of the New York Stock Exchange, whose corporate owners have described conflicts as having a “corrosive impact” on stock markets; Joseph P. Ratterman of BATS Global Markets, which operates exchanges that compete with NYSE and has a different view; Joseph P. Brennan of Vanguard Group, a major mutual fund company that has expressed concerns about these conflicts; and Steven Quirk of TD Ameritrade, a retail broker that derives significant revenue from payment for order flow from wholesale brokers and rebates from exchanges.

The duty of lawmakers and financial regulators is to look out for the interests of investors and the wider public. There is significant evidence that these conflicts can damage retirement savings, pension holdings, and other investments on which Americans rely. And even Americans without a single share of stock or a mutual fund account have something at stake, because stock markets exist to foster investment, growth, and job creation. Conflicts of interest jeopardize that vital function.

Americans don't shy from innovation or technology; indeed we embrace them. But Americans are understandably suspicious when technology can be turned against them and their families' financial interests. They are rightly concerned when technology and innovation are used to undermine basic, enduring principles such as trust and duty to a client. Our goal is to advance the protection of investors and our free markets by promoting those enduring values.

I want to thank Senator McCain and his staff for their close cooperation in this matter. Senator McCain.

**Opening Statement of Senator John McCain**  
**Before**  
**Permanent Subcommittee on Investigations**  
**On**  
***Conflicts of Interest, Investor Loss of Confidence, and***  
***High Speed Trading in U.S. Stock Markets***  
**June 17, 2014**

Thank you, Mr. Chairman. When Michael Lewis's book *Flash Boys* came out, the public knew very little about high-frequency trading. Important questions were raised: Is the stock market, quote, "rigged" by unethical high-speed traders with faster access to market information, advanced technology, and sophisticated trading algorithms? Is high-frequency trading adding costs for other traders without contributing any real value to the market? Will stock markets face another flash crash like in 2010 when the Dow Jones temporarily lost \$1 trillion dollars in market value in 20 minutes?

These concerns about high-frequency trading have fueled suspicions that Wall Street may well have become the ultimate insiders' game, where the average investor can no longer meaningfully participate. Consumers see firms that can make trades in fractions of a second using cutting-edge technology and wonder if the stock exchanges are still a place where their interests matter. Hopefully, this hearing will shed light on the high-frequency trading practices used on Wall Street and help restore confidence in our financial system.

The Subcommittee interviewed many industry participants, academic researchers, and key financial regulators. While the problems facing the market are complex, we can address them with a few common sense solutions. For example, one of the most predatory high-frequency trading practices depends on the unintended consequences of the SEC's Regulation National Market System, or Reg NMS. That regulation essentially mandated that investment firms must buy or sell stocks at the best price available. While that might sound like a reasonable requirement, high-frequency trading firms can take advantage of the rule by putting out offers to buy or sell small amounts of stock at attractive prices. When a large investor, seeking to make a big order, accepts the high-frequency trading firm's offer because it is the best price available, the high-frequency trader can predict that the large investor will have to go to another exchange to purchase the rest of his order. The high-frequency trader can then race ahead of that investor to the other exchanges, buy up all available shares, and sell them to the large investor at a higher price. Changing Reg NMS so that investment firms are no longer

legally required to take the high-frequency traders' bait is an easy, clear first step to cleaning up the worst high-frequency trading practices.

Another key tactic used by high-frequency trading firms is co-location. This practice involves trading firms literally renting space for their computers in the same room as the computers that run the stock exchanges so that they can receive market information directly from the exchanges' computers as fast as possible. The investors that don't buy this direct connection to the exchanges receive market data via a government-established system using out-of-date technology called the Securities Information Processor that compiles market data much more slowly. But, as experts told the Subcommittee, there is no reason why public data feeds like the Securities Information Processor cannot be improved so that they are effectively as fast as private data feeds acquired through co-location. Updating the technology in the Securities Information Processor is another helpful measure that can be quickly adopted to shore up consumer confidence in the market.

In addition to high-frequency trading, *Flash Boys* also described how stock exchanges often pay rebates to stock brokers to entice them to trade on those exchanges. Those rebates, called "maker-taker payments," create an apparent conflict of interest for the stock brokers, who must choose between sending their clients' orders to exchanges offering a higher rebate or to exchanges that would fill the orders as quickly as possible. While many trading firms argue that those payments spur more market activity and reduce costs for consumers, some experts have argued that these benefits are minimal and that investors are harmed by their brokers' conflict of interest.

The Subcommittee has found that there is a lack of publicly-available data regarding maker-taker payments, leading to difficulties in determining whether the payments actually have an adverse effect on the market. A logical first step would be to have more transparency in the payments, allowing neutral researchers to study the issue in greater detail.

I hope that this hearing will educate the public about high-frequency trading and broker conflicts of interest, and I look forward to hearing what the witnesses have to say. Thank you, Mr. Chairman.

**Testimony of Robert Battalio**

## Conflicts of Interest in the U.S. Equity Markets

Before the U.S. Senate Permanent Subcommittee on Investigations  
of the Committee on Homeland Security and Governmental Affairs

June 17, 2014

**I. Introduction**

Chairman Levin and Ranking Member McCain, thank you for inviting me to testify today. It is an honor to have the opportunity to present my views on conflicts of interest in U.S. equity markets to the Senate Permanent Subcommittee on Investigations. I am a Professor of Finance in the Mendoza College of Business at the University of Notre Dame, where I have been a faculty member off and on since 1995. I am also a fellow at Notre Dame's Center for the Study of Financial Regulation. I served as Nasdaq's first Visiting Economist and have consulted for numerous firms on market structure issues. I currently have no consulting relationships related to my testimony. My expertise is the relationship between order flow inducements offered by dealers and exchanges and the quality of trade execution.

In preparation for my testimony today, I was asked to address three broad questions:

- (1) The conflicts of interest faced by retail brokers in determining how to route customer orders, as identified in my paper (coauthored with Shane Corwin and Robert Jennings) titled "Can Brokers have it All? On the Relation between Make-Take Fees and Limit Order Execution Quality";
- (2) Other market conditions that may create conflicts of interest affecting brokers deciding where to route institutional and retail customer orders; and
- (3) Any recommendations for policies that could reduce or eliminate those conflicts of interest and enhance public confidence in U.S. equity markets.

In consultation with my coauthors Shane Corwin and Robert Jennings, I have organized my testimony today around these three points. I begin with a brief background on the history of order flow inducements.

**II. Background on order flow inducements.**

The prevailing wisdom in academia is that dealers post bid and ask prices in a manner that allows them to generate enough revenue by trading with uninformed investors to recover the potential losses incurred from trading with better informed investors.<sup>1</sup> In other words, dealers will set wider

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<sup>1</sup> See "Bid, Ask, and Transaction Prices in a Specialist Market with Heterogeneously Informed Traders," by Lawrence Glosten and Paul Milgrom, published by the *Journal of Financial Economics* in 1985 and "Price,

quoted spreads in the presence of informed traders than they would in the absence of informed traders. By limiting exposure to informed traders, dealers can earn higher market making revenue, set narrower bid-ask spreads, or both. These incentives have led market participants to search for order characteristics or other means that allow them to separate uninformed and informed order flow. One common method to accomplish this is to separate retail order flow from institutional order flow, as retail order flow is generally considered uninformed and therefore less “toxic” to trade against. Many of the market structure issues I will discuss below are directly related to the goal of market participants to attract retail order flow.

In 1975 Congress instructed the Securities and Exchange Commission (SEC) to “amend any restrictions which imposed an unnecessary or inappropriate burden on competition” between domestic securities markets.<sup>2</sup> In response to this directive, the SEC mandated exchanges distribute real time trade and quote information to market participants. Beginning in 1982, market participants trading NYSE-listed securities could observe real-time quotes and trades that were recorded within 90 seconds of consummation. This was an important event for the retail investor. Prior to 1982, the NYSE’s competitors were unable to promise brokers that their customer orders would be treated at least as well as if they had been routed to the NYSE. As a result, 82% of all trades in NYSE-listed securities were executed on the NYSE in 1982.<sup>3</sup> After 1982, market participants could guarantee that market orders would trade at prices that were equal to (or better than) the National Best Bid and Offer, allowing them to compete more directly with the NYSE.<sup>4</sup>

In the early eighties, in order to entice retail brokers to divert their marketable orders away from the NYSE, a few market makers began offering brokers \$0.01 to \$0.02 per share for their market orders. This is referred to as payment for order flow. In return, these market makers guaranteed immediate executions at the NBBO. Conversely, the NYSE charged retail brokers up to \$0.03 per share to execute customer orders. Thus, for many retail brokers, order routing transitioned from a cost center into a profit center. As competition for retail orders increased in the late eighties and early nineties, per share order flow payments also increased.

Despite the intense competition to attract market orders, competition for limit orders was affected by the mandated priority of retail orders over professional trading interests. As noted by Battalio, Greene, Hatch and Jennings (2002), dealers purchasing market orders could not exclude others from interacting with the purchased orders.<sup>5</sup> FINRA Rule 5320 (previously referred to as the Manning Rule), states that “a member firm that accepts and holds an order in an equity security from its own customer or a customer of another broker-dealer without immediately executing the order is prohibited from trading that security on the same side of the market for its own account at

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Trade Size, and Information in Securities Markets,” by David Easley and Maureen O’Hara, published by the *Journal of Financial Economics* in 1987.

<sup>2</sup> See SEC Release No. 20074.

<sup>3</sup> See [http://www.nyxdata.com/nysedata/asp/factbook/viewer\\_edition.asp?mode=table&key=129&category=4](http://www.nyxdata.com/nysedata/asp/factbook/viewer_edition.asp?mode=table&key=129&category=4).

<sup>4</sup> A market order is an order to buy or sell an asset at the best *available* price immediately. In fast-moving markets, a market order to purchase (sell) shares may execute at a price that is well above (below) the NBBO that was prevailing when the order was placed. See <https://www.sec.gov/answers/mktord.htm>.

<sup>5</sup> See “Does the Limit Order Routing Decision Matter?,” by Robert Battalio, Jason Greene, Brian Hatch, and Robert Jennings published in 2002 by the *Review of Financial Studies*.

a price that would satisfy the customer order.”<sup>6</sup> As a result, in the eighties and early nineties most dealers were unwilling to pay for standing limit orders. In addition, as noted by Battalio et al. (2002), brokers were reluctant to route market orders to one venue and limit orders to another for fear of attracting regulatory attention (see footnote 4).<sup>7</sup> Things changed with the introduction of the SEC’s Order Handling Rules in 1997.

Prior to 1997, the public did not have access to the superior quotes that were often posted by market participants in electronic communication networks (ECNs).<sup>8,9</sup> However, the Order Handling Rules allowed public limit orders to compete directly with dealers to provide liquidity, spurring the growth of ECNs. To attract liquidity, ECNs offered standing limit orders a rebate when they traded. To fund this rebate, ECNs charged liquidity demanders a fee that exceeded the rebate by a small amount. The difference between the fee and the rebate was the primary source of revenues for ECNs. Today, we refer to this type of pricing as maker-taker pricing. Among other things, the Order Handling Rules merged two distinct business models into the NBBO: a dealer market and an electronic limit order book with maker-taker pricing. A liquidity demander purchasing shares from a dealer pays the ask price, while a liquidity demander buying shares from a limit order resting on an ECN pays the ask price plus a take fee.

The proliferation of electronic limit order books that offered to pay for standing limit orders allowed brokers to further monetize their order flow. Since market makers pay for orders only when they can trade against them, brokers can obtain higher order flow payments by segregating their marketable and nonmarketable orders. One such strategy is to sell marketable orders to market makers and to route nonmarketable limit orders to venues offering high make rebates. Based on our analysis of Rule 606 filings, several brokers began routing their orders in this fashion between 2002 and 2004. Notably, if all brokers routed orders in this fashion, market makers could potentially interact with all of the brokers’ marketable orders (since public limit orders would not ‘get in the way’).

Regulation NMS, passed in 2005, made it possible for exchanges operating electronic limit order books to viably trade both NYSE- and Nasdaq-listed stocks.<sup>10</sup> As competition to attract order flow increased, U.S. exchanges such as the NYSE switched to maker-taker pricing. Today all U.S. equity exchanges use some form of maker-taker pricing.<sup>11</sup> As was the case with the early ECNs,

<sup>6</sup> See FINRA’s May 2011 Regulatory Notice 11-24., available at <https://www.finra.org/web/groups/industry/@ip/@reg/@notice/documents/notices/p123669.pdf>.

<sup>7</sup> A limit order is an order to buy or sell a stock at a specific price or better. For the sake of my testimony, there are two basic categories of limit orders: marketable and nonmarketable (or standing). A limit order is marketable if it generates a trade when it arrives at a trading venue. Otherwise, the order is not marketable and is placed onto the trading venue’s limit order book where it will remain until it cancels, expires, or trades.

<sup>8</sup> For an in depth discussion and analysis of the SEC’s Order Handling Rules, see the “Effects of Market Reform on the Trading Costs and Depths of Nasdaq Stocks,” by Michael Barclay, William Christie, Jeffrey Harris, Eugene Kandel, and Paul Schultz, published by the *Journal of Finance* in 1999.

<sup>9</sup> ECNs were the precursor to today’s exchanges that operate electronic limit order books (e.g., BATS).

<sup>10</sup> See SEC Release 51801.

<sup>11</sup> For an in depth discussion of make take fees in U.S. equity markets following the passage of Regulation NMS, see “Make and Take Fees in the U.S. Equity Market,” a Texas Tech working paper by Laura Cardella, Jia Hao, and Ivalina Kalcheva.

exchanges using the traditional maker-taker model charge liquidity demanding orders (i.e., marketable orders) a “take” fee and rebate a portion of that fee back to the liquidity supplying orders (i.e., nonmarketable limit orders). More recently, a few exchanges began using an inverted fee structure (sometimes referred to as “taker-maker”), whereby they charge liquidity suppliers a fee and pay a rebate to liquidity demanders. The maximum allowable take fee is currently \$0.30 per hundred shares, but there is considerable variation in take fees across venues. Given the competition among U.S. exchanges, there is also a high correlation between the level of an exchange’s fee and its rebate.

**III. The conflicts of interest faced by retail brokers in determining how to route customer orders, as identified in my paper titled “Can Brokers have it All? On the Relation between Make-Take Fees and Limit Order Execution Quality,” coauthored with Shane Corwin and Robert Jennings.**

Although the SEC’s Order Protection Rule establishes price priority in U.S. equity markets, the rule does not specify who trades first when multiple venues have the best posted price.<sup>12</sup> Angel, Harris, and Spatt (2011) note that across-exchange differences in fee schedules create situations in which equally priced, nonmarketable limit orders resting on separate exchanges have different ‘net price’ priority.<sup>13</sup> All else equal, when two venues offer the best price, one expects liquidity demanders arriving in the marketplace to first route their orders to the venue with the lower take fee. Consider the case where two exchanges are at the national best bid. If sufficient selling demand arrives, sellers exhaust liquidity by walking down both exchange’s limit order books. In this situation, all limit orders at the original bid price execute and all suffer a short-term loss. However, if the stock price rises before liquidity is exhausted at the national best bid, limit orders on the venue with the higher take fee (and thus, the higher make rebate) can become isolated, missing out on profitable trading opportunities. Thus, on average, we expect that limit orders sent to venues with high take fees will have lower fill rates and suffer greater adverse selection costs – they are more likely to trade when the price moves against them and less likely to trade when prices move in their favor. This suggests that brokers routing limit orders to venues with the highest take fees (and make rebates) may not be obtaining best execution for their clients.<sup>14</sup> It is

<sup>12</sup> Rule 611 of Regulation NMS (the order protection rule) requires market centers to put into place procedures to avoid trade-throughs. Rule 604 of Regulation NMS (the limit order display rule) requires exchange specialists and OTC market makers to display customer standing limit orders in their best-priced quotations. Together, these rules ensure that the market will exhaust all displayed liquidity at the national Best Bid or Offer before moving to the next (inferior) price. If all shares at a given price execute, the limit order routing decision should not influence limit order execution quality (as measured by the probability or profitability of the execution).

<sup>13</sup> See “Equity Trading in the 21<sup>st</sup> Century,” by James Angel, Lawrence Harris, and Chester Spatt published in 2011 by the *Quarterly Journal of Finance*.

<sup>14</sup> NASD Notice to Members 01-22 (NTM 01-22) states the SEC has articulated that, when evaluating its procedures for handling limit orders, the broker-dealer “must take into account any material differences in execution quality (e.g., the likelihood of execution) among various markets or market centers to which limit orders may be routed” when meeting its ‘regular and rigorous’ examination obligations. NTM 01-22 also notes that “broker-dealers must not allow an order routing inducement, such as payment for order flow or the opportunity to trade with that order as principal, to interfere with its duty of best execution.” See [http://www.complinet.com/file\\_store/pdf/rulebooks/nasd\\_0122.pdf](http://www.complinet.com/file_store/pdf/rulebooks/nasd_0122.pdf).

also important to note that investors whose orders go unfilled cannot be made whole through lower commissions, because their orders do not trade.

Why might brokers' and clients' interests diverge? Angel et al. (2011) note that if fees and rebates are passed through to clients, brokers would generally send limit orders to the venue that maximizes the likelihood of execution, as brokers receive commissions only when orders execute. The typical situation, however, is for the broker to offer a fixed commission schedule that reflects fees, rebates, and the other costs of doing business. All else equal, in a competitive market, brokers that pay the lowest fees to exchanges can offer the lowest commissions. If investors choose brokers based primarily on commissions (perhaps because they lack the sophistication and/or the necessary information to evaluate limit order execution quality), it may be profit maximizing for brokers to consider liquidity rebates rather than the probability of limit order execution when making routing decisions. Even if investors walk away from the market when their standing limit orders do not execute, depending upon differences in fill rates, it can be revenue maximizing for brokers to route to the venue with the higher rebate and lower fill rate.

In my paper with Shane Corwin and Robert Jennings, we present evidence from Rule 606 filings that four popular retail brokers made order routing decisions in the fourth quarter of 2012 that appear to maximize the liquidity rebates generated from limit order executions.<sup>15</sup> Specifically, these brokers appear to route their customers' standing limit orders to a single exchange that pays the maximum liquidity rebate.<sup>16</sup> To the best of our knowledge, none of these brokers makes it a practice to directly pass exchange fees/rebates through to their customers. As a result, we argue that limit order execution quality, not liquidity rebates, should determine where these brokers route their limit orders. Using both proprietary limit order data and publicly available trade and quote data, we next present evidence that limit orders routed to venues with lower take fees are executed faster and more frequently than orders on high fee venues and suffer less adverse selection. These results are consistent with Angel et al. (2011), who hypothesize that when multiple venues are displaying the best quote, limit orders resting on venues that pay low/negative liquidity rebates should execute before those on venues that offer high liquidity rebates. Our results suggest that the decision to use a single venue that offers the highest liquidity rebates is not consistent with the objective of obtaining best execution for customer limit orders.

#### **IV. Other market conditions that may create conflicts of interest affecting brokers deciding where to route institutional and retail customer orders.**

In addition to maker-taker fees, conflicts of interest between brokers and customers could also result from payment for order flow or other preferencing arrangements (such as soft dollars). As noted earlier, these arrangements have been in existence for many years and the potential agency conflict associated with the sale of customer market orders has attracted a lot of academic

<sup>15</sup> Our paper is available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2367462](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2367462).

<sup>16</sup> Our conservative back of the envelope calculations using data from Rule 606 filings suggest that for the brokers we identify as routing orders to maximize rebates in the fourth quarter of 2012, standing limit orders comprise between 13% to 23% of their total order flow.

attention. Most empirical studies find that market order execution quality is better on venues that do not pay for marketable orders.<sup>17</sup> However, these studies predominately focus on trade price rather than net price. In a research project with Robert Jennings and Jamie Selway, we sought to identify low-commission brokers that did not directly receive dealer revenue. After an exhaustive search that identified 40 low-commission brokers, only one was not directly or indirectly paid for its order flow. On the surface, this suggests a link between order flow payments and low commissions. Indeed, we found that that the net cost of liquidity (trade price plus commission) offered by some of the brokers who sold their market orders was cheaper than the cost of liquidity offered by the broker that did not sell orders.<sup>18</sup>

While inducements for market orders may occasionally result in conflicted market order routing, these payments appear to have resulted in some benefits for the average retail investor. Today, retail market orders are instantaneously executed, commissions have fallen, and executions outside of the NBBO are rare. This is not to say that inducements for marketable orders should not be monitored. It is possible that the effects of payment for order flow have changed since the pre-Reg. NMS environment that I and other academics have studied. For example, as part of a 2004 agreement to sell its capital market business to UBS, Charles Schwab & Co., Inc. “committed to route most orders in equity securities and listed options to UBS for order handling and execution, for a term of eight years.”<sup>19</sup> More recently, as part of the sale of its market making unit GIX to an affiliate of Susquehanna International Group in February of 2014, E\*Trade “entered into an order handling agreement whereby it will route 70 percent of its customer equity order flow to GIX over the next five years, subject to best execution standards.”<sup>20</sup> Whether or not long-term tie ups of order flow are consistent with best execution is an empirical question that is difficult to answer with data that are currently available to the public.

#### V. Policy considerations.

As described above, we believe that exchanges’ make-take rebates/fees create a potential conflict of interest between investors using nonmarketable limit orders and brokers hired to route those orders. We next will discuss three potential approaches to reduce or eliminate the agency conflict described above. Of the three, we believe the best approach is to enforce current best execution requirements on brokers, while also requiring additional disclosure. We believe that any rule change should be accompanied by the creation of data that will allow subsequent analyses of both the effectiveness and the unintended consequences of the new regulation.

<sup>17</sup>See, for example, “Market Integration and Price Execution for NYSE-Listed Securities,” by Charles Lee, published by the *Journal of Finance* in 1993 and, more recently, “Order Preferencing and Market Quality on U.S. Equity Exchanges,” by Mark Peterson and Erik Sirri, published by the *Review of Financial Studies* in 2003.

<sup>18</sup> See “The Relationship Among Market-Making Revenue, Payment for Order Flow, and Trading Costs for Market Orders,” by Robert Battalio, Robert Jennings, and Jamie Selway published by the *Journal of Financial Services Research* in 2001.

<sup>19</sup> See <https://www.sec.gov/Archives/edgar/data/316709/000031670904000035/body.txt>.

<sup>20</sup> See <http://www.sec.gov/Archives/edgar/data/1015780/000115752314000543/a50801535.htm>.

1. *Elimination of make-take rebates and fees.*

The most aggressive approach to address this conflict is to completely eliminate make-take rebates and fees. However, while this approach might eliminate the conflict we address in our paper, it is quite possible that other (and potentially worse) conflicts could arise as a consequence.

Order flow is a valuable commodity. Payment for valuable order flow has a long history. For decades, actors in the U.S. equity markets have been actively seeking to segregate order flow into its most and least valuable components. Make-take rebates and fees and the variation in these rebates and fees across venues are part of the effort to attract order flow consistent with the venue's business model.

We believe that order flow will not lose its value should make-take rebates and fees be eliminated. We believe that the market will introduce other approaches to paying for the desired order flow. One advantage to the make-take model, in our opinion, is that the payments are reasonably transparent. If incentives to attract a particular type of order flow continued after the make-take model is regulated away (as we believe they would), then understanding what the replacement system of inducements might look like is important. It seems reasonable to wonder if the payments might be less transparent than the current system and, thus, harder to study/monitor.

We believe that the make-take model is only part of the effort to segregate order flow in today's equity marketplace. Two other examples are payment for order flow and dark pools. Without a comprehensive effort to address these order flow inducements, eliminating one aspect of them is ill advised.

If the approach of eliminating make-take fees is taken, we recommend that it not be done without a thorough evidence-based review of the potential unintended consequences. This could potentially be done in the form of an SEC pilot program related to make-take fees. However, careful consideration would have to be given to ensure that such a pilot is well-designed and to whether such a pilot could even be used to effectively study the alternative market structures that would develop in the absence of make-take fees.

2. *Requiring that rebates and fees be passed along to the customer.*

A second approach is to mandate that rebates and fees flow through to the investor. In theory, this would solve the conflict of interest we study. If fees and rebates are passed through to the customer, the broker would be concerned solely about receiving the commission, which is paid only if the order is filled. Thus, the broker would be motivated to maximize the fill rate.

Note, however, that the world we describe here is a simple one: there is an investor who gives an order to a single broker and the broker routes the order to a venue that pays/receives a single rebate or fee. In reality, orders can take a very circuitous route from initiation to

completion, potentially passing through multiple brokers and/or venues. Thus, in practice, it may be difficult to specify the pass-through rules that would solve this more complex problem.

In addition, it is unclear that investors want to move away from known, fixed commissions. Some retail brokers allow clients to select between a fixed commission and a “cost plus” model. It is our understanding that almost all select the fixed commission option. Institutional investors who trade for multiple accounts rely on the fixed commission model when allocating net trade prices from a given trade across accounts in real time. Without changes to billing and reporting systems, this would not be possible if fees and rebates were passed through to customers.<sup>21</sup>

3. *Enforce current best execution requirements on brokers and improve disclosure.*

The approach likely to have the fewest unintended consequences, and the approach that we recommend, is to enforce current best execution requirements on brokers and improve related disclosure. We believe that the current regulatory structure requires that brokers provide best execution for customers. In the discussion of best execution for limit orders, it seems to us that the likelihood of filling the order should be prominent. Requiring that brokers rigorously demonstrate that their routing practices insure best execution for their clients on a regular basis (as laid out in NASD Notice to Members 01-22) would be a good first step before initiating additional regulations. It seems unlikely to us that routing all nonmarketable orders to a single high rebate venue can be justified as best for the client.

If this approach is taken, it should be combined with additional disclosure by brokers regarding their routing decisions and the fees/rebates that they pay/earn. Some of this disclosure could be accomplished through improvements to the 606 reports. For example, brokers should be required to provide separate information for marketable and nonmarketable limit orders. Additional disclosure should also be provided to customers in the form of information on the routing path their order took before execution and the fees/rebates associated with the execution. Finally, Rule 605 reporting could be extended to individual brokers. Such a change would provide information to allow comparisons of execution quality across venues not just in the aggregate, but for orders routed from each individual broker.<sup>22</sup>

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<sup>21</sup> For a more in depth discussion of the pitfalls associated with passing fees/rebates through to the customer, see section II of “The Maker-Taker Pricing Model and its Impact on the Securities Market Structure: A Can of Worms for Securities Fraud?,” by Stanislav Dolgoplov, forthcoming in the *Virginia Law & Business Review*.

<sup>22</sup> In an April 21, 2010 comment letter on the equity market structure concept release, Ameritrade suggests the SEC should provide for a central repository so that investors may access Rule 606 reports from one location and that it should “consider requiring firms within their 606 reports to disclose 605 information relating to overall quality of execution received from those executing market centers.” Ameritrade notes that this would allow investors to make “apples-to-apples” comparisons. See <http://www.sec.gov/comments/s7-02-10/s70210-124.pdf>.



Testimony of Bradley Katsuyama  
President and CEO, IEX Group, Inc.

Before the U.S. Senate Permanent Subcommittee on Investigations of the Committee on Homeland Security and Governmental  
Affairs

June 17, 2014

### Introduction

Good afternoon Chairman Levin, Ranking Member McCain, Senators, Staff, ladies and gentlemen. Thank you for the opportunity to participate in this hearing and share our thoughts on issues affecting the US equity markets. My name is Brad Katsuyama and I am the President and Chief Executive Officer of IEX Group.

IEX would like to commend the Subcommittee for taking the time and interest to examine such a critical aspect of the U.S. equity markets given its importance to the overall economy. Forums such as this are a critical element in addressing the difficulty that many people, both inside and outside of our industry, have had in obtaining relevant information on how our markets operate. IEX hopes that we can assist in changing that dynamic and we appreciate the invitation to participate today.

IEX currently operates a non-displayed Alternative Trading System ("ATS"), or dark pool, for U.S. equities, and intends to pursue registration as a national securities exchange with the SEC later this year.

IEX is dedicated to institutionalizing fairness in the market by offering a balanced, simplified and transparent market model, and also through the use of cutting edge technology. IEX believes strongly in a marketplace's responsibility to ensure its rules and product offerings are designed to promote just and equitable principles of trade, as required by Section 6 of the Securities and Exchange Act of 1934 as amended ("the Act").

This principled approach began with IEX seeking to eliminate conflicts of interest in the operation and participation of our marketplace through our ownership and subscriber structure. Different from the other non-public markets in the US, IEX chose not to take investment from broker-dealers, and instead took investment from buy-side firms, family offices, individuals and employees as owners. To further neutralize conflict and create balance, we chose to allow only broker-dealer firms to become subscribers to our ATS.

In addition to our ownership and subscriber model, IEX has sought to further eliminate conflicts and promote fairness through the pricing structure, market design, and technology architecture of the IEX ATS. IEX has a fee/fee pricing model where we charge both sides the same fee for transactions, there are no rebates paid to the maker or taker of liquidity; we institute a time buffer to neutralize certain negative effects of structural inefficiencies in the national market system, and have a limited number of order types.

IEX believes that the U.S. equity markets have improved dramatically over the past twenty years as participants can now trade less expensively and faster than they did in the past. We believe this is in large part due to the inevitable improvements that technology has delivered across many industries – with financial markets being no exception.

We also believe that the current regulatory framework provides a viable balance between regulation and free market forces, designed to promote competition between markets and orders, and protection of the investor. We want to emphasize the point that IEX was created within the current regulatory framework, which shows that the spirit of the rules governing our market allow for different types of solutions to emerge if participants are properly incentivized to create them.

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But despite all of the benefits that we can discuss, it has become apparent to our team and our supporters that the U.S. equity markets are also far from perfect.

We believe perfection is an impossible goal; however, consistent with the 1975 Amendments to the Act, we believe that the industry should constantly be striving towards improving the mechanisms of the National Market System for the betterment of all investors and society as a whole.

We believe in the current legislative and regulatory framework of the market and fully support the regulation and controls intended to support the public interest, protection of investors, and promotion of competition. We believe that all interests – commercial, regulatory, legal, and political – should be dedicated to serving the true purpose of the market, capital formation, and its fundamental role in the domestic and global economy.

IEX believes strongly in Congress' findings in the 1975 Amendments to the Act that:

1. *"The securities markets are an important national asset which must be preserved and strengthened*
2. *New data processing and communications techniques create the opportunity for more efficient and effective market operations.*
3. *It is in the public interest and appropriate for the protection of investors and the maintenance of fair and orderly markets to assure*
  - a. *economically efficient execution of securities transactions;*
  - b. *fair competition among brokers and dealers, among exchange markets, and between exchange markets and markets other than exchange markets;*
  - c. *the availability to brokers, dealers, and investors of information with respect to quotations for and transactions in securities;*
  - d. *the practicability of brokers executing investors orders in the best market; and*
  - e. *an opportunity, consistent with the provisions of clauses (i) and (iv) of this subparagraph, for investors' orders to be executed without the participation of a dealer.*
4. *The linking of all markets for qualified securities through communication and data processing facilities will foster efficiency, enhance competition, increase the information available to brokers, dealers, and investors, facilitate the offsetting of investors' orders, and contribute to best execution of such orders."*

The rapid technological advancement of the markets over the last two decades has undoubtedly resulted in many benefits to participants. Faster electronic communication between, and information processing by, market systems have decreased uncertainty regarding the state of orders and trades in the market, improving the ability of investors and traders to manage market and opportunity risk.

These advancements have also presented the industry with the greatest potential for democratization of market access, fairness and objectivity in order handling, and the ability to supervise and surveil markets.

But we use the word *potential* very specifically – as we believe that this potential has not been fully realized.

**Committee Ask: Address conflicts of interest affecting brokers charged with seeking best execution of customer orders, including conflicts posed by market rebates, access fees, and payments to retail brokers for customer order flow.**

The potential conflicts of interest we see affecting brokers handling of customer orders primarily have to do with economics of trade execution and attribution of business handled, in particular the desire to increase or maintain market share in a broker-dealer's own dark pool.

**Rebates and fees.**

The so called “maker/taker” (and the inverse “taker/maker”) model, where providers of liquidity are paid a rebate per share traded and takers of liquidity are charged a fee (or vice versa), with the market venue (i.e. exchange) keeping the difference, has increased venue competition since its emergence in the late 1990’s. The practice became nearly universal among U.S. equity exchanges by the time Regulation NMS was effected in 2007. The introduction of the rebate and the increased certainty of execution brought on by Regulation NMS has been a benefit to electronic market makers and created a competitive niche of trading strategies specifically focused on capturing the rebate. Intense competition for rebates among professional traders has reduced the likelihood of investor orders adding liquidity in maker/taker markets, either relegating those orders to the back of the exchange queue or requiring them to disproportionately take liquidity and therefore pay the access fee.

Today there are pricing models set at various price points for rebates and fees. The largest exchanges by market share pay high rebates and charge high take fees. These markets tend to have more competition to add liquidity, and therefore more interest at the inside price. These markets are also the most expensive markets on which to take liquidity (because they charge the highest fees), and at times may be avoided by a broker sensitive to its own economics, despite the market having the most liquidity at the inside price.

**Broker challenges:**

The landscape of execution costs presents brokers handling customer orders with a number of interesting challenges. When seeking to earn itself the rebate by posting an investor’s order passively, the broker risks the order joining the back of a long queue of older orders (exchanges generally execute orders at the same price in time priority, with the oldest orders receiving the highest priority), potentially missing a trading opportunity before the price moves away from it. Further, if the order does execute, since it is near the back of the queue it will likely do so immediately before the price moves into it, an undesirable outcome. A broker who posts an investor’s order on a taker/maker exchange places their client in a higher probability position to get passively filled at the inside price, a desirable outcome, but to do so the broker must be willing to incur the higher execution cost associated with paying the fee to add liquidity.

The impediments to executing orders as a provider of liquidity increase the probability of those orders needing to become takers of liquidity. Prices along a continuum from high fee to high rebate present a risk that economically sensitive order routing may lead to more predictable and recognizable broker-dealer behavior, leaking information and creating unintended adverse market impact.

Economic considerations have also led to the proliferation of broker dark pools. By internalizing customer flow, an agency broker can avoid incurring a sizable take-fee on the public exchanges. As a consequence, the evolution of market economics has created a clear incentive for an agency broker to isolate its customer orders in its own dark pool and given that each broker-dealer only represents a portion of total customer order flow, the likelihood of investor orders isolated in this manner interacting without intermediation decreases significantly.

**The brokers’ dark pool dilemma**

In order to increase the chance of an execution in their dark pools, broker-dealers looked to provide access to other broker-dealers, especially those handling customer orders. With nearly all of the major broker-dealers operating dark pools, the willingness of a given broker to route orders to another broker’s pool is diminished by the disincentive to improve the performance of a competitor. Orders executed in a dark pool contribute to that pool’s percentage of market share. Market share is an important metric by which trading venues, and those brokers who operate them, compete for customer business. This places in conflict the service of seeking liquidity for the customer orders on the best terms available across venues and the broker’s incentive to maintain dark pool market share relative to its competitors.



To further increase the chance of an execution, many pools grant access to electronic market making and other proprietary trading strategies. The service of these strategies is in large part to bring together interest widely dispersed across venues by intermediating between the buyer in one market and the seller in another. While in some cases strategies may have their own liquidity needs, in cases of cross-venue intermediation the motivation for the intermediary is economic, either a price inefficiency between markets, or the fees/rebates offered by the market center. Price inefficiency means that one or both of the orders being intermediated is paying for the service of intermediation, even though both orders were in the composite market at the same time with intersecting price limits.

Orders isolated on a dark pool are insulated from meaningful interaction with interest in the larger market. These orders may be subject to a disproportionately high level of interaction with principal interest, either from the broker-dealer operating the pool or proprietary high frequency trading strategies. While one of the stated objectives of dark pool trading is to minimize information leakage and market impact, it may also result in execution at unimproved prices, while permitting an intermediary to immediately capture a profit with an offsetting transaction in another venue.

The risk of transmitting an actionable signal may be low for single, large executions, and this is a proposed value of dark pools. Without quotes, information about a trade is communicated to the market only after the trade is complete as a report to the Consolidated Tape. Signal risk may be high, however, for portions of an order executed across multiple dark pools as an antecedent to accessing the displayed quotation in the public market. Signal risk would also likely be high in cases where a liquidity seeker accessed a single pool, such as the pool it operates, with an effort or frequency disproportionately high relative to other markets. In such an event the over-accessing could create a series of signals indicative to certain strategies that significant directional interest exists.

**Committee Ask: Describe the role of high frequency trading in today's marketplace and the relationship between benefits attributed to high frequency trading, such as increased liquidity and narrowing spreads, and the above conflicts of interest.**

The market benefits from a diversity of participants, and a diversity of trading strategies. In addition to natural investors, market making, arbitrage and speculative trading strategies contribute to the information available in the market, as well as providing and taking liquidity, improving efficiency and bridging geographic and temporal fragmentation. However, strategies that exist solely to exploit structural inefficiencies impose unnecessary cost and potential risk to the system.

It should be recognized that the most significant improvements in spread tightening in U.S. equities followed the Order Handling Rules, implemented in the latter half of the 1990's, and then by the conversion of the industry from fraction-based pricing to decimals. Both of these changes surround the adoption of Regulation ATS which greatly promoted competition among market centers by allowing an exemption from the requirement to register as a national securities exchange for alternative trading systems, which would compete directly and indirectly with exchanges. Order handling rules mandating that customer interest be represented in the market whenever not prohibited by customer instruction, decimalization, competition and continuous improvement in technological performance allowed the industry to more precisely and efficiently present demand and supply to the market. High frequency trading strategies both rely upon and contribute to these conditions, but to claim they are the reason for this improvement is debatable at best.

High frequency trading strategies were generally categorized by the SEC 2010 Concept Release on Equity Market Structure as: passive market making, arbitrage, directional, and structural. The first two of these provide the greatest social value to the market; liquidity provision, elimination of natural inefficiencies, promotion of price discovery and the intermediation of interest that would otherwise not interact.



Directional strategies may receive a more mixed review. These strategies compete with customer orders, in particular, when a trading is a result of order detection. Setting manipulative strategies aside as prohibited; it is an expected characteristic of a free and transparent market that some participants will react to pressures in the market. Competition among orders is an objective of the Act.

The last category, structural strategies, are strategies that exist solely to exploit a structural inefficiency, or to the extent that any strategy of the prior categories are materially benefitting from structural inefficiencies, must be considered with the most discriminating examination. The Act requires the "removal of impediments to and perfection of the mechanism of a national market system". Inefficiencies in the structure of the market; communication networks, trading and information systems, and market data dissemination, pose a particular risk to the integrity of the composite market place because the exploitation of such inefficiencies does not eliminate the inefficiency, and therefore the opportunity to extract value from the system is perpetual, as is not the case with other types of more natural inefficiency.

High frequency trading strategies operating in compliance with market rules are valid competitors for trading interest, provide liquidity, intermediation, and contribution to price discovery. The questions of value and fairness relating to high frequency trading must be answered by understanding the opportunities and advantages, as well as the disadvantages, imposed upon the national market system by the system itself.

**Committee Ask: Describe other matters associated with high frequency trading, including order protection rules; market centers' use of proprietary and public data feeds in determining national best bid and offer; market latency and its impact on investors; the role of Regulation National Market System; and market participants' use of high speed, proprietary data feeds and co-location.**

To best appreciate the potential impacts of structural inefficiencies in the market the Industry is still evolving its collective understanding of the relative utility of exceedingly small increments in time. In this highly automated, computerized market environment actionable windows of time are counted in micro-seconds, millionths of a second. The concepts of instantaneous, immediate and simultaneous must be reconsidered to include granularities to the millionth of a second or finer. The issue at hand is that of structural inefficiencies in the market creating asymmetries of information among participants which to some are of actionable duration while to others, previously, not considered to be relevant.

Regulation NMS established the requirement that each market participant and market center determine the best-priced protected quotations based on the market data feed or feeds of their choice. The most often discussed structural inefficiency related to this requirement is the difference in dissemination speeds between the two consolidated Securities Information Processors (SIP) and proprietary market data feeds offered commercially by market centers, including each of the national securities exchanges which comprise the governing committees of each of the SIPs.

The common criticism that the SIP feeds are significantly slower than proprietary data feeds is often met with a response citing the necessity for the SIP to process information from each of the exchanges and calculate the National Best Bid and Offer to be included in the disseminated consolidated quote feed. Consumers of proprietary data feeds have similar needs; they must process the messages to arrive at an understanding of the market. That private and commercial processors of proprietary feeds are significantly faster than the SIPs, and tend to have less variance in performance under stress raises questions of conflicted interests of those exchanges governing the SIPs.

Some exchanges offer multiple proprietary market data products, including differences solely based on the speed or content of a feed. Further adding to the potential for information asymmetry is the difference in dissemination between the various



market centers due to varying levels of technological capabilities and order book composition, with more advanced exchanges disseminating information faster than less advanced markets. This results in differences between their system processing performances, especially during times of high message rate related stress in the market.

Some markets have different means of accessing the market whereby participants can enter orders and cancels, and receive information from the exchange about those orders. The two main elements of speed of market access are order entry application program interfaces (API) protocols and co-location services. These two services present a number of benefits to the market, with co-location, in particular, solving the classic issue of the physical room around the specialists' post on the floor of an exchange.

Proximity to the market is now less restrained by physical space (for all intents and purposes), and the uniformity and fairness of that access is greatly enhanced when co-location services are part of an exchange's rulebook and subject to SEC approval and oversight. Discussions about co-location as advantaging one party over another, namely, the non-co-located party, are understandable, but practically off the mark. Proximity will always be a factor. To some it will be important and to others it will not. There is no solution for the relative difference in market access speed between a trader in California vs. a trader in New York. Similarly, where co-location is about the race to the front door of the market center, it is now available to any participant who wants it and can afford to pay for it.

It is our belief that concerns around co-location should focus on whether it enables a market's participants to be able to process and act on information more timely than the market center itself. Co-location should also be considered in light of how it may magnify latency and structural related trading opportunities.

Where these differences are material, noting that materiality may mean tens or hundreds of microseconds, the following negative/questionable effects may be found.

#### **Concerns regarding negative effects structural inefficiencies**

**Order Anticipation/Detection** - The negative effect in this case is the enabling of certain trading strategies to perceive and react to a change in the market, such as an investor order attempting to access all the currently displayed liquidity at once. "At once" is not a single instant in time; it is a series of moments over a very short time horizon. The issue is magnified when one party thinks its action occurs instantaneously, while others, who have the technological resources and skill, see the event as a series of sequential actions, thus creating a trading opportunity for the latter.

The question of fairness here centers on the market system providing information and allowing market access in such fine increments of time as to increase both the confidence of order detection and the window of time in which a participant may act on the received information. Considering the fact that the construct of the market system enables action being taken on an order as it seemingly enters the marketplace instantaneously is suggestive of an unnecessary and unproductive practice worth eliminating.

**Fading Liquidity** - The same principles apply to the issue of fading liquidity as certain high speed strategies respond to pressure in the market, including just their own orders being filled, and cancel their orders on other markets. In this case, technology revives the issue previously resolved by rule of non-firm quotations, or of orders "backing away".

In a single market's limit order book, an incoming order is processed against orders resting on the book according to that market's priority schema. In no case would a strategy with an order resting on the book be able to effect a cancellation prior to the time the order that is currently processing against that book has finished. All orders in the displayed market today are expected to be firm orders, and they are by rule and by computer code. Again due to the construct of the market system certain strategies are able to get out of the way of buy or sell interest as they are accessing the market in aggregate, which



calls into question the fairness of the inefficiencies which allow or enable such behavior, and the potential distortion of price discovery and of supply and demand.

**Price Dislocation** – There are several ways in which structural inefficiencies contribute to price dislocation. One of the most commonly talked about ways is arbitrage based upon the relative speed of market data feeds from the SIPs vs. proprietary feeds from the exchanges. A market center using SIP feeds to determine the NBBO, which is being accessed by a strategy using proprietary market data feeds, will be at a disadvantage if that strategy can enter order instructions into the market center in a timeframe within the difference in delivery time between the feeds. Even in the event that a market center is using proprietary feeds it is reasonable to expect that a market center system will take more time to process and propagate changes in market data than a participant system optimized to run a trading strategy.

As a result, a slower market center pricing orders resting on its book, for example to the midpoint of the NBBO, may provide a structural arbitrage opportunity when one of its trading participants possesses trading information that the market itself doesn't have. This is a structural inefficiency where any participant who has entrusted a market center with their resting order may be placed at a disadvantage to a high speed participant due to the slowness of the particular market where its order is resting.

**Committee Ask: Provide any recommendations for policies that could reduce or eliminate conflicts of interest while maintaining liquidity and low investor costs, and enhancing public confidence in U.S. equity markets.**

At IEX we believe that if a market and its participants are provided with adequate information and given the leeway to self-correct, the market as a whole will come to the best possible decision, and produce the solutions that it needs.

IEX suggests that the best policies to reduce or eliminate conflicts of interest are those that promote transparency and disclosure, with a particular emphasis towards standards that promote comparability. With better information each participant can make better choices. Disclosure of relationships, practices, and performance with a uniform reference enables comparison, and compels those with agency and fiduciary obligations, and other high standards of care to factor any such information into their decision making process.

The SEC and FINRA have taken positive recent steps towards making the markets more transparent – through the SEC Midas website and FINRA's ATS reporting rule– and we would encourage further pursuit of greater transparency in our markets through any regulatory means necessary.

IEX recommends that the following areas be considered for policies to improve transparency:

**Standardization of Data:**

1. When data is requested of participants, ensure that a standard for how the data should be derived and presented is clear and concise.
2. Require market systems, broker-dealers, exchanges, ATSs and SIPs, to time stamp messages sent, received and used internally to a standard granularity of at least microseconds with specificity on where in the system it was recorded.
3. Improve atomic clock synchronization from a one second tolerance to one millisecond or finer.

**Data requirement examples:**

1. Public disclosure of an anonymous breakdown of subscribers by volume on any registered trading venue (ATS and Exchange).



2. Public disclosure of an anonymous breakdown of message traffic and message to trade ratio by subscriber on any registered trading venue (ATS and Exchange).
3. A complete audit trail of how client orders are handled, including both routing and trading information, available to the client upon request.

**Market Operation Disclosures:**

1. Plain language rules and common use examples for proposed rules for products and services offered by exchanges.
2. Require public disclosure of alternative trading systems' Form ATS and subsequent products, services, and pricing.
3. Ensure an adequate amount of reporting between exchanges and brokers, as well as between brokers and clients – whereby execution data and routing data is standardized and available upon request.
4. Define acceptable tolerances for trading, market center and inter-market communication system performance to ensure there are no meaningful risks to the integrity of the system in the context of structural inefficiencies which could allow unfair advantages and disadvantages to certain market participants.

The most important aspect of transparency is that it brings accountability to all participants in our market. A better understanding of how our market works (this includes venue behavior, subscriber behavior, and inter-market behavior) will undoubtedly help us uncover problematic issues and ask critical questions, which ultimately reduces complexity and helps the industry to self-regulate and stabilize the market. With greater transparency, it will be much easier to evaluate new participants, products and services against the key principles of serving investors, companies, and the public interest. In many ways, increased transparency directly helps to mitigate the very real concern that IEX and many of our partners share – the overall health and stability of our market.

**Conclusion**

In conclusion, IEX has created a market based solution that addresses numerous market conflicts while also reducing the potential for predatory high frequency trading opportunities. We are currently implementing additional commercial solutions to make further advancements to our market model. Everything that we have implemented at IEX is within the current regulatory structure which we believe reflects the spirit of the rules as intended and we respectfully ask that when evaluating the extent by which Congress or the Commission seek to further modify the structure of the equity markets, a cost-benefit analysis should contrast potential regulation against commercially available solutions.

To the extent market participants choose to route orders through IEX, this confirms IEX's contribution to market quality. The optional nature of routing orders to IEX is inherent as part of a market-based solution. With regard to regulation, such optionality is not the case, and any new regulation that is imbedded in market structure brings the potential for uncertainty and implementation risk.

For this reason we support the Commission's thoughtful data driven approach and would suggest that the primary goal would be to collect greater amounts of information in a standardized form and to make that data publicly available.

In closing, IEX would like to echo SEC Chair White's recent statement in a speech given in New York on June 5, 2014. "The secondary markets exist for investors and public companies, and their interests must be paramount."

As we as an industry work through this period of change, we should never forget why the market exists in the first place.

Thank you.

**Testimony of New York Stock Exchange President Thomas W. Farley  
before the  
U.S. Senate Homeland Security and Governmental Affairs Committee  
Permanent Subcommittee on Investigations  
on Equities Market Structure  
June 17, 2014**

Chairman Levin, Ranking Member McCain and members of the Subcommittee, we appreciate your interest in the regulatory structure of the U.S. capital markets. My name is Tom Farley and I am President of the New York Stock Exchange (NYSE). I have been in the business of exchanges for most of my career including as President and COO of ICE Futures US (formerly the New York Board of Trade) and as Senior Vice President of Financial Markets at Intercontinental Exchange (ICE) where I oversaw the development of initiatives within ICE's financial markets.

Intercontinental Exchange has a track record of investing in markets and clearing houses that are underperforming within our industry and turning them into best-in-class exchanges. As a first step toward streamlining and improving the operations, we separated the NYSE and Euronext businesses, recreating NYSE Group. NYSE Group includes the iconic New York Stock Exchange as well as two additional equities exchanges, two options exchanges and a bond trading platform. Across these venues we list and trade equities, options, exchange traded products and debt securities. Intercontinental Exchange has also been party to many of the major policy and regulatory discussions regarding the structure of the markets in which we operate. In those discussions, we maintain that transparency and fairness should be a core consideration.

The equities market in the United States is the leader in global capital raising and trading. It is unique to any other market in the world, and thus warrants a different regulatory structure. In particular, the U.S. equities market comprises both institutional and retail market participations and millions of Americans rely on the market to grow their retirement funds through pensions, life insurance, mutual funds and individual securities. As a result, the equities market must not only have a high level of systems reliability, it must also maintain a high level of the public's trust. This trust is what gives companies confidence that they can access the public markets for capital raising and gives investors' confidence that they will be able to transact in a fair market.

As market operators, we have come to the view that the U.S. equities market is highly fragmented – making it overly complex and opaque. The regulations and structures in place today incentivize participants to make it more complex and more opaque. Numerous surveys and recent history have shown that this structure does not contribute to investor confidence or high systems reliability.

As the dominant rule setting the boundaries of equity market structure, Regulation NMS set out to accomplish several objectives. The first was to increase competition among markets and to increase competition among orders.<sup>1</sup> While the rule did an excellent job of increasing competition among markets,<sup>2</sup> we believe competition of orders has been severely damaged, particularly in recent years, due to the record level of off-exchange trading and increased levels of order fragmentation. In fact, last week off-exchange trading reached a record high of 40.5% across all Regulation NMS securities.<sup>3</sup> This means that despite someone taking a risk to establish the National Best Bid or Offer (NBBO) on a displayed market, brokers decided to execute the trade away from the displayed, or regulated, market 40% of the time rather than rewarding the people who established the NBBO, with an execution. We find this troubling and damaging to price discovery.<sup>4</sup>

<sup>1</sup> Securities Exchange Act Release No. 51808 (June 9, 2005), 70 FR 37498, 37501 (June 29, 2005) ("Reg. NMS Adopting Release")

<sup>2</sup> NYSE held 80 percent market share in Tape A securities in 2005. Today five exchanges have more than 5% market share in Tape A securities.

<sup>3</sup> Consolidated Tape Association and Universal Trading Privileges Plan data.

<sup>4</sup> Daniel G. Weaver Study available at: <http://www.sec.gov/comments/s7-02-10/s70210-127.pdf>. John McCrank, "Dark Markets May Be More Harmful than High-Frequency Trading", *Reuters*, April 6, 2014. SEC Chairman Mary Jo White, June 2014; <http://www.sec.gov/News/Speech/Detail/Speech/1370542004312>.

The second objective of Regulation NMS was to design a structure to the benefit of long-term investors and public companies.<sup>5</sup> Long-term investors have benefited in many ways from the implementation of Regulation NMS, however data now shows that some of these benefits, such as lower costs, might be reversing.<sup>6</sup> In addition, we consistently hear from large institutional investors that there are too many conflicts in the current market structure and that they would like to see those conflicts eliminated or, at least, reduced. Many incentives are in place to keep orders away from the public markets where they would interact with displayed liquidity. These incentives often conflict with the interests of the investor whose orders are being executed off of public markets and are always inconsistent with the interests of those participants who are displaying trading interest and setting the public prices that are so critical to the transparency and efficiency of our markets. Perhaps most importantly, we hear from listed companies and entrepreneurs that they believe the market is not designed for them but rather for the trading community and, as a result, they have lost confidence in the market. Newly listed companies via the IPO process are the lifeblood of our economy and job creation. We must care about market structure if we care about the real economy. Now that we have had time to observe the impact of Regulation NMS, we should consider revisions that would better enable it to meet stated goals by removing some of these conflicts and thereby restoring confidence.

The New York Stock Exchange will take a leadership role in bringing about beneficial change. Our goal is simple: Reduce the level of complexity and fragmentation of the US stock market. To accomplish this goal, there are several unilateral steps that we are committing to take and that we would welcome our industry colleagues to also adopt. To start, we are self-imposing a six-month moratorium on any new, or novel, order types that further segment the market. We believe that this will give the industry and the SEC time to focus on the complexity that exists. In addition, we have already announced the elimination of more than a dozen unique order types. We believe this is a first step toward reducing complexity and toward a more efficient market structure.

At an industry level, we are seeking support for the elimination of maker-taker pricing and the use of rebates. Broad adoption of this policy would reduce the conflicts inherent in such pricing schema and further reduce complexity through fewer order types and fewer venues. In conjunction with the elimination of maker-taker and rebates, we believe regulation should require that deference be given to displayed quotes. There is risk involved in displaying a quote accessible to all market participants and we believe strongly that the person taking that risk should be rewarded with an execution at that price. Unfortunately, in today's environment, those displayed quotes are used to inform trading on dark markets which are not contributing to the price discovery process. The original investors who posted these public quotes are all-too-often left with no trade at all. This ability to transact on dark markets at the same price as posted public quotes is what is driving an increasing amount of volume off fully-regulated, transparent venues and onto dark markets at an alarming rate. Several countries, including Canada and Australia fairly recently, have adopted rules that establish the primacy of public quotes. In the cases of Canada and Australia, the regulators have established that this policy has simplified and improved their markets.

Lastly, as you heard on the first panel this morning, there are questions as to whether or not some market participants are able to build an advantage over others by using high-speed data feeds and colocation services. While it should be noted that both of these services are regulated and made available to all investors equally, we believe that if something results in a loss of investor confidence, we should find a way to change it. These changes should build on the advances we've made in technology and increase investor confidence. NYSE is willing to put all options on the table as it pertains to the delivery of market data, however we highlight that this cannot be done in a vacuum and any changes must be applied equally to all exchange and dark pool venues. By leveling the playing field for regulated and unregulated venues alike, we will see a much more simple and transparent market.

Thank you for your time and I look forward to answering any questions you may have.

<sup>5</sup> Securities Exchange Act Release No. 51808 (June 9, 2005), 70 FR 37498, 37501 (June 29, 2005) ("Reg. NMS Adopting Release")

<sup>6</sup> Strumpf, Dan; (June 4, 2014) Institutional Investors Paying More for Services; WSJ Online. Retrieved from: <http://blogs.wsj.com/moneybeat/2014/06/04/institutional-investors-paying-more-for-services/>.

**TESTIMONY OF JOE RATTERMAN  
US SENATE PERMANENT SUBCOMMITTEE ON INVESTIGATIONS**

**June 17, 2014**

Thank you and good morning. My name is Joe Ratterman, Chief Executive Officer of BATS Global Markets, Inc. ("BATS"), and one of the founding employees. I am pleased to be here and want to thank Chairman Levin and Ranking Member McCain for inviting me to testify on matters related to the US equity capital market structure.

BATS was formed in 2005 in response to a competitive void that emerged in the U.S. equity markets. The NYSE and NASDAQ had acquired the first generation of efficient, technology-oriented exchange competitors, namely Archipelago, Inet (which reflected the merger of Instinet and Island), and Brut. In the face of this exchange duopoly, BATS stepped into the competitive void, launching as a small alternative trading system ("ATS") from a north Kansas City storefront in January 2006. In January of this year, we merged with Direct Edge, an innovative exchange operator that was similarly formed in 2005 to enhance competition among markets.

BATS remains headquartered in the Kansas City area, and maintains offices in New York, New Jersey, and London. With approximately 300 employees globally, we compete vigorously every day in the U.S. and Europe to earn our customers' business and trust. We have leveraged technology to significantly reduce execution costs for all investors and deliver innovative products and services to market participants.

I agree with the sentiments recently expressed by SEC Chair Mary Jo White, who said that our markets are "not broken, let alone rigged."<sup>1</sup> Evidence overwhelmingly demonstrates that the automation of the market over at least the last decade has resulted in significant enhancements in market quality for long term investors, whether retail or institutional. But like the distinguished SEC Chair and her fellow commissioners, I recognize that our markets are not perfect; in fact, the search for perfection is a never-ending quest. As exchanges, we are not only competing market centers, but also regulators and, therefore, approach these issues with utmost seriousness. Because of this, I am particularly grateful to be here today and have the opportunity to share my views.

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<sup>1</sup> Mary Jo White, Chair, SEC, *Enhancing our Equity Market Structure* (speech given at Sandler O'Neill & Partners, L.P. Global Exchange and Brokerage Conference, New York, NY, June 5, 2014).

## **I. Background**

In 1975, Congress amended the Exchange Act of 1934 (“Act”) to adopt Section 11A, which was designed to facilitate the establishment of a national market system to link together the multiple individual markets that trade securities. Congress intended for the SEC to take advantage of opportunities created by advancements in technology to preserve and strengthen the securities markets. By leveraging technology, our national market system is designed to achieve the objectives of efficient, competitive, fair, and orderly markets that are in the public interest and protect investors.

In response to this Congressional mandate, the SEC has adopted various rules since 1975 to further the objectives of the national market system, including the order handling rules in 1997, Regulation ATS in 1998, decimalization in 2000, and Regulation NMS in 2005. Many of the innovative structural characteristics of our market owe their existence to Congress’ 1975 amendments to the Act, and subsequent SEC rulemaking in furtherance of those amendments.

Our national market system is premised on promoting fair competition among individual markets, while at the same time assuring that all of these markets are linked together in a unified system that promotes interaction among the orders of buyers and sellers. The national market system thereby incorporates two distinct types of competition – competition among individual markets and competition among individual orders – that together contribute to efficient markets. Vigorous competition among markets promotes more efficient and innovative trading services, while integrated competition among orders promotes more efficient pricing of individual stocks for all types of orders, large and small. Together, they produce markets that offer the greatest benefits for investors and listed companies.

In adopting Regulation NMS, the SEC stated that its primary challenge in facilitating the establishment of the national market system has been to maintain the appropriate balance between fostering competition between markets and fostering competition between orders; mandates that at times come into conflict. The SEC further stated that it attempted to avoid the extremes of: (1) isolated markets that trade securities without regard to trading in other markets, and (2) a totally centralized system that loses the benefits of vigorous competition and innovation among individual markets. The SEC navigated these extremes by allowing market competition, while at the same time fostering order competition through the adoption of the order protection rule, which prohibits markets from trading without regard to the prices posted on other markets.

Today we have an equity marketplace that is widely considered to be the most liquid, transparent, efficient and competitive financial market in the world. Costs for long term investors, both institutional and retail, in the U.S. equity marketplace are among the lowest globally and these gains in market quality have been noted by academics, institutional buy-side

investors, and agency brokers:

- In April 2010, *Vanguard* noted that estimates of declining trading costs over the previous ten to fifteen years *ranged from a reduction of 35% to more than 60%* and stated that Vanguard’s own experience was in line with that range. Reduced trading costs, as Vanguard noted, flow directly as a “substantial benefit to investors in the form of higher returns.”<sup>2</sup>
- In June 2013, three economists, including former SEC Chief Economist Larry Harris, found a dramatic change in the spread for NYSE-listed and Nasdaq-listed stocks over the preceding twelve years. In particular, between 2001 and 2013, *the spread paid by investors had decreased from more than 6 cents to below 2 cents for NYSE-listed stocks and from above 5 cents to below 3 cents for Nasdaq-listed stocks.*<sup>3</sup>
- In April 2014, *Blackrock* noted the same positive trends in their assessment of market structure performance since 1998, stating that *bid-ask spreads have narrowed significantly* and that *institutional trading costs have declined and are among the lowest in the world.*<sup>4</sup>
- In June 2014, *ITG’s Global Cost Review Report* further confirmed the decline in institutional trading costs, noting that from Q3 2009 to Q4 2013, *implementation shortfall*<sup>5</sup> *costs decreased from roughly 45 basis points to 40 basis points.* (This decline followed a drop from 63 basis points in Q3 2003).<sup>6</sup>

Further, our market is able to handle volume and message traffic considered astronomical only a few decades ago, and the efficient operation of this market throughout the recent financial crisis and resulting volatility should serve as a reminder of the systemic risks that have been reduced as a result.

<sup>2</sup> See Letter from George Sauter, Managing Director and Chief Investment Officer, Vanguard Group, Inc. to Elizabeth M. Murphy, Secretary, Securities and Exchange Commission, dated April 21, 2010.

<sup>3</sup> See Angel, James J., Lawrence E. Harris and Chester S. Spatt, “Equity Trading in the 21<sup>st</sup> Century: An Update” (June 21, 2013), available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1584026](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1584026).

<sup>4</sup> See BlackRock, “US Equity Market Structure: An Investor Perspective” (April 2014).

<sup>5</sup> ITS defines Implementation Shortfall cost as the difference, or slippage, between the arrival price and the execution price for a trade.

<sup>6</sup> See ITG, “Global Cost Review Q4/2013” (June 6, 2014), available at [http://itg.com/marketing/ITG\\_GlobalCostReview\\_Q42013\\_20140509.pdf](http://itg.com/marketing/ITG_GlobalCostReview_Q42013_20140509.pdf); see also Speech by Chair Mary Jo White: Enhancing Our Equity Market Structure (June 5, 2014)

Despite the overall high quality of our equity capital markets today, we must remain focused on identifying areas in which market quality and stability can be improved and consider responsible, data-driven regulatory action where appropriate. In this regard, we are encouraged by the SEC's plan for a continuous and comprehensive review of the state of our market structure. Such a review is timely because the aforementioned changes, particularly those following from the implementation of Regulation NMS in 2007, reflect a relatively recent and dramatic evolution in the manner in which securities trade.

We can always improve market quality, but we need to avoid disrupting or reversing the substantial improvements in market quality we have experienced. While it has been widely recognized that retail investors have benefited the most from improvements in market quality over the last decade, I also believe institutional investors have experienced measurable benefits in the form of the above-referenced reductions in implementation shortfall costs. That said, I recognize that institutional investors continue to face challenges in executing large orders with a minimum of market impact. To be sure, finding a "natural" investor or liquidity provider willing to take the opposite side of a well-informed institutional investor's order is a complex problem to solve regardless of market structure.

Policymakers looking to reform our equity market structure must be cognizant of the concern that enacting rules that tip the scales for or against particular market constituents runs the very real risk of negating benefits currently delivered by our equity markets. Therefore, we advocate for responsible and thoughtful changes that are supported by reliable data and perhaps even tested through pilot programs of sufficient duration to obtain data that adequately demonstrates the impact of the change.

## **II. Conflicts of Interest**

Certain practices surrounding broker agency relationships, such as payment for order flow and soft dollar arrangements, as well as exchange fee structures create the potential for conflicts of interest; however, I believe these potential conflicts of interest can be and generally are managed by vigorous oversight within broker-dealers, and can be supplemented through additional transparency as well as oversight and enforcement by FINRA and the SEC. For example, I believe institutional investors could benefit from additional transparency about the ATSs to which their brokers route orders. I support the voluntary initiatives of some ATSs to make public their Form ATS, and additional regulatory action could be considered to require ATSs to provide customers with their rules of operation, which would include order types, eligible participant and participant tiers, all forms of data feed products, and order-routing logic and eligible routing venues. With this information, institutional investors might be better positioned to determine which trading venues best meet their trading needs, and compare disparate broker product and service offerings.

Moreover, I support reviewing current SEC rules designed to provide transparency into execution quality and broker order routing practices. In particular, Rules 605 and 606 of Regulation NMS require execution venues to periodically publish certain aggregate data about execution quality and require brokers to publish periodic reports of the top ten trading venues to which customer orders were routed for execution over the period, including a discussion of any material relationships the broker has with each venue. Publication of this data has helped better inform investors in regards to the manner in which their orders are handled.

Nonetheless, these rules were adopted nearly 15 years ago<sup>7</sup> and the market has evolved significantly enough to warrant re-examining whether additional transparency could be provided that would benefit investors. For example, advances in technology now permit significant market events to occur in millisecond time frames, and audit trails are granular enough to capture that activity. However, the current requirements of Rule 605 effectively allow a trading venue to measure the quality of a particular execution by reference to any national best bid or offer in effect within the one second period that such order was executed. Given the frequency of quote updates in actively traded securities within any single second, compliance with this requirement may not in all cases provide adequate transparency into a particular venue's true execution quality. Transparency could further be improved by amending Rule 606 to require disclosure about the routing of institutional orders, as well as separate disclosure regarding the routing of marketable and non-marketable orders, and the inclusion of execution quality data.

Some have suggested that exchange fee structures may be the source of unmanageable conflicts of interest associated with order routing decisions. The dominant exchange pricing mechanism over the last decade has been the so-called maker-taker model, which generally encourages liquidity makers to take the risk of exposing an order in the marketplace by paying them a small rebate, if and only when their order is executed. Under Regulation NMS, exchange fees to access – or “take” – liquidity are capped at 30 cents per 100 shares, which effectively serves as a cap on the rebate that can be paid to liquidity makers.

These rebates provide an effective incentive to encourage liquidity makers to post tight bid-offer spreads, which benefit all investors. I believe restricting incentives to provide liquidity could be counter-productive. Whether it is banning the current maker-taker fee structure, limiting payment for order flow generally, or other attempts to alter the economics of trading, price controls are a blunt instrument likely to cause disruptions and consequences that are unforeseeable and potentially detrimental to all types of investors. I am concerned that additional pricing restrictions could drive significantly more volume to dark venues or order types, make the compensation brokers receive for their liquidity far less transparent, and widen the displayed bid-ask spread in a manner that effectively taxes all investors. Efforts to avoid

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<sup>7</sup> Exchange Act Release No. 43590 (Nov. 17, 2000) (Rules 605 and 606 were originally adopted as Rules 11Ac1-5 and 11Ac1-6, respectively, under the Exchange Act).

these potential consequences could lead to a set of regulations so complex that the root cause of future behaviors could never fully be known.

### **III. Fairness & Market Data**

Because of the flexibility of our national market system for market data, it is in many ways the fairest in the world. With side-by-side competition between a nationally consolidated feed and direct feeds from multiple exchanges, market participants pay only for the content and related infrastructure they actually need. Given that quote and trade information serve multiple needs ranging from real-time trading data to back-office reference information to news and information, providing multiple products through multiple sources meets needs in a diverse and constructive way.

Nonetheless, there remain perceptions that differences in content and speed of dissemination confer unwarranted advantages on select market participants. And perceptions affect investor confidence about the integrity of the markets, so I take them very seriously. While Rule 603 of Regulation NMS dictates that exchanges do not release market data to private recipients before disseminating that data to the public securities information processor (“SIP”), differences in content and downstream technologies can still create a perception of unfairness.

To address this perception issue in an optimal manner, exchanges should continue to strive to make the dissemination of consolidated data through the SIPs as fast as possible, and should consider including aggregated depth-of-book data per exchange based on industry demands.

Perceptions of unfairness are also present with respect to the market data exchanges use in their matching engines and routing infrastructure to calculate the national best bid and offer (“NBBO”). Some have suggested that exchanges that use the SIP data to calculate the NBBO provide unfair opportunities to sophisticated traders to engage in risk-free latency arbitrage. Exchanges have historically used SIP data to determine the NBBO with the changeover to direct feeds being a relatively recent phenomenon. While that change yields an optimization in the speed with which quotes can update, there are particular reasons why that optimization is not as significant at an exchange as the difference in the speed between the SIPs and direct feeds. In particular, this is because exchanges accept intermarket sweep orders (“ISOs”), which can display on an exchange at a price that appears from the SIP data to lock another exchange’s quote. The ISO designation on an order tells the exchange that the sender has either sent an order to execute against the locking quote or that the sender has a faster view of the market and knows that the locking quote no longer exists. Therefore, when SIP data is augmented by ISOs, exchanges are able to update the quote in their matching engines nearly as fast as direct feeds update.

#### IV. Venue Complexity – How Many Is Too Many?

Competition and automation have combined to dramatically improve the market's trading infrastructure. The low commissions, diversity of products and ability to handle large order and trading volumes are a direct result of these forces. Regulation ATS and Regulation NMS provided a framework for this competition to thrive, and maintaining a system whereby new entrants can prove their value to the market is essential. At the same time, we need to reconsider where regulation may artificially subsidize competition or encourage complexity that does not address a market need.

In particular, all exchanges are given a significant competitive advantage regardless of their size by virtue of the order protection rule under Regulation NMS. While this was necessary in an era where legacy exchanges routinely ignored their competitors, current practices have reduced the need for regulatory protections of smaller venues. Recent events provide evidence that market forces ultimately can correct for venues that add only marginal value; the existing concentration of exchanges among scale providers – including BATS – means that in some cases the marginal operating cost for a “new” exchange is near zero. The cost and complexity of connectivity to a small venue for market participants, however, can be substantial.

Accordingly, Regulation NMS should be revised so that, until an exchange achieves greater than a de minimis level of market share, for example 1%, in any rolling three-month period:

- They should no longer be protected under the order protection rule; and
- They should not share in/receive any NMS plan market data revenue.

The combination of these two provisions would: (a) potentially reduce client costs in connecting to small exchanges, giving them the flexibility to route around them should they so choose, while still protecting displayed limit orders on all venues of meaningful size; and (b) take away market data revenue that may be the basis for the continued operation of marginal venues.

#### V. Order Type Complexity – Drivers and Solutions

While I am sensitive to concerns about the complexity of our markets, the vast majority of market functionality exists because it meets the needs of a diverse group of market participants.<sup>8</sup> Functionality becomes counter-productive when it exists solely to address arcane or trivial requirements, rather than addressing important economic, operational or regulatory needs of market participants. This is especially true when the level of complexity is high in relation to the supposed benefits.

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<sup>8</sup> See e.g. Gregg E. Berman, Associate Director, Division of Trading and Markets, SEC, *What Drives Complexity and Speed of our Markets* (speech given at the North American Trading Architecture Summit, New York, NY, April 15, 2014).

One such driver of excessive exchange complexity is rooted in an often-overlooked provision of Regulation NMS – the ban on locked markets. Price-sliding logic and other order types such as ISOs often stem directly from this discrete prohibition. Given that existing regulatory guidance already effectively prohibits locking a market for the sole purpose of avoiding or reducing fees, revisiting regulatory obligations in this regard could be a simple yet powerful way to materially reduce the complexity of exchange operations.

#### **VI. Systemic Complexity – Strengthening Critical Infrastructure**

Technology has undoubtedly transformed our market for the better, but it has also brought with it new challenges and risks. Even in a market with fewer exchanges and fewer order types, the risk of IT or operational malfunctions will remain. Since 2010, the SEC and the industry have worked constructively to improve coordination and systemic risk management, from the implementation of Limit Up/Limit Down execution price bands to the enactment of the Market Access Rule to the harmonization of the standards for clearly erroneous trades. Taken together, these initiatives represent significant progress with respect to enhancing market stability.

This progress is measurable. According to the Financial Information Forum, exchange system issues as measured by self-help declarations have dropped more than 80% since 2007 and 2008, the first years after Regulation NMS. In addition, the number of clearly erroneous executions across the industry has dropped dramatically over the last few years. For example, clearly erroneous events reported on the BATS BZX Exchange in 2014 is on pace to be approximately 66% lower than 2013 and 85% lower than the previous 5-year average.

Further mitigating operational risk requires continuous vigilance and a flexible framework. More can and needs to be done with respect to critical market infrastructure as a whole, and by the individual institutions that actively participate in the markets. In particular, a well-vetted and properly scaled Regulation SCI should be finalized and adopted with respect to exchanges, SIPs and clearance and settlement facilities. While the SEC should work with these future Regulation SCI entities to refine its requirements in a manner that will achieve the best outcomes, completing this regulation should be prioritized. I am encouraged by Chair White's recent comments on her desire to finalize the proposal. This would strengthen market infrastructure truly deemed to be "critical" around industry best practices and help better manage the complexity that competition brings where it is needed.

#### **VII. Conclusion**

While our current equity market structure is not perfect, I believe that it is by far the fairest, most efficient and most liquid market in the world. However, because it is a complex ecosystem, policymakers need to be mindful of the potential unintended consequences of sudden, significant changes. I fully support the SEC conducting a deliberate, data-driven study of the quality of our market structure and advocate for reforms where that analysis supports the potential for market quality improvement.

Thank you for the opportunity to appear before you today. I would be happy to answer any of your questions.



**Written Testimony of Joseph Brennan  
Principal and Head of Global Equity Index Group,  
The Vanguard Group, Inc.  
Senate Permanent Subcommittee on Investigations hearing on  
“Conflicts of Interest, Investor Loss of Confidence, and High Speed Trading in U.S. Stock  
Markets”  
June 17, 2014**

Thank you Chairman Levin, Ranking Member McCain and members of the Committee for inviting me to participate today. My name is Joe Brennan. At Vanguard, I am responsible for overseeing the investment professionals who manage our equity index mutual funds. Vanguard is one of the world’s largest mutual fund organizations, serving more than 20 million investors who entrust us with \$2.6 trillion of their retirement and education savings. Vanguard’s investing principles are simple and straightforward: create clear goals, develop a suitable diversified allocation, minimize cost, and maintain a long-term perspective. Vanguard’s core mission is equally simple and straightforward: To take a stand for all investors, to treat them fairly, and to give them the best chance for investment success.

My comments are informed by the billions of dollars we regularly invest in the equity markets, with the goal of trading effectively and efficiently on behalf of our mutual fund clients. Before getting into specific comments on potential improvements to our current market structure, I must make two fundamental points.

First, the markets are not “rigged.” We have a high degree of confidence in the markets as a safe place for investors to place their assets for the long term. Frankly, sweeping conclusory statements that the markets are “rigged” do nothing to instill investor confidence. To the contrary, they undermine the efforts of regulators and the vast majority of industry participants

who have strived for years to continue to create a market that functions in the best interests of investors.

Second, all investors have benefitted from improvements to our equity market structure. Through various regulatory initiatives over the past two decades, most notably, Reg NMS, our equity markets have evolved to a competitive marketplace that is connected through highly advanced technology. Over time, this structure has resulted in significantly lower transaction costs for all market participants. Individual investors who access the equity markets through asset managers like Vanguard have, without question, benefited from the market structure improvements that have been made over the last twenty years.

That said, additional improvements can be made and we appreciate the opportunity to discuss these matters. We also commend SEC Chair White for initiating a comprehensive review of ways to further strengthen the markets. We look forward to working with the Commission in this regard.

#### **High Frequency Trading**

I will now discuss a topic that has garnered considerable public attention recently - high frequency trading. While the term "high frequency trading" has become shorthand for disruptive trading, there is a significant amount of legitimate activity, such as market making, which falls under this broad umbrella. Today's markets contain many venues in which trades can be executed. Professional traders and technology are the yarn that knits these venues together. There are extensive rules and regulations governing trading in place today and manipulative activity can be dealt with through vigorous enforcement. Regulators have made significant

progress over the last few years in obtaining access to better information allowing them to better enforce existing rules. We expect those efforts to continue.

It is important to understand that much of the recent discussion about high-frequency trading really involves a faster, highly automated version of an issue that institutional traders have dealt with since the beginning of trading – information leakage. Even before computers dominated the marketplace, institutional traders always had to deal with the risk that their trading interest would be signaled to the market enabling others to step in and make a small profit. This risk was perhaps at its highest when institutional traders had to call a broker (or several brokers) to attempt to execute a large trade. While technology has benefitted high frequency traders, it has also provided institutional traders with the tools to control the manner in which their trading needs are submitted to the market.

Our efforts should not be focused on banning high frequency trading. We suggest examining our market structure holistically to ensure it is providing incentives for the type of activity we want to see.

#### **Review of Regulation NMS**

Vanguard supports efforts by regulators to comprehensively reevaluate Reg NMS. As time has passed and the markets have changed, most would agree that it is time to assess whether this regulation continues to further the goals of our national market system. Reg NMS has been successful in promoting the goal of enhancing competition among market centers as evidenced by the proliferation of off-exchange trading in recent years. Off-exchange trading is not bad and plays an important role in our markets by, among other things, providing a venue for the trading of large institutional orders without market impact. However, another goal of our national

market system is to foster the competition of orders. As our markets have evolved under Reg NMS, it is time to explore ways to better balance the sometimes incompatible goals of encouraging competition among market centers and facilitating the interaction of orders.

Publicly-displayed liquidity is the foundation of a transparent and efficient market. We would suggest the most important goal of a national market system is to create a structure that encourages market participants to publicly display limit orders. A structure that encourages publicly displayed limit orders reduces spreads, increases liquidity, promotes price discovery, and lowers transaction costs for all investors.

#### Maker/Taker Pricing Models

As part of an analysis of Reg NMS, Vanguard supports regulatory efforts to revisit the current maker/taker pricing models. Fundamentally, it is important to understand that these models did not develop from any nefarious intent. Maker/taker models were created for an important purpose – to attract liquidity to the public markets and thereby promote price discovery. What has developed over time, however, as the different exchanges have implemented different pricing points, is the ability for certain traders to engage in “rebate arbitrage” which is really just trading focused on profiting from these rebates. This was not the purpose of this fee/rebate structure. More importantly, as the amount of fees and rebates differ across exchanges, it creates the appearance of a potential conflict in which brokers posting liquidity may be motivated to send an order to the exchange that offers the highest rebate while brokers routing market orders taking liquidity may be motivated to send their orders to the exchange that charges the lowest fee. While firms have a best execution obligation to ensure their routing decisions are based on the best interests of their client, we think there is an

appearance of a conflict which is not necessary. The models have become unnecessarily complex and the decision to submit orders to the public markets should not be driven by the desire to capture a rebate or avoid a fee.

“Trade-At”

Any reevaluation of the maker/taker models must be connected to an analysis of other ways to encourage publicly displayed orders. Specifically, we believe the analysis of Reg NMS should also consider a pilot of a “Trade-At” rule. Today, a market center can execute an order at the best publicly displayed price without actually contributing to the public price discovery process. Generally speaking, those that publicly display their interest should be first in line for any execution at that price across the markets.

The current “Trade Through” protections of Reg NMS prohibit the purchase or sale of a stock at a price outside the national best bid/offer. Any market participant can execute trades at these prices regardless of whether the market participant is also publicly displaying that price. Because market participants can use the publicly displayed prices provided by other market participants, the “Trade-Through” rule provides little incentive for market participants to display their own trading interest and, thereby, deepen or tighten the public quote.

Conversely, a “Trade-At” rule would encourage market participants to contribute to the public price discovery process could help enhance confidence in the public markets. A well-designed pilot of a “Trade-At” rule under Reg NMS that also considers changes to the maker/taker models could help strike the appropriate balance between promoting the public competition of orders while still encouraging competition among a variety of market centers.

**Access to Information**

Finally, there has been much discussion about the direct market data feeds provided by the exchanges. These proprietary data feeds provide certain market participants with a snapshot of the markets moments before the same information is disseminated more broadly through the consolidated market data feed – the “SIP.” The structure should not create the appearance of an informational advantage. Market participants who choose to invest in technology to act on market data faster than others is *not* the issue. Rather, it is the unequal access to information that raises the appearance of an unfair market. We support the regulators’ attention to improving the integrity and resiliency of market-wide data feeds.

**Conclusion**

I will close by saying these are not “new” topics. Regulators and industry participants have been working diligently over the past few years to take steps to continuously improve the manner in which our markets operate. The equity markets are extremely complex. It is vitally important to recognize and examine the unintended consequences of any changes to our structure. We believe the SEC and FINRA are well equipped to continue to evaluate ways to improve our markets and we commend them on the work they have already performed.



STATEMENT OF

STEVEN QUIRK  
SENIOR VICE PRESIDENT, TRADER GROUP  
TD AMERITRADE

FOR THE

UNITED STATES SENATE  
PERMANENT SUBCOMMITTEE ON INVESTIGATIONS

HEARING ON

CONFLICTS OF INTEREST, INVESTOR LOSS OF CONFIDENCE  
AND HIGH SPEED TRADING IN THE U.S. STOCK MARKETS

JUNE 17, 2014

**I. INTRODUCTION**

Good morning Chairman Levin, Ranking Member McCain, and Members of the Subcommittee. My name is Steve Quirk. I am Senior Vice President, responsible for trading at TD Ameritrade. Thank you for the opportunity to appear before you today. On behalf of TD Ameritrade, we look forward to addressing your questions on several of the many interrelated topics in the current U.S. equity market structure debate. This debate is very timely given the recent speech by Securities and Exchange Commission (“SEC”) Chair Mary Jo White, and her strong leadership and commitment to conduct a data-driven, comprehensive review of market structure.

**A. TD Ameritrade Background and History**

TD Ameritrade is a financial services company that specializes in serving the needs of retail investors. We offer investing and trading services to over 6 million client accounts that hold over \$600 billion in assets, including custodial services for more than 4,500 independent registered investment advisors (“RIAs”) and their clients, and provide investor education resources to investors. TD Ameritrade offers its brokerage services primarily online and over the phone, but also in person in over 100 branches located nationwide. TD Ameritrade’s corporate goal is to be the better investment firm for today’s investors.

TD Ameritrade, based in Omaha, Nebraska, was founded in 1975 and was one of the first firms to offer discounted commissions to individual investors following the passage of the Securities Acts Amendments of 1975. Since 1975, TD Ameritrade has pioneered technology changes such as touch-tone telephone trading, internet trading, and more recently, mobile trading. Each of these developments has made markets more accessible, affordable and

transparent for retail investors. For almost 40 years, TD Ameritrade has been leveling the playing field between Wall Street and Main Street investors.

TD Ameritrade is an award-winning company, and has been recognized for the quality of its trading platforms and services for retail investors:

- Barron's in 2013 and 2014 named TD Ameritrade the best online broker for long-term investing and novices. In 2012, the publication rated TD Ameritrade the best for research amenities, and research and education.
- Kiplinger's Personal Finance in 2013 named TD Ameritrade as the best broker for ETFs. In 2012, the publication named TD Ameritrade the best place for your IRA.
- Investor Business Daily in 2013 named our thinkorswim platform as the best options and mobile trading platforms.
- Stockbrokers.com named TD Ameritrade the best online broker three years in a row – 2012, 2013 and 2014.

The most important recognition, however, comes from our clients – during the last five years they have entrusted us with an additional \$192 billion in net new assets.

TD Ameritrade's business model uses open architecture and strives to provide unconflicted and unbiased products and services. When it comes to order routing, brokerage firms have two options: (1) internalize and trade against client order flow; or (2) route orders to third party market centers. TD Ameritrade believes in the current market structure, it is in the best interests of our clients to send their orders to a mix of market centers, such as wholesale market makers, exchanges and electronic communication networks ("ECNs") for execution. TD Ameritrade believes that having a diverse selection of market centers, and having them compete for our order flow is beneficial to our clients because the market centers must continually improve execution quality to be considered a viable option for executing our client orders.

Competition between markets is vitally important to the health of the current market. A few market participants or business models will not suffice. For example, it is our experience that wholesale market makers provide: consistent price improvement, fill size improvements of up to four times that quoted on exchanges, trade resolution and the ability to provide a consistent client experience. Public exchanges provide the valuable service of allowing firms to display liquidity on their depth of book; however, their model has limitations in that they do not allow for trade resolution beyond erroneous trades, do not provide fill size improvements, and, by regulation, have limited liability (*e.g.*, Facebook IPO). While the exchanges and market makers are different and serve unique roles, they are *both* vitally important in that they drive competition among market centers that ultimately benefits investors.

**B. Our Clients**

Our typical retail client holds on average, \$81,000 of assets with us. This client is 49 years old and places 24 trades annually. Our clients have access to the markets today that only professionals used to have in the past. They have access to free independent research reports on our website, investor education courses, and real-time streaming quotations. They use our powerful trading software, and they receive split second executions, most of the time, with price improvement.

We believe that the current U.S. equity structure has never been better for retail investors.

Our retail clients generally want the following:

1. Inexpensive execution. Retail online discount commission rates have been reduced by almost 70% since 1997 – from an average of \$38.63 to \$12.03 per trade.
2. Orders filled quickly. Our average execution speed has improved by 90% since 2004 – from 7 seconds to 0.7 seconds today.

3. The price that they are quoted, or better. In 2013, our clients trading listed securities received a better price than the published national best price 91% of the time – ten years ago, the industry average for marketable orders in listed stocks was 14%.
4. Their entire order filled. Approximately 99% of client market orders are filled in their entirety. In our experience, the wholesale market makers provide an average of four times the liquidity that is available on the exchange displaying the largest amount available.

Our data shows that during the past year, the retail investor has re-engaged with the stock market, and with renewed faith. The number of TD Ameritrade accounts trading is up 31% year over year.

Retail investors today benefit from competition in the marketplace, just as they benefit from competition among brokerage firms. TD Ameritrade provides clients with an all-inclusive experience where we charge a fixed transaction fee inclusive of streaming tools, free market data, 24-hour client support, research and education, all at no additional cost. Other brokerage firms offer a more “à la carte” approach and charge a separate fee for each service (e.g., fees for real-time market data), but may pass through to clients certain economics, such as market center rebates. Many of the firms in our space utilize an “all in” model. We believe our offering provides value and is aligned with what our clients generally want.

## **II. CONFLICTS OF INTEREST AND BEST EXECUTION**

Today’s hearing focuses on a few components of the larger market structure debate. The Subcommittee asked TD Ameritrade its views on possible conflicts of interest as they relate to a brokers’ obligation to seek best execution for their client orders and, at the same time, receive payments or rebates based on where their order flow is directed. Conflicts of interest are common throughout the financial services industry, but TD Ameritrade believes that a broker’s compliance with its best execution obligations, along with proper disclosure, can allow the

broker to effectively manage any conflict of interest that may arise by accepting payments or rebates. We strongly believe that we effectively manage any such conflict.

A broker's duty of best execution is well established. When handling customer orders, brokers are required to seek the most favorable terms reasonably available under the circumstances. We consider many factors in making this assessment, including, the opportunity to obtain a better price than currently quoted, the speed of execution and the likelihood of execution.

In fact, this is how our order routing strategy works:

- First, we give our clients choice. They can choose to route their orders using TD Ameritrade's order routing logic, or they can choose from a list of direct routing destinations.
- Second, we do not internalize orders. We believe that turning all client orders back to the market is more transparent and better aligned with the needs of our clients.
- Instead, we work with multiple market centers, which are selected after extensive due diligence where execution quality is a top priority, in addition to a litany of other variables such as system capacity and performance, order handling protocols, risk controls, capitalization and business continuity procedures.
- And third, we evaluate market center stability, execution quality and consistency every day. We hold our market centers to a very high standard, and in the event that there is a degradation, we adjust accordingly.

After, and only after a market center satisfies our standards for providing best execution, do we consider transaction costs or revenue opportunities. Regardless, the payments we receive from market participants do not interfere with our efforts to seek quality execution and optimize the value proposition for our clients. Best execution comes first.

Transparency also is important in addressing conflicts. The payments or rebates that brokers receive are disclosed as an average per share payment in the quarterly Rule 606 reports,

which the SEC requires brokers to post on their websites. Clients also are informed that we receive payment for order flow in their account agreement, on account statements and on confirmations, as required by SEC rules.

The recent Battalio study raises questions whether the receipt of maker-taker fees paid by exchanges could interfere with a broker's pursuit of best execution of client limit orders. As we understand, the study remains in draft and is subject to peer review. And, we understand that at least one academician has raised questions regarding the relevance of the data and the conclusions that are drawn from the data. From our perspective, we will simply note that the draft study used two months of data consisting of "*non-retail* order flow from one broker trading algorithm," and we question whether it is appropriate to draw any conclusions about the execution quality of *retail* order flow, which appears to us to be fundamentally different from the order flow that was analyzed.

Revenue generated from order flow is used to operate our business and is indirectly passed back to clients in part through the products and services that TD Ameritrade offers at low or no additional cost. As noted earlier, TD Ameritrade clients enjoy: free trading software; free real-time market data; and free independent research, to name a few products. That is, clients benefit tremendously from market access that remains easy and inexpensive. TD Ameritrade agrees with the primary author of the draft study when he states that payment for order flow "appears to be beneficial for investors... because payments for order flow are passed back to investors due to brokerage house competition."<sup>1</sup>

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<sup>1</sup> DOES PAYMENT FOR ORDER FLOW TO YOUR BROKER HELP OR HURT YOU? Robert H. Battalio and Tim Loughran, at page 14 (January 17, 2007). See also DIMENSIONS OF BEST EXECUTION FOR MARKET ORDERS: ASSESSING DIFFERENCES BETWEEN THE NYSE AND THE NASDAQ THIRD MARKET, Robert

### III. RECOMMENDATIONS

The Subcommittee asked whether TD Ameritrade has recommendations for policies that could reduce or eliminate conflicts of interest while maintaining liquidity and low investor costs, and enhancing public confidence in the U.S. equity markets. As noted above, TD Ameritrade, agrees that retail investors have never had better, low cost access to the markets. And, we believe the pursuit of best execution and disclosures can effectively manage conflicts of interest related to a firm's receipt of payments or rebates. Clearly, any market structure changes should first "do no harm" to investor costs or access. That being said, we agree that the markets are not perfect, and we should always be looking for ways to improve them. TD Ameritrade has the following recommendations:

- We applaud SEC Chair White's recent speech announcing the wide-ranging market structure proposals now being considered by the SEC staff. We believe it is appropriate for the SEC to consider the topics discussed today in the context of the SEC's holistic review of market structure.
- Equal and timely access to information.
- Update and improve the Rule 605 and 606 statistics.
- Increase technology resiliency and redundancy.
- Continue to enhance transparency.

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Battalio, Brian Hatch and Robert Jennings, at page 20 (March 2000) ("payment for order and high quality trade executions are not necessarily mutually exclusive."); PAYMENT FOR ORDER FLOW, TRADING COSTS, AND DEALER REVENUE FOR MARKET ORDERS AT KNIGHT SECURITIES, L.P., at page 4 (December 1998)("We find little evidence that investors using brokers accepting payment for flow are worse-off than investors using a broker that does not."); TO PAY OR BE PAID? THE IMPACT OF TAKER FEES AND ORDER FLOW INDUCEMENTS ON TRADING COSTS IN U.S. OPTIONS MARKETS, Robert Battalio, Andriy Shkilko and Robert Van Ness, at page 36 (Nov. 3, 2011)("requiring brokers to explicitly pass taker fees and order inducement fees back to investors on a trade-by-trade basis is a potentially costly cure for an ailment that may not exist.")

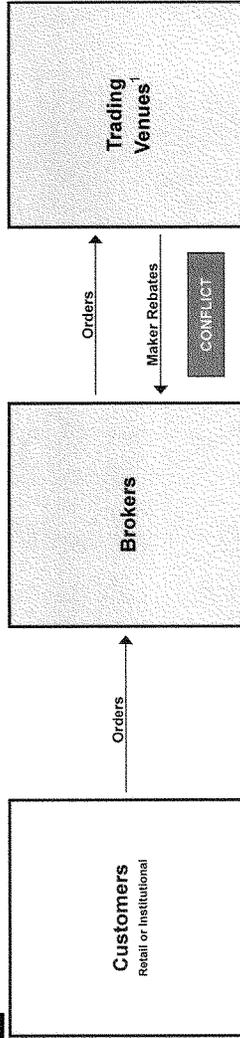
**IV. CONCLUSION**

The U.S. capital markets are the most accessible, diverse, liquid and transparent in the world. Great care should be taken before making even small changes that could have large, unintended consequences. Moreover, any review of market structure should be undertaken in a holistic way, based on relevant and objective data and a deep understanding of the markets. TD Ameritrade believes that the continual pursuit of best execution and disclosure effectively manage any conflicts of interest presented by revenue sharing arrangements. As we have said before, our view is that execution quality for retail investors has never been better. Costs are lower than ever, spreads have narrowed significantly, liquidity has increased, and execution speed has improved. Just as we are constantly seeking to improve our client experience, we as an industry should continue to examine ways in which we can improve our nation's market structure – without compromising the many improvements that currently exist.

TD Ameritrade looks forward to participating in a thoughtful review of our current market structure, and appreciates the opportunity to appear before the Subcommittee to contribute constructively to this important debate. I am happy to address any of your questions.

# Maker-Taker Conflict

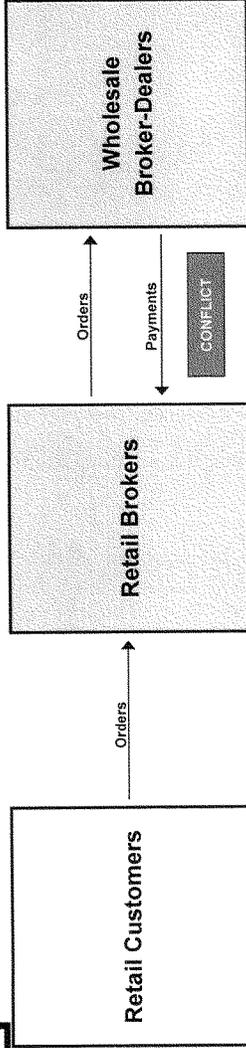
Permanent Subcommittee on Investigations  
**EXHIBIT #1a**



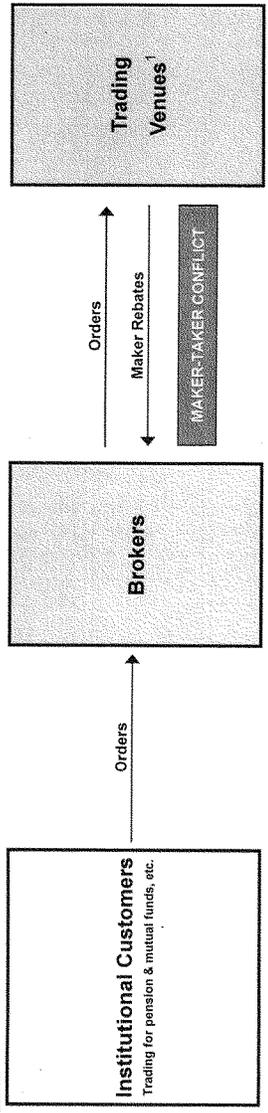
1. Not all trading venues use maker-taker.

# Payment for Order Flow Conflict

Permanent Subcommittee on Investigations  
EXHIBIT #1b



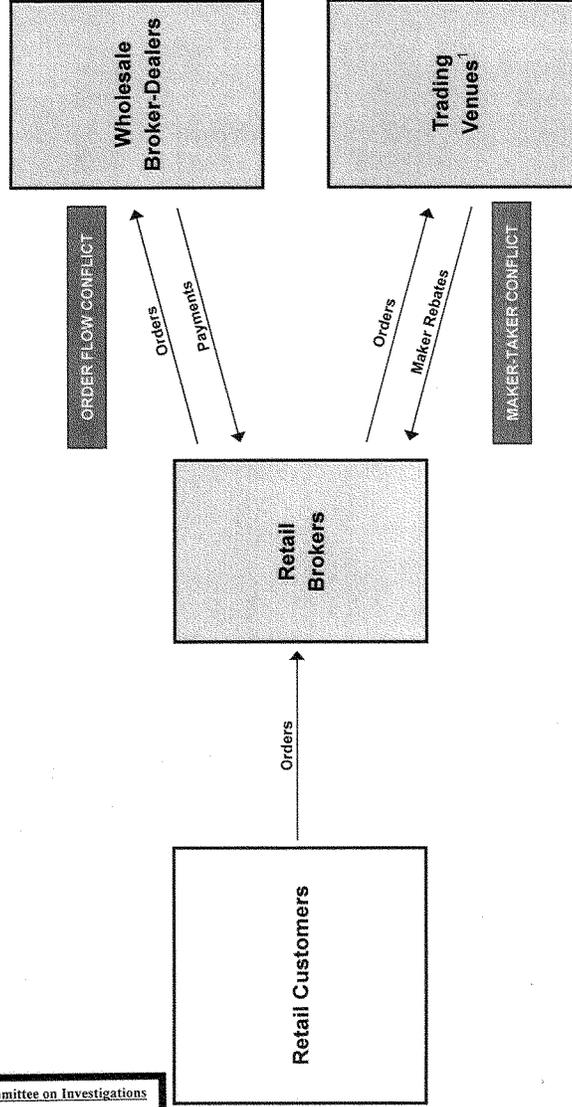
# Conflict for Brokers Trading for Institutional Investors



1. Not all trading venues use maker-taker.

# Conflicts for Retail Brokers Trading for Retail Investors

Permanent Subcommittee on Investigations  
EXHIBIT #1d



1. Not all trading venues use maker-taker.

Chart prepared by the U.S. Senate Permanent Subcommittee on Investigations, June 2014.



THE CHAIR

UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
WASHINGTON, D.C. 20549

June 18, 2014

The Honorable Carl Levin  
Chairman  
Permanent Subcommittee on Investigations  
Committee on Homeland Security and  
Governmental Affairs  
United States Senate  
340 Dirksen Senate Office Building  
Washington, DC 20510-6250

The Honorable John McCain  
Ranking Member  
Permanent Subcommittee on Investigations  
Committee on Homeland Security and  
Governmental Affairs  
United States Senate  
340 Dirksen Senate Office Building  
Washington, DC 20510-6250

Dear Chairman Levin and Ranking Member McCain:

Thank you for your April 11, 2014 letter in which you raised questions regarding the impact of high-frequency trading (HFT) on the efficiency, stability, and integrity of the U.S. capital markets. As I recently discussed at some length, one of the SEC's top priorities is the ongoing review of our current equity market structure, and considering issues raised by HFT is an important aspect of that initiative.<sup>1</sup>

In your letter, you ask a number of specific questions with respect to HFT and the Commission's oversight of that activity. Responses to your questions are set forth below.

**1. What effects of HFT on the markets, if any, has the SEC observed?**

To assess and address complex market structure issues, including HFT, the SEC has taken a data-driven, disciplined approach. As part of this effort, we have launched an equity market structure website at <http://www.sec.gov/marketstructure/>. The website is intended to promote a market-wide dialogue and empirical understanding of the equity markets. Included on this website is a new analytical tool called MIDAS (Market Information Data Analytics System) that enables us to quickly analyze enormous amounts of trading data across markets.<sup>2</sup> The website serves as a central location for SEC staff to publicly share evolving data, research, and analysis, including staff analyses of the MIDAS data, as well as relevant academic research and regulatory information.

<sup>1</sup> See <http://www.sec.gov/News/Speech/DetailSpeech.aspx?speechid=170817084> (Market Structure Speech).

<sup>2</sup> MIDAS is an SEC system that collects equity quote and trade data from the consolidated public tapes as well as the individual data feeds that are commercially available from each equity exchange. That system supports a variety of powerful applications across the SEC's enforcement, examination, and regulatory functions, including research to better understand a market structure with a significant amount of HFT trading. This research in turn helps better inform policy decisions related to market structure issues, including HFT.

The Honorable Carl Levin  
The Honorable John McCain  
Page 2

As the research and analysis on the website demonstrates, the SEC, along with other regulators and academics, have made good progress in recent years in understanding the effects of HFT on the markets, although questions remain. The development of more comprehensive and reliable analysis is challenged by, among other things: (1) the limitations of available data,<sup>3</sup> (2) the absence of a clear, commonly agreed definition of HFT; and (3) inherent complexities in the econometric techniques available for assessing the effect of HFT on market quality.

Despite these challenges, we have gained an increased understanding of HFT through a variety of targeted evaluations using datasets that focus on particular time periods and markets. The SEC recently released on its equity market structure website a staff review of recent empirical economic literature on HFT and its impact on the markets (HFT Literature Review).<sup>4</sup> That literature generally recognizes that HFT is not a monolithic phenomenon, but rather encompasses a diverse range of trading strategies. In particular, HFT is found to be not solely, or even primarily, characterized by passive market making strategies that employ liquidity providing orders that rest on order books and can be accessed by others. Recognizing the diversity of HFT strategies is essential when assessing the effect of HFT on market quality. Different strategies can have quite varying effects on market quality.

In general, the HFT Literature Review illustrates that primarily passive HFT strategies appear to have beneficial effects on market quality, such as by reducing spreads and reducing average intraday volatility. In contrast, primarily aggressive HFT strategies can raise potential concerns, particularly with respect to their impact on market volatility and institutional execution costs. With respect to the potential benefits and costs to investors of HFTs, a significant limitation in the datasets used in these studies is that they do not allow researchers to address how savings and costs are allocated across classes of market participants. It is possible that different groups of market participants do not equally share in improvements in market quality, or disproportionately bear the costs of degradation in market quality.

In drawing any conclusions of HFT, it is also important to recognize that high-speed algorithms are used not only by those engaging in HFT strategies, but also by or on behalf of investors. Generally, there are two broad types of algorithms – the proprietary trading algorithms, which are typically used by high-frequency traders, and the large order execution

<sup>3</sup> There currently is no comprehensive data source that enables regulators to tie all order and trade activity in the U.S. equity markets back to particular accounts. Accordingly, exhaustively identifying and categorizing all activity is not possible at this time. The SEC, however, has directed and undertaken an initiative to expand the data available to regulators. Specifically, on July 18, 2012, the SEC adopted Rule 613, which requires the self-regulatory organizations (SROs) to submit a national market system (NMS) plan to establish a consolidated audit trail for NMS securities, across all U.S. markets, from the time of order inception through routing, cancellation, modification, or execution. See Exchange Act Release No. 34-67457 (July 18, 2012), 77 FR 45722 (August 1, 2012). The NMS plan is to be submitted by the SROs by September 30, 2014, and the SEC then will publish it for public comment. When the consolidated audit trail is fully implemented, regulators will be able to readily tie all order and trade activity in NMS securities throughout the U.S. markets back to particular accounts and to accurately sequence that activity in time.

<sup>4</sup> Staff of the Division of Trading and Markets, *Equity Market Structure Literature Review, Part II: High Frequency Trading* (March 18, 2014), available at [http://www.sec.gov/marketstructure/research/hft\\_lit\\_review\\_march\\_2014.pdf](http://www.sec.gov/marketstructure/research/hft_lit_review_march_2014.pdf).

The Honorable Carl Levin  
 The Honorable John McCain  
 Page 3

algorithms, which are often used by or on behalf of institutional investors. These large order execution algorithms take institutional investor orders, which typically are too large to be executed all at once without excessive price impact, and slice them into a number of smaller orders that are fed into the marketplace over time in ways designed to minimize the price impact of the order as much as possible, consistent with the investor's trading objectives.

**2. For each of the last five years, what percentage of orders (buy and sell), cancelled orders (buy and sell), and completed trades on public exchanges involve HFT?**

There currently are two sources of data for U.S. equities that are broadly illustrative of HFT activity in the U.S. equity markets.<sup>5</sup> The first consists of two datasets (the FINRA Dataset<sup>6</sup> and the Lit Venue Dataset<sup>7</sup>) that were analyzed by SEC staff when preparing the joint report with the CFTC on the "Flash Crash" events of May 6, 2010.<sup>8</sup> The second consists of data for equity trading on Nasdaq made available to researchers (the Nasdaq Datasets).<sup>9</sup>

The analysis of this data shows that HFT constituted a significant portion of completed trades in the market on the day of the Flash Crash.<sup>10</sup> For example, the FINRA Dataset showed that the 12 largest firms classified by FINRA as HFTs had a trade participation rate of 46%.<sup>11</sup> For the time period covered by the entire Lit Venue Dataset, 17 HFT firms represented 43.8% of

<sup>5</sup> See footnote 3, *supra*.

<sup>6</sup> The FINRA Dataset collected the aggregate minute-by-minute dollar volume of trading on May 6, 2010 by the 12 largest HFTs, as reflected in audit trail data reported to FINRA. See May 6 Report, *infra* note 8 for more detailed information on the FINRA Dataset.

<sup>7</sup> The Lit Venue Dataset consisted of all trades executed on the largest public quoting markets - each of the registered equities exchanges and the Direct Edge electronic communication networks (which were not in May 2010 registered as exchanges). The Lit Venue Dataset included trading volume in all securities across a 6-day period from May 3 through May 10, 2010. The SEC staff manually identified 17 firms that appeared to be primarily associated with HFT. See May 6 Report, *infra* note 8 for more detailed information on the Lit Venue Dataset.

<sup>8</sup> Staffs of the U.S. Commodity Futures Trading Commission and the U.S. Securities and Exchange Commission, *Findings Regarding the Market Events of May 6, 2010* (May 6 Report), available at <http://www.sec.gov/news/studies/2010/marketevents-report.pdf>.

<sup>9</sup> The Nasdaq Datasets include quote and trade information for a stratified sample of 40 large-cap corporate stocks, 40 mid-cap corporate stocks, and 40 small-cap corporate stocks. Nasdaq used its access to trading and quoting activity on its market to identify the firms submitting orders. Based on its knowledge of the firms, Nasdaq manually classified 26 of the firms as HFT.

<sup>10</sup> See HFT Literature Review for a more detailed description and analysis of the academic studies on HFT activity using these datasets.

<sup>11</sup> When measuring HFT activity, it is important to keep clear distinctions between different metrics of market activity. Every trade has two sides. Sides can be classified as buyer and seller or as aggressive (the side that traded immediately) and passive (the side that was resting on an order book when an aggressive order arrived). For purposes of this response, the trade participation rate means the extent to which HFTs participated on one or both sides of a trade. The percentage of double-counted volume means the percentage of total sides attributable to HFTs.

The Honorable Carl Levin  
 The Honorable John McCain  
 Page 4

double-counted volume, with an aggressiveness ratio of 51.5%.<sup>12</sup> Using the Nasdaq Datasets, one 2013 study found that, across the selected sample, HFT firms had a trade participation rate of 68.3% of dollar volume, and that the HFT percentage of aggressive sides and passive sides were, respectively, 42.2% and 41.2% of dollar volume.<sup>13</sup> Another 2013 study, using the Nasdaq Datasets, found that HFTs are less active in mid-cap and small-cap stocks relative to large-cap stocks, and their activity in mid-cap and small-cap stocks involves much more aggressive trading than passive trading.<sup>14</sup>

With regard to quoting activity, a 2011 study gathered information on the percentage of quotes initiated by HFTs and their percentage of passive dollar volume (which generally occurs when a quote is matched with an aggressive order). The study found that HFTs generated 73.7% of quotes, and executed 43.7% of passive dollar volume.<sup>15</sup>

**3. Has the SEC identified trends in the frequency or prevalence of HFT in the market over the last few years? If so, what recent regulatory developments may have contributed to those trends?**

In addition to the datasets referenced in response to Question 2, there are other sources of data that shed light on trends in HFT activity. First, the level of quote messages in the consolidated data feeds disseminated by securities information processors (SIPs) has plateaued in recent years. In fact, quote messages appear to have peaked in the third and fourth quarters of 2011, after several years of significant growth.<sup>16</sup> Since that time, the level of quote messages and other indicia of quoting activity have declined.<sup>17</sup> As noted above, a substantial majority of

<sup>12</sup> An aggressiveness ratio is calculated as the ratio of aggressive volume to total volume.

<sup>13</sup> See Carrion, Allen, 2013, *Very Fast Money: High-Frequency Trading on the Nasdaq*, Journal of Financial Markets, 16(4), 680-711.

<sup>14</sup> See Brogaard, Jonathan, Terrence Hendershott and Ryan Riordan, 2013, *High Frequency Trading and Price Discovery*, European Central Bank Working Paper Series No. 1602.

<sup>15</sup> See Zhang, Sarah and Ryan Riordan, 2011, *Technology and Market Quality: The Case of High Frequency Trading*, ECIS 2011 Proceedings, Paper 95.

<sup>16</sup> SIP operating metrics available at <http://www.utpplan.com> and <https://eta.nyse.com> CTA. SIP data is disseminated by three "tapes" – Tape A for NYSE-listed equities, Tape C for Nasdaq-listed equities, and Tape B for equities listed on other exchanges. NYSE is the administrator of Tapes A and B, and Nasdaq is the administrator of Tape C.

<sup>17</sup> For example, peak quotes per second disseminated by Tapes A/B increased from 8,673 in 2006, to 88,249 in 2008, to 308,705 in 2010, and to a still-record peak of 580,870 in the 4<sup>th</sup> quarter of 2011. Similarly, the average quotes per day for Tapes A/B peaked in the 3<sup>rd</sup> quarter of 2011 at 937 million, but has since dropped and plateaued at approximately 463 million in 2013.

Quoting activity also has dropped relative to trading. For example, the ratio of average trades per day to average quotes per day for Tapes A/B bottomed at 3.24% in the 3<sup>rd</sup> quarter of 2011, but has since increased and plateaued at approximately 4.25% in 2013.

Tape C statistics are similar. Average quotes per day for Tape C peaked in the 3<sup>rd</sup> quarter of 2011 at 226 million, but has since dropped and plateaued at approximately 110,000 in 2013. The ratio of average trades per day to average quotes per day for Tape C bottomed at 4.05% in the 3<sup>rd</sup> quarter of 2011, but has since increased and plateaued at approximately 7.52% in 2013.

The Honorable Carl Levin  
 The Honorable John McCain  
 Page 5

quoting activity in the equity markets appears to be attributable to HFT firms. Consequently, it is reasonable to assume that the recent reduced levels of overall quoting activity in the equity markets is due at least in part to a decline in quoting activity by HFT firms.

There may be a variety of reasons for the reduced levels of quoting activity reflected by the SIP data, including the overall decline since 2011 in the general level of market volatility, as represented by CBOE's Volatility Index (VIX).<sup>18</sup> Another factor in the reduced levels of quote messages may stem from industry compliance with the SEC's Market Access Rule (Rule 15c3-5) in November 2011.<sup>19</sup> Because the Market Access Rule requires brokers with direct access to the markets to establish robust financial and regulatory controls with respect to orders they or their customers enter into the markets, including establishing appropriate capital and credit limits, these new limitations may have contributed to the decline in the level of quoting activity. A recent study found evidence consistent with a reduction in quoting activity associated with the implementation of the Market Access Rule.<sup>20</sup>

The public securities filings by HFT firms also are informative about recent trends in the nature of their business activities. These filings indicate the HFT business is becoming increasingly competitive and that revenue attributable to trading U.S. equities has been declining relative to revenues from trading in other products or countries.<sup>21</sup>

**4. What findings, if any has the SEC arrived at regarding the prevalence of trading abuses in connection with HFT, including but not limited to "front-running" or trading on non-public information?**

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The much higher trade-to-quote ratio for Tape C than Tapes A/B is likely due to the heavy concentration of exchange-traded products (ETPs) in Tape B. An SEC staff review, for example, found that the trade-to-order volume ratio for ETPs is less than one-tenth of the ratio for stocks, averaging 0.17% in Q4 2012, 0.22% in Q1 2013 and 0.24% in Q2 2013. SEC Staff, Data Highlight 2013-01, "Trade to Order Volume Ratios," (October 13, 2013) (available at <http://www.sec.gov/marketstructure/research/highlight-2013-01.html>).

<sup>18</sup> Quote messages increased significantly from 2008 through 2011, even as the VIX was mostly declining during this period.

<sup>19</sup> See Exchange Act Release Nos. 34-63241 (Nov. 3, 2010), 75 FR 69792 (Nov. 15, 2010) and 34-64748 (June 27, 2011), 76 FR 64748 (June 30, 2011).

<sup>20</sup> See Chakrabarty, Bidisha, Pankaj Jain, Andriy Shkilkov, and Konstantin Sokolov (2014), *Quote Intensity and Market Quality: Effects of the SEC Naked Access Ban*, working paper, available at [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2328231](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2328231). Jain currently is visiting the SEC's Division of Economic and Risk Analysis from the University of Memphis.

<sup>21</sup> For example, while the net trading income of Virtu Financial, Inc., a large electronic trading firm and market maker, increased from \$449 million in 2011 to \$623 million, net trading income from Americas Equities remained relatively flat, increasing only modestly from \$157 million in 2011 to \$168 million in 2013. Publicly reported financial information of GETCO Holding Company, LLC, another electronic market maker, similarly indicates that revenues from the Americas are declining relative to other regions where the firm is actively trading.

The Honorable Carl Levin  
 The Honorable John McCain  
 Page 6

For the reasons discussed above, definitive findings regarding the prevalence in equity markets of certain types of HFT, including abusive HFT, are not possible at this time.<sup>22</sup> The Division of Enforcement is committed to investigating potential violations of the federal securities laws, including possible manipulative trading activity by HFT firms and other market participants. It has a number of ongoing investigations regarding manipulation schemes and other abusive trading practices.

The SEC has, for example, brought actions against firms and individuals who conducted a form of manipulative trading known as “layering.” Layering involves the use of non-bona fide orders that the trader intends to cancel before they are executed to induce others to buy or sell securities at prices that do not represent actual supply and demand. These actions have not involved orders that were entered by computers, and therefore were not sent by firms considered to be HFT firms. Layering, however, involves a number of attributes of HFT, including high volumes of orders that are cancelled quickly, a trading strategy that can be completed in a very short period of time (often within several seconds), and traders who quickly flatten their positions. The SEC’s recent layering actions include:

- In the Matter of Visionary Trading LLC, et al., Exchange Act Release No. 71871 (April 4, 2014). The SEC charged the owner of a New Jersey-based brokerage firm with manipulative layering. The SEC’s order alleged that the misconduct occurred from May 2008 to November 2011 and generated nearly \$1 million in profits. The individual agreed to settle the proceeding by consenting to pay disgorgement, prejudgment interest and a penalty of \$750,000, and was permanently barred from the securities industry.
  - In the Matter of Biremis Corp., et al., Exchange Act Release No. 68456 (Dec. 18, 2012). The SEC charged a Toronto-based brokerage firm and two senior executives for failing to supervise overseas traders who engaged in layering. The SEC revoked the firm’s registration as a broker-dealer and imposed permanent industry bars against both executives, requiring each to pay a \$250,000 penalty in a settled proceeding.
  - In the Matter of Hold Brothers On-Line Investment Services, LLC, et al., Exchange Act Release No. 67924 (Sept. 25, 2012). The SEC charged a New York-based brokerage firm, two foreign customers, and three executives with allowing foreign traders to access the U.S. markets and conduct manipulative layering activity. The firm agreed to pay \$2.5 million in disgorgement and a penalty, the foreign customers agreed to pay more than \$1.25 million in disgorgement, and the individuals agreed to pay \$75,000 each and accepted two and three year industry bars.
5. **Did the public exchanges offer any incentives (such as tiered-pricing), perform any services (such as customizing data), or take any other action over the last five years that appear to encourage HFT or benefit HFT firms? If so, please describe them.**

<sup>22</sup> Such studies exist in futures markets, but their results may not be applicable because of significant differences in market structure, particularly in the degree of market fragmentation.

The Honorable Carl Levin  
The Honorable John McCain  
Page 7

Each exchange has a fee schedule that applies to all members for transactions on that exchange. Some exchanges have established volume-based fee tiers where a market participant executing more volume on the exchange will receive better pricing. HFT firms, along with other broker-dealers with high transaction volume, may benefit from this type of pricing structure. In addition, most exchanges apply a form of rebate pricing to transactions on their exchange – charging a fee to one side of a trade and providing a rebate to the other side. For example, an exchange with a “maker-taker” pricing model provides a rebate to the liquidity provider and charges a slightly larger fee to the liquidity taker. Liquidity providing HFT firms, and other broker-dealers with liquidity providing strategies, benefit from this type of pricing structure. Other exchanges operate a different pricing scheme where participants pay to provide liquidity on the exchange, and earn a rebate for taking liquidity through submission of a marketable order. Additionally, some exchanges have also provided member firms with order types that accommodate specialized trading strategies.

Exchanges offer and charge for certain services, such as proprietary data feeds and co-location. Proprietary data feeds are separate from the consolidated data feeds disseminated by the SIPs. Data are required to be provided by exchanges to the SIP no later than they are provided to the proprietary feeds; however, for several reasons, including the additional step at the SIP of consolidating the data received from the exchanges, recipients of the proprietary data feeds, co-located or not, generally receive the information slightly faster than recipients of the SIP feeds. Co-location offers member firms the opportunity to place their servers and equipment within the exchange’s data center to reduce latency and permit them to receive and react to prices on the proprietary data feeds as soon as possible.

These pricing structures, order types, and services are available to all member firms – not just HFT firms – and a variety of market participants, such as brokers acting as agents on behalf of their customers, use them.

**6. Did the public exchanges take any steps to monitor and oversee HFT? If so, please describe them and provide any studies analyzing the impact of these steps.**

The SROs, which include each of the public exchanges and FINRA, are responsible for enforcing compliance with the securities laws by all of their members, including those characterized as HFTs. Most of the exchanges have contracted with FINRA to monitor trading activity, including HFT, through various intra-market and cross-market surveillances and examinations. SEC staff recently conducted an examination of FINRA concerning HFT surveillance, and it found that FINRA has been enhancing its surveillances for manipulative strategies associated with HFT activity, such as spoofing and layering. The SEC staff is not aware of studies analyzing the impact of the steps taken by the SROs to monitor and oversee HFT.

**7. If some exchanges have a greater percentage of HFT than others, please identify those exchanges and, if possible, explain why.**

As noted in our response to Question 2, while precise calculations of HFT activity at each exchange currently are not possible, estimates of HFT activity based on Nasdaq Datasets, which

The Honorable Carl Levin  
The Honorable John McCain  
Page 8

were limited to trading on Nasdaq in corporate stocks, are generally consistent with the Lit Venue Dataset, which encompassed trading in both corporate stocks and exchange-traded products across all large lit venues from May 3 through May 10, 2010 and found a high volume of HFT trading. Accordingly, it is likely that HFT represents a significant volume of trading on all large lit venues, including the large exchanges.

**8. What regulatory framework currently governs the conduct of HFT, and (as to HFT) are current laws and authorities sufficient for the SEC to ensure U.S. exchanges are operating in a fair and transparent manner without undue risk of trading abuses or technological failures?**

The Securities Exchange Act of 1934 (Exchange Act) requires any person who buys and sells securities for its own account as part of a regular business to register with the SEC as a "dealer," and to become a member of an SRO. The Exchange Act, SEC rules thereunder, and SRO rules establish a regulatory framework specifically applicable to dealers, which includes books and records rules, capital requirements, targeted antifraud provisions, supervisory requirements, and examination oversight by the SROs and SEC. Currently, many proprietary trading firms that engage in HFT strategies are registered dealers and, therefore, subject to the dealer regulatory framework, but, this framework does not govern firms not registered as dealers.

As I recently discussed,<sup>23</sup> I have asked the SEC staff to prepare two recommendations: first, a rule to clarify the status of unregistered active proprietary traders to subject them to our rules as dealers; and second, a rule eliminating an exception from FINRA membership requirements for dealers that trade in off-exchange venues. Dealer registration and FINRA membership would significantly strengthen regulatory oversight of active proprietary trading firms and the strategies they use.

**9. Has the SEC found evidence that some investors pay a higher price to buy, or receive a lower price to sell, because of actions taken by high-frequency traders than they would absent such traders? Please explain.**

Several of the academic papers summarized in the HFT Literature Review address the question of whether HFT may adversely affect the prices of other types of market participants, including institutional investors whose orders tend to be large and executed over an extended period of time.<sup>24</sup> In general, the papers discuss three ways in which HFT may adversely affect the prices of non-HFT trades: (1) adverse selection of prices received by non-HFT passive orders that are imposed by aggressive HFT activity; (2) aggressive HFT activity leading to

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<sup>23</sup> See Market Structure Speech, *supra* note 1.

<sup>24</sup> See HFT Literature Review for a more detailed summary of the academic studies on HFT activity and its effect on the prices of other types of market participants.

The Honorable Carl Levin  
 The Honorable John McCain  
 Page 9

higher execution costs for institutional investors;<sup>25</sup> and (3) aggressive HFT activity that may engage in harmful “order anticipation”<sup>26</sup> or “momentum ignition”<sup>27</sup> strategies.

Staff is not aware of any study of execution quality for retail order flow, but believes most non-directed retail order flow to be executed off-exchange through preferencing agreements where such order would not interact directly with exchange-based HFT. While such order flow generally would not be subject to the costs identified in the academic papers, it may experience different execution quality than it would on an exchange with competing liquidity providers.

As noted above, HFT encompasses a diverse range of trading strategies. While some of the research finds that certain types of HFT activity may negatively affect the prices received by other market participants, the research also finds that some HFT activity may have positive effects on market quality. For example, a recent study found that HFTs tend to be more aggressive when spreads are narrow and more passive when spreads are wide, and that realized spreads are significantly more negative when HFTs trade aggressively.<sup>28</sup> However, the same research team found that price efficiency is significantly higher on days of high HFT aggressiveness.

When taken as a whole, these studies suggest a decrease in overall direct trading costs associated with the activity of HFTs. However, the lack of account-level data does not allow these studies to examine total execution costs across classes of market participants. Furthermore, they cannot address whether improvements in short-term price efficiency translate into increased trading costs for institutions, for which indirect trading costs such as price impact are a primary driver of transaction costs.

<sup>25</sup> A cost measure used in the papers to measure this potential effect is “implementation shortfall,” which is applied where a large institutional investor seeks to minimize the price impact of a large order by slicing up the large parent order into many smaller orders and feeding them into the marketplace over time. The implementation shortfall is defined as a percentage difference between the average execution price of an order and a benchmark price that is prevailing in the market when the order ticket is placed with the broker.

<sup>26</sup> An order anticipation strategy seeks to ascertain the existence of large buyers or sellers in the marketplace and then trade ahead of those buyers or sellers in anticipation that their large orders will move market prices (up for large buyers and down for large sellers).

<sup>27</sup> A momentum ignition strategy involves initiating a series of orders and trades in an attempt to ignite a rapid price move up or down.

<sup>28</sup> See Carrion, Allen, (2013), *Very Fast Money: High-Frequency Trading on the NASDAQ*, Journal of Financial Markets, 16(4), 680-711. Negative realized spreads often occur when trades have high price impact. For a large institutional “parent” order being filled as a series of smaller “child” orders over an extended period of time, this outcome could signify higher trading costs for the order as a whole. High price impact implies that subsequent child orders trade at less favorable prices. Because the data source for this study does not include account information, the total cost (direct, such as spreads, plus indirect, such as price impact) of filling parent orders cannot be measured explicitly and researchers rely on realized spreads and price impact measures to infer the effect on parent orders.

The Honorable Carl Levin  
The Honorable John McCain  
Page 10

10. **Has the SEC found evidence linking HFT to any exchange-related problems or concerns, such as increased price volatility, lower market liquidity, structural imbalances, or an increased risk of technological failure? Please explain.**

***Price Volatility and Liquidity***

Much of the economic literature on HFT has focused on issues relating to the effects of HFT on established market quality metrics, such as price volatility and liquidity.<sup>29</sup> As noted above, recognizing the diversity of HFT strategies also is essential when assessing the effect of HFT on market quality. Different strategies can have quite different effects on market quality. As discussed above in response to Question 1, the HFT Literature Review indicates that, in general, primarily passive HFT strategies appear to have beneficial effects on market quality, such as by reducing spreads and reducing intraday volatility on average. In contrast, the HFT Literature Review indicates that primarily aggressive HFT strategies can raise potential concerns, particularly with respect to their impact on market volatility and institutional execution costs.

***Technological Failures***

The use of complex and high-speed algorithmic trading tools creates risk of technological failures. HFTs use these tools, as do a variety of other types of market participants, including institutional investors. As discussed below in response to Question 12, the SEC and SROs have taken a series of important measures to address these risks generally, including the Market Access Rule, proposed Regulation SCI, and the critical market infrastructure initiative undertaken at my direction by SROs last fall.

Although there have been high-profile systems failures in recent years, none of these thus far has been associated with HFT. For example, the Knight Capital systems malfunction was due to a significant error in Knight Capital's automated order routing system, which caused the firm erroneously to send millions of orders into the market when it processed 212 small retail orders, generating more than 4 million trades in 45 minutes.<sup>30</sup> This error, however, did not arise from a trading strategy that could be classified as HFT.

Similarly, the technological failure experienced by Nasdaq in conducting the initial public offering (IPO) of Facebook Inc. resulted from a design limitation in Nasdaq's IPO system.<sup>31</sup> The technological failure did not arise from a trading strategy that could be classified as HFT.

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<sup>29</sup> See HFT Literature Review for a more detailed summary of the academic studies on HFT effects on market quality metrics.

<sup>30</sup> See In the Matter of Knight Capital Americas LLC, Admin. Proc. File No. 3-15570, Exchange Act Release No. 70694 (October 16, 2013).

<sup>31</sup> See In the Matter of The Nasdaq Stock Market, LLC and Nasdaq Execution Services, LLC, Admin. Proc. File No. 3-15339, Exchange Act Release No. 69655 (May 29, 2013).

The Honorable Carl Levin  
 The Honorable John McCain  
 Page 11

Though academic literature discusses the potential harm of “channel stuffing” activity by HFT, the literature contains little direct evidence of it.<sup>32</sup> “Channel stuffing” is thought to occur when a trader or group of traders enter so many quotes that the exchanges’ systems slow down to the advantage of the trader relative to those unaware of the slow-down. A recent study found evidence consistent with, though not necessarily indicative of, channel stuffing in Nasdaq stocks.<sup>33</sup>

**11. What steps, if any, has the SEC taken to improve its ability to monitor, document, and analyze HFT in U.S. capital markets? What improvements, if any, should be made in this regard? What are the major impediments to the SEC’s monitoring, documenting, and analyzing HFT?**

Generally, the SEC’s ability – in enforcement, examination, and regulation – to monitor and analyze HFT activity in the U.S. markets has increased, as more tools have become available to SEC staff, including software that can handle larger datasets and more advanced and powerful computers. Several impediments the SEC faces are addressed above in response to Question 1, and a number of the SEC’s improvements in resources and personnel are discussed below in response to Question 13.

The SEC has developed improved data sources and capabilities that can be used to analyze HFT activity. Though MIDAS does not identify individual firms, MIDAS data is now used in conjunction with existing investigations of specific firms. In particular, OCIE examiners and Enforcement staff use MIDAS to compare the individual trades and quotes of a particular firm (acquired from the firm itself) in the context of all other contemporaneous market trades and quotes. These types of analyses can help inform investigations on a variety of issues, such as those relating to insider trading and market manipulation.

SEC staff also is now analyzing information that recently has become available to it through the Large Trader Reporting Rule<sup>34</sup> – which provides SEC staff access to information about the trading activity of the largest market participants, including many HFT firms, upon request – into its policy-making, examination, and enforcement efforts.

The SEC has also concentrated and deployed new resources that can be targeted to better understand and, as appropriate, address HFT activity. The Center for Risk and Quantitative Analytics (CRQA) within the SEC’s Division of Enforcement was created in July 2013 to lead, support, and coordinate the risk assessment and data analytic efforts for the division. CRQA is staffed with attorneys, accountants, market surveillance specialists, and quantitative analysts with varied backgrounds and areas of expertise in the U.S. securities laws. CRQA capabilities

<sup>32</sup> See, e.g., Biais, Bruno, and Paul Woolley, (2011), *High Frequency Trading*, working paper, available at [http://idei.fr/doc/conf/pwri/biais\\_pwri\\_0311.pdf](http://idei.fr/doc/conf/pwri/biais_pwri_0311.pdf).

<sup>33</sup> See Gai, J., C. Yao, and M. Ye. (2013), *The Externalities of High Frequency Trading*, working paper.

<sup>34</sup> See Exchange Act Release No. 34-64976 (July 27, 2011), 76 FR 46959 (Aug. 3, 2011).

The Honorable Carl Levin  
 The Honorable John McCain  
 Page 12

include multiple data source integration, complex statistical analysis of large datasets, and the organization and visualization of data.

In addition, the Enforcement Division's Market Abuse Unit was formed in 2010 to focus specialized expertise and resources on identifying market structure violations and high-volume manipulation schemes. The Market Abuse Unit has hired a number of industry specialists, including individuals with quantitative analytical skills, market structure insight, and expertise in complex trading strategies. These specialists are fully integrated into enforcement investigations and work closely with attorneys in developing investigative approaches, identifying trading strategies and analyzing voluminous data necessary to determine whether fraudulent or improper conduct is occurring.

The Division of Economic and Risk Analysis (DERA) has also expanded its capacity to analyze market structure issues with the addition of both staff and IT resources and also with the increased ability to structure and analyze large quantities of financial market data through the Quantitative Research and Analytical Data Support (QRADS) program.

A significant impediment to the SEC's ability to comprehensively monitor and analyze HFT trading is the absence of complete data that links orders and trades to individual market participants. Although current data resources allow the SEC to monitor and analyze overall market quality or individual cases, questions regarding outcomes for end-users and intermediaries are often difficult to answer without account-level data. Data from a consolidated audit trail will facilitate many types of studies that are difficult to conduct with current data.<sup>35</sup> CAT will also significantly improve regulators' ability to monitor the trading activity of individual firms, the overall level of HFT activity in the market, and the outcomes realized by end-users of the market.

Even with additional data resources like CAT, studies require human resources to design, implement, and document the research. As such, hiring staff with expertise in quantitative analysis and algorithmic computerized trading will continue to be important to enhancing the SEC's oversight of HFT and keeping pace with today's markets.

**12. What steps, if any, has the SEC taken to address and prevent technological failures occurring at automated traders or market centers? Have these steps proven effective?**

It is critical to ensure that the technology employed by exchanges and other market participants is deployed, used, and maintained in a way that reduces the risk of market disruptions that can harm investors and undermine confidence in the integrity of our markets. To

<sup>35</sup> Examples of such studies include: how different types of market participants provide liquidity, and how liquidity provision from different market participants impact market quality at times of market stress; whether aggressive HFT strategies increase investor trading costs or serve to provide short-term liquidity at a premium; whether certain HFT strategies crowd out passive liquidity suppliers, and if so, how the costs of end-users are affected; and whether improvements in price efficiency allow liquidity providers to provide more liquidity to institutional orders.

The Honorable Carl Levin  
The Honorable John McCain  
Page 13

this end, the SEC has taken a multi-layered approach that involves SEC regulation, examination, enforcement, as well as initiatives by the SROs, to address and prevent technological failures in the markets.

#### ***Regulation SCI***

With respect to trading markets in particular, SEC oversight of technology historically has been conducted pursuant to a voluntary set of principles articulated in the SEC's Automation Review Policy (ARP) Statements and Regulation ATS. Through the ARP inspection program, SEC staff conducts inspections of the trading and related systems of national securities exchanges and associations, certain alternative trading systems, clearing agencies, and securities information processors to assess their information technology programs, identify weaknesses, and recommend improvements.

In March 2013, the SEC proposed Regulation SCI to supersede and replace the ARP inspection program with an updated, expanded, and mandatory regulation. Regulation SCI would put in place new, stricter requirements for the use of technology by exchanges and other key market infrastructures. A key feature of the Regulation SCI proposal is that it would require all Regulation SCI entities to have policies and procedures reasonably designed to help ensure that their systems are robust, secure, and compliant. Regulation SCI would also require entities to provide certain notices and reports to the SEC to improve its oversight of securities market infrastructure.

Adoption of Regulation SCI is a priority for the SEC's 2014 rulemaking agenda.

#### ***Critical Market Infrastructure***

Following the interruption of trading in Nasdaq-listed securities last August that resulted from the failure of the Nasdaq SIP, I requested that the leaders of the equities and options exchanges promptly enhance the technological resilience of the consolidated market data systems and other critical market infrastructure. In November 2013, the SROs provided the SEC with their short- and long-term action plans for addressing these issues and, since then, have been implementing them.

With respect to the SIPs, audits were performed of the systems to identify enhancements that would achieve a variety of resilience, capacity, information security, testing, monitoring, and latency objectives, and the process to implement those enhancements is well underway. Among other measures, the SROs have also advanced new backup recovery processes for each SIP. We expect that, by the end of June, each SIP will be in a position to failover to a "hot-warm" backup site in the event of a failure of the primary site, and resume operations within a ten minute timeframe.

The SROs also have been working to implement "kill switches" for equity exchanges that would terminate trading by a broker-dealer if that broker-dealer's own trading systems or risk controls failed. Several equity exchanges have recently rolled out new kill switch mechanisms and are actively encouraging use of these new risk monitoring tools by their member firms. The

The Honorable Carl Levin  
The Honorable John McCain  
Page 14

SROs are similarly evaluating and refining their pre-trade risk mitigation mechanisms for options markets.

Finally, the SROs have been working to enhance and harmonize their trading halt and resumption processes, and their handling of erroneous trades following a trading halt or otherwise.

#### ***Market Access Rule and Risk Management Controls***

The Market Access Rule, referred to in response to Question 3 above, was adopted in November 2010, with full compliance required by the end of November 2011.

The Market Access Rule requires broker-dealers with access to trade directly on an exchange or alternative trading system, including those providing customers with sponsored or direct market access, to implement risk management controls and supervisory procedures designed to manage the financial, regulatory, and other risks of this business activity. The Market Access Rule requires certain controls – including those designed to prevent erroneous trades, set appropriate credit or capital limits, and facilitate regulatory compliance – to be applied automatically on a pre-order entry basis. The risk management controls must be under the direct and exclusive control of the broker-dealer with market access. The Market Access Rule also requires that the broker-dealer regularly review its risk management controls and supervisory procedures to assure the overall effectiveness of its controls and promptly address any issues.

In addition, I recently instructed the staff to prepare recommendations for the Commission to further improve firms' risk management of trading algorithms and to enhance regulatory oversight over their use.

#### ***Volatility Moderators***

In response to market structure vulnerabilities revealed by the events of May 6, 2010, SEC staff quickly worked with the SROs to implement single-stock "circuit breakers" to prevent excessive market volatility. Thereafter, work continued on a more sophisticated and effective way to address excessive volatility, namely a market-wide "limit up-limit down" mechanism. This new mechanism was reflected in a Plan filed by the SROs and approved on a pilot basis by the SEC in May 2012.<sup>36</sup> The Plan was phased-in over a number of months and now applies to all exchange traded stocks during regular trading hours.

As a result, today the limit up-limit down mechanism prevents trades in exchange-listed stocks from occurring outside of a specified price "band" around the current market price. This price band generally is 5% for the most liquid stocks, and 10% for the less-liquid stocks, with the bands being doubled during the opening and closing periods. The Plan also includes a trading pause and reopening mechanism to accommodate more fundamental price moves. SEC and SRO

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<sup>36</sup> See Exchange Act Release No. 34-67091 (May 31, 2012), 77 FR 33498 (June 6, 2012).

The Honorable Carl Levin  
The Honorable John McCain  
Page 15

staff will assess the operation of the limit up-limit down mechanism during the pilot period, and propose further adjustments as warranted.

This pilot is set to expire in February 2015. Prior to expiration, the SEC and public will have the opportunity to review statistical analyses by the SROs and FINRA, as well as by DERA staff on issues such as the effects of limit up-limit down and the calibration of various parameters of limit up-limit down. Depending on the timing and results of that review, the pilot may be extended for an additional period.

Under certain circumstances, even moves within these limits can be damaging. I have directed SEC staff to prepare an anti-disruptive trading rule for Commission consideration that would be tailored to apply to active proprietary traders in short time periods when liquidity is most vulnerable and the risk of price disruption caused by aggressive short-term trading strategies is highest.

#### ***Enforcement***

It is critical that market participants and, in particular, those that play key roles in securities transactions – namely, exchanges, alternative trading systems, and broker-dealers – operate fairly, within the rules, and with a close eye on their responsibilities to safeguard their technology. The SEC has taken strong enforcement steps when technology failures at key market participants have led to securities law violations. For example, in October 2013 the SEC fined Knight Capital \$12 million in a settled proceeding that was the SEC's first enforcement action under the Market Access Rule. Among other things, the SEC order found that Knight failed to adopt reasonably designed financial controls to manage the risks of its market access.

In addition, in a May 2013 settled proceeding, the SEC fined Nasdaq and its affiliated routing broker \$10 million in connection with Nasdaq's technology failure during the Facebook IPO and the exchange's decisions made in response to resulting trading disruptions.

In September 2012, the SEC fined the New York Stock Exchange (NYSE) \$5 million in a settled proceeding for releasing market data through two proprietary data feeds before NYSE sent data to the SIPs that make quote and trade data available for sale to the public on a consolidated basis.<sup>37</sup> The internal architecture of NYSE's data delivery systems gave NYSE's depth-of-book proprietary feed a path to its customers that was faster than the path used to send quotes to the SIP. In addition, the path that sent data to the SIP had a software issue that caused delays during multiple periods of high trading volume.

In October 2011, the SEC brought a settled proceeding against the Direct Edge exchanges and their affiliated routing broker.<sup>38</sup> The order included findings that the Direct Edge entities

<sup>37</sup> See In the Matter of New York Stock Exchange LLC, and NYSE Euronext, Admin. Proc. File No. 3-15023, Exchange Act Release No. 67857 (September 14, 2012).

<sup>38</sup> See In the Matter of EDGX Exchange, Inc., EDGA Exchange Inc., and Direct Edge ECN LLC, Admin. Proc. File No. 3-14586, Exchange Act Release No. 65556 (October 13, 2011).

The Honorable Carl Levin  
 The Honorable John McCain  
 Page 16

had weaknesses in their systems, processes, and controls, which caused them to commit several securities law violations. Among other problems, a coding error resulted in orders being executed for more than their intended amounts, and a database administrator inadvertently entered a command that disabled connections to one of the exchange's production databases, which disrupted the exchange's ability to process incoming orders, modifications, and cancellations.

**13. What practical limitations, if any, exist on the SEC's ability to distinguish unfair or potentially improper activities from legitimate trading practices related to HFT?**

Beyond the informational issue described above, there are several other challenges to identifying potentially improper trading practices relating to HFT.

First, the amount of data relating to HFT is voluminous and a significant financial investment is required to maintain the capability to analyze this data quickly and effectively.<sup>39</sup> As noted in response to Question 11, the SEC has enhanced its systems and analytical resources in recent years, including the implementation of MIDAS,<sup>40</sup> but the sheer volume of information will continue to be challenging.

Second, despite the enhancements described in Question 11 above, and even with the full implementation of the consolidated audit trail, maintaining technological resources at the SEC that are on par with those used by the financial services industry likely will remain a significant challenge. Furthermore, as regulatory data becomes more comprehensive, the SEC will face increased challenges to attract and retain technically specialized professional staff who can use and analyze the data for surveillance, policy research, and enforcement.

Third, fraud or manipulation violations require proof of scienter. Many of the SEC's investigations concerning manipulative trading involve traders located in foreign jurisdictions who obtain access to U.S. markets through U.S.-registered broker-dealers. The SEC has focused on this practice, and as noted in response to Question 4 above, has brought enforcement actions involving trading that originated outside the United States and against broker-dealers who failed to implement reasonable controls to monitor this trading.<sup>41</sup> Nevertheless, the relevance of evidence located in foreign jurisdictions presents challenges to these investigations. SEC staff has successfully obtained access to information by means of agreements with foreign authorities, but challenges in obtaining documents and taking testimony from witnesses located in foreign

<sup>39</sup> Challenges also arise from the dispersal of trading at different market centers. Trade data often has format and synchronization issues, and the prevalence of trading through different broker-dealers makes it difficult to quickly identify the source of certain trades and obtain a complete understanding of a trader's market activities.

<sup>40</sup> For example, MIDAS has been used to provide the public with detailed analyses regarding the speed of quote cancellations. The impact of high rates of cancellation, and the speed at which those cancellations occur, have been the subjects of considerable public discourse regarding the way HFTs may operate.

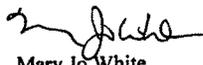
<sup>41</sup> See *In the Matter of Wedbush Securities Inc., et al.*, Admin. Proc. File No. 3-15913, Exchange Act Release No. 72340 (June 6, 2014).

The Honorable Carl Levin  
The Honorable John McCain  
Page 17

jurisdictions can affect the SEC's ability to develop persuasive evidence of the contemporaneous scienter of the individuals who directed the trading.<sup>42</sup>

Thank you again for your inquiry. If you have additional question, please call me a (202) 551-2100, or have your staff contact Tim Henseler, Director of the Office of Legislative and Intergovernmental Affairs, at (202) 551-2010.

Sincerely,



Mary Jo White  
Chair

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<sup>42</sup> For example, two actions that the SEC brought against broker-dealers that facilitated layering involved traders located in foreign jurisdictions. See In the Matter of Biremis Corp., et al., Admin. Proc. File No. 3-15136, Exchange Act Release No. 68456 (December 18, 2012) (majority of trading floors located in China, with others located in Canada, Russia, Bangladesh, Nigeria, Venezuela, and Uzbekistan); In the Matter of Hold Brothers On-Line Investment Services, LLC, et al., Admin. Proc. File No. 3-15046, Exchange Act Release No. 67924 (September 25, 2012) (traders associated with one customer were located primarily in China).



UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
WASHINGTON, D.C. 20549

August 5, 2014

The Honorable Carl Levin  
Chairman, Permanent Subcommittee on Investigations  
United States Senate  
269 Russell Senate Office Building  
Washington, DC 20510

Dear Chairman Levin:

Thank you for your July 9, 2014 letter expressing concern about conflicts of interest in the U.S. equities markets, including “maker-taker” fee schedules and payment for order flow by wholesale brokers to retail brokers. I appreciate your recommendation that the SEC take prompt action to consider whether to prohibit both of these industry practices.

As your letter notes, under the “maker-taker” pricing model used by some exchanges and non-exchange markets, non-marketable, resting orders that provide (“make”) liquidity at a particular price receive a rebate if they are executed against, while incoming orders that execute against (“take”) the liquidity of resting orders are charged an access fee. Markets that offer these pricing arrangements typically charge a higher access fee than the amount of their liquidity rebates, and retain the difference as compensation. As your letter notes, a few markets offer “inverted” pricing where the taker of liquidity receives the rebate. One of the stated purposes of the “maker-taker” pricing model is to incentivize and encourage participants to post competitively priced orders and thus provide additional liquidity to the market.

The incentive for a retail broker to send a non-marketable customer limit order to a market that provides a rebate to the broker if the order is traded against versus a market that does not provide such economic incentives poses a potential conflict of interest for the broker making the routing decision. The other issue your letter discusses, payment for order flow from wholesale brokers to retail brokers for their marketable order flow, poses a similar potential conflict of interest. These conflicts are noteworthy because retail investors rely on their brokers to navigate the markets on their behalf to achieve best execution for their orders.

As I noted in a recent speech, broker conflicts are a focus of the Commission’s enforcement program and will continue to merit our close and comprehensive attention. In addition, I have asked the staff to further consider these issues for near-term regulatory action. As a first step, I have asked the staff to prepare a recommendation to the Commission for a rule that would enhance order routing disclosures. Specifically, the staff is developing a proposal to supplement Rule 606 of Regulation NMS, which currently requires broker-dealers that route customer orders to make publicly available quarterly reports to disclose certain order routing information as well as describe certain payment for order flow arrangements. In addition, I have

Permanent Subcommittee on Investigations  
**EXHIBIT #3**

PSI-SEC-02-000001

The Honorable Carl Levin  
Page 2

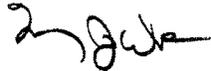
directed the staff to consider more generally the questions relating to broker conflicts, including whether and how to further mitigate or eliminate potential sources of conflicts between brokers and their customers. Exercising care in this area is very important, as a number of fee structures are intertwined with many aspects of the current market structure.

As you alluded in your letter, perceptions are also very important and need to be carefully considered to the extent they can affect investor confidence in our markets. Investors need to know that brokers are held to their duty of best execution and act in the best interest of their customers.

As we continue our efforts in this area, we will consider whether these conflicts warrant regulatory intervention, and of what kind. As part of that process, I have asked the Commission staff to consider your suggestions carefully as they formulate policy recommendations for the Commission.

Thank you again for your input. Please contact me at (202) 551-2100, or have a member of your staff contact Tim Henseler, Director of the Office of Legislative and Intergovernmental Affairs, at (202) 551-2010, if we can be of further assistance.

Sincerely,

A handwritten signature in black ink, appearing to read 'M. Jo White', written in a cursive style.

Mary Jo White  
Chair



John S. Markle  
Deputy General Counsel, Operations  
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john.markle@tdameritrade.com

June 19, 2014

**VIA ELECTRONIC DELIVERY**

Ms. Mary Robertson  
Chief Clerk  
United States Senate  
Committee on Homeland Security and Government Affairs  
Permanent Subcommittee on Investigations  
Washington, DC 20510-6250

Dear Ms. Robertson:

This letter is being submitted on behalf of Steven Quirk of TD Ameritrade, Inc. ("TD Ameritrade" or "the Firm") regarding his participation in the United States Senate, Committee on Homeland Security and Government Affairs, Permanent Subcommittee on Investigations hearing entitled, "Conflicts of Interest, Investor Loss of Confidence and High Speed Trading in the U.S. Stock Markets," which occurred on June 17, 2014.

In response to Chairman Levin's questions concerning how much TD Ameritrade received in maker-taker rebates, the Firm reviewed its records and estimates that the amount of maker-taker rebates related to U.S. equities received by TD Ameritrade from exchanges for calendar year 2013 was approximately \$36 million, not the \$80 million roughly estimated by Mr. Quirk. TD Ameritrade requests that the record reflect the \$36 million estimate, and not the \$80 million that was noted.

As for the request for the amount of fees that TD Ameritrade paid for routing orders to exchanges last year, the Firm submits for the record that total fees deducted from amounts received by the Firm were as follows: (1) \$2 million in "taker" fees; and (2) \$2 million in "route out" fees. Exchanges reduce amounts paid to brokers for "route out fees" in the instances in which the exchange receives an order and routes the order out to another market center for execution.

Very truly yours,

A handwritten signature in black ink that reads "John S. Markle".

John S. Markle

Permanent Subcommittee on Investigations

**EXHIBIT #4**

PSI-TDAmeritrade-03-000001



John S. Markle  
 Deputy General Counsel, Operations  
 TD Ameritrade Holding Corporation  
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 443.539.2128 (direct)  
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 john.markle@tdameritrade.com

August 1, 2014

**VIA ELECTRONIC DELIVERY**

Ms. Mary Robertson  
 Chief Clerk  
 United States Senate  
 Committee on Homeland Security and Government Affairs  
 Permanent Subcommittee on Investigations  
 Washington, DC 20510-6250

Dear Ms. Robertson:

This letter is being submitted on behalf of Steven Quirk, Senior Vice President, TD Ameritrade, Inc. ("TD Ameritrade" or "the Firm") regarding the Permanent Subcommittee on Investigations ("Subcommittee") letter dated July 10, 2014 ("July 10<sup>th</sup> Letter"). The July 10<sup>th</sup> Letter included a Supplemental Question For the Record related to the Subcommittee's Hearing on "Conflicts of Interest, Investor Loss of Confidence, and High Speed Trading in U.S. Stock Markets," which occurred on June 17, 2014. The Supplemental Question is as follows:

**Q.** *For the years 2013, 2012, and 2011, please identify the amount of revenue that TD Ameritrade earned, respectively, from (1) payment for order flow, (2) market rebate payments, and (3) the amount TD Ameritrade paid in fees to exchanges.*

**Firm Response:** For revenues and fees related to the listed equities markets, the Firm submits the following table in response (amounts rounded to nearest million):

Year	Payment for Order Flow from Market Makers	Market Rebate Payments from Exchanges	Fees Paid to Exchanges (Taker and Route Out)
2013	\$78,000,000	\$36,000,000	\$4,000,000
2012	\$66,000,000	\$37,000,000	\$7,000,000
2011	\$67,000,000	\$46,000,000	\$9,000,000

Very truly yours,

John S. Markle

**Permanent Subcommittee on Investigations**  
**EXHIBIT #5**

PSI-TDAmeritrade-04-000001

July 25, 2014

The Honorable Carl Levin  
Chairman  
Permanent Subcommittee on Investigations  
United States Senate  
Washington, D.C. 20510

*Re:* Supplemental Response for the Record

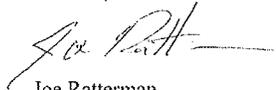
Dear Chairman Levin:

I am in receipt of your supplemental question in connection with the hearing held by the Permanent Subcommittee on Investigations on June 17, 2014. The supplemental question is set forth below, followed by my response.

*Question: SEC Rule 605 requires exchanges to produce execution quality statistics on a monthly basis. In his testimony, Professor Battalio proposed that Rule 605 reporting could be extended to individual brokers, stating that "such a change would provide information to allow comparisons of execution quality across venues not just in the aggregate, but for orders routed from each individual broker." Would you support such a requirement?*

*Response:* BATS would support an amendment to either SEC Rule 605 or SEC Rule 606 that would enable investors to compare execution quality across individual brokers.

Sincerely,



Joe Ratterman  
CEO, BATS Global Markets, Inc.



Thomas Farley  
President  
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September 15, 2014

VIA Email ([mary\\_robertson@hsgac.senate.gov](mailto:mary_robertson@hsgac.senate.gov))

Senator Carl Levin  
Chairman  
Permanent Subcommittee on Investigations  
Senate Committee on Homeland Security and Governmental Affairs

Senator John McCain  
Ranking Minority Member  
Permanent Subcommittee on Investigations  
Senate Committee on Homeland Security and Governmental Affairs

Dear Senators:

Thank you for your follow-up question from the June 17, 2014 hearing held before the Subcommittee. Below is my response, please feel free to reach out if you have any further questions.

*Question: SEC Rule 605 requires exchanges to produce execution quality statistics on a monthly basis. In his testimony, Professor Battalio proposed that Rule 605 reporting could be extended to individual brokers, stating that "such a change would provide information to allow comparisons of execution quality across venues not just in the aggregate, but for orders routed from each individual broker." Would you support such a requirement?*

*Answer: The New York Stock Exchange (NYSE) believes that the Securities and Exchange Commission should take steps to modernize the U.S. equity market structure in a way that improves transparency, decreases complexity and gives deference to orders that contribute to public price discovery. The NYSE believes providing data on an individual broker level could assist investors when choosing their broker and therefore we support Professor Battalio's proposal. The NYSE recognizes, however, that providing such data would require technology changes on the part of exchanges and brokers. Nevertheless, we believe this is something that could be achieved over time or potentially through third party data services.*

Sincerely,

A handwritten signature in cursive script that reads "T. Farley".

Thomas W. Farley  
President  
NYSE Group



July 31, 2014

*Via electronic mail*

Mary Robertson  
 Chief Clerk  
 Permanent Subcommittee on  
 Investigations,  
 United States Senate  
 Washington, D.C. 20510-6250  
 mary\_robertson@hsgac.senate.gov

**RE: June 17, 2014 Hearing, Conflicts of Interest, Investor Loss of Confidence, and High Speed Trading in U.S. Stock Markets**

Dear Ms. Robertson:

On June 17, 2014, I testified at the above referenced hearing of the Permanent Subcommittee on Investigations ("Subcommittee") on behalf of The Vanguard Group, Inc. ("Vanguard"). Subsequently, on July 10, 2014, I received "follow-up" questions from the Subcommittee for potential inclusion in the final record. The specific questions are referenced below along with Vanguard's responses.

1. **"On May 19, 2014, during a phone call between Vanguard officials and Subcommittee staff, Mr. Michael Buek stated that Vanguard did not accept payment for order flow on retail order because Vanguard felt that such payments would create a conflict of interest, and that the hurdle to overcome such a conflict was too high.**

**Does this statement accurately reflect Vanguard's position on payment for order flow of retail orders?"**

Vanguard's retail broker-dealer currently does not accept compensation for directing equity orders to other market participants. As discussed in many forums, payment for order flow compensation raises the appearance of a potential conflict. At this time, Vanguard's retail broker-dealer chooses to avoid any appearance of such a conflict with respect to equity orders and focuses its efforts on routing practices that are derived from robust measures and processes to obtain the best execution of client orders. That said, firms that accept payment for order flow compensation may also meet their best execution obligations through robust policies and procedures focused on the quality of executions for their customers. We support the SEC's efforts to improve the disclosure required of firms around payment for order flow compensation,

which is one of the areas recently highlighted by SEC Chair White in the Commission's plan for reassessing market structure regulations.

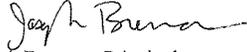
2. **"On May 19, 2014, during a phone call between Vanguard officials and Subcommittee staff, a Vanguard official stated that the maker-taker system creates an "inherent conflict" and that the company wants to 'make sure our brokers trade for the quality of the trade not for the incentive of the rebate.'**

**During that same conversation, a Vanguard official said that maker-taker pricing forces the company to monitor broker routing more closely than would otherwise be required and that 'it would be nice [for Vanguard] not to have to worry about [the maker-taker] conflict.' Do those statements continue to reflect Vanguard's view of maker-taker system?"**

Vanguard believes the maker-taker pricing model of the exchanges creates a potential conflict that should be reexamined. While the potential conflict exists, it is one that could be addressed and monitored through robust policies and procedures. It is also important to note that the maker-taker pricing models of the exchanges were designed for a legitimate purpose – to attract liquidity to the public markets. Nevertheless, as stated in more detail in my original statement to the Subcommittee, Vanguard believes it is time to re-examine Regulation NMS to determine whether there are ways to further incentivize the public competition of orders. In that light, we support a well-designed pilot to examine a "Trade-At" rule under Regulation NMS in connection with significant changes to or elimination of maker/taker pricing. Obviously, if maker/taker pricing is eliminated, the associated potential conflict would no longer be an issue about which firms like Vanguard would need to be concerned. We support the SEC's recently announced efforts in this regard.

I trust that the foregoing responds to the Subcommittee's additional questions. If you require additional information, please contact Jerry Golden, Vanguard Government Relations, at (202) 824-1285.

Sincerely,

/s/   
Joseph Brennan, Principal  
The Vanguard Group, Inc.