

**REGULATORY REFORMS TO IMPROVE EQUITY
MARKET STRUCTURE**

HEARING
BEFORE THE
SUBCOMMITTEE ON
SECURITIES, INSURANCE, AND INVESTMENT
OF THE
COMMITTEE ON
BANKING, HOUSING, AND URBAN AFFAIRS
UNITED STATES SENATE
ONE HUNDRED FOURTEENTH CONGRESS

SECOND SESSION

ON

EXAMINING RECENT EFFORTS BY THE SEC AND FINRA IN AIDING THE
FUNCTIONING AND STABILITY OF THE EQUITY MARKETS, AND IDENTIFYING
KEY ISSUES UNDER CONSIDERATION TO REDUCE MARKET COMPLEXITY,
INCREASE OPERATIONAL STABILITY, AND PROMOTE EFFICIENCY,
COMPETITION, AND CAPITAL FORMATION

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MARCH 3, 2016
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THURSDAY, MARCH 3, 2016

U.S. SENATE,
SUBCOMMITTEE ON SECURITIES,
INSURANCE, AND INVESTMENT,
COMMITTEE ON BANKING, HOUSING, AND URBAN AFFAIRS,
Washington, DC.

The Subcommittee convened at 10 a.m., in room 538, Dirksen Senate Office Building, Hon. Mike Crapo, Chairman of the Subcommittee, presiding.

OPENING STATEMENT OF CHAIRMAN MIKE CRAPO

Chairman CRAPO. The Committee will come to order.

This is a hearing of the Subcommittee on Securities, Insurance, and Investment relating to market structure. I think we will have a very good hearing today and I appreciate everyone's attendance.

The landscape of stock markets and trading today is substantially different than it was 20, 10, or even 5 years ago. Regulations and technological innovation have moved stock trading from the floors of exchanges to virtually all trading now being conducted electronically on automated markets. Technology and innovation has benefited investors by leading to tighter spreads, lower costs, and more efficient markets.

However, the expansion of trading venues, speed, and mandated interconnectedness of exchange and market participants has raised questions regarding market complexity and resiliency. For the past several years, the Securities and Exchange Commission and the Financial Industry Regulatory Authority have been working to better understand whether their market structure rules have kept pace with the changes in trading technology and practices.

In 2014, the Banking Committee held a hearing with a broad mix of market participants to examine the role of regulation in shaping today's markets as well as whether these markets are as resilient and as stable as they should be. Several witnesses at the hearing argued that Regulation NMS, a set of SEC market structure rules that passed by a three-two vote over 10 years ago, needed to be reexamined.

Later in the year, SEC Chair White provided an update to her market structure agenda in a response to a letter Senator Johnson and I sent and highlighted three fundamental policy questions that the Commission would be focusing on.

First, the trade-through restrictions in Rule 611 of Regulation NMS and whether they should be rescinded or modified.

Second, the current regulatory model for exchanges and other trading venues and whether it makes sense for today's markets.

And, third, the maker-taker fee structure, including the related issue of restrictions on locking and crossing quotations in Rule 610 of Regulation NMS.

These are complicated issues and I appreciate the data-driven approach by the SEC and FINRA and the extensive comments from market participants, investors, and academics. It will be helpful to understand from our witnesses what progress has been made in identifying and prioritizing the key concerns with our equity market structure and what options are being explored to address them. After all, the 2010 Flash Crash is still fresh in many of our minds and additional market events have raised concerns about market integrity and resiliency.

In fact, the SEC's Equity Market Structure Advisory Committee met to diagnose and discuss one of the latest market disruptions, namely, what went wrong last August 24 when dramatic price moves triggered more than 1,000 trading halts in hundreds of stocks and exchange-traded funds.

Today, this Committee hopes to hear from our witnesses about what lessons were learned from recent market disruptions and what steps need to be taken to strengthen the operation of the markets. The U.S. capital markets are vital to the growth of our economy and we need to take the necessary steps to make sure that the U.S. financial system and markets remain the preferred destination for investors throughout the world.

I do look forward to the testimony of our witnesses, who I will introduce in just a moment, but let me turn first to my colleague, Senator Warner.

STATEMENT OF SENATOR MARK R. WARNER

Senator WARNER. Well, thank you, Chairman Crapo, and thank you for holding this hearing on this very important topic.

I was going to remark that, knowing how it is a little complicated, I was happy to see that at least one of our colleagues was here, but already our comments have driven him out of the room, so—

[Laughter.]

Senator WARNER.—but we are glad to see him—

Chairman CRAPO. I am sure he is listening on his iPhone.

Senator WARNER. Over the past few decades, we have seen remarkable technological progress and innovation in our security markets, coupled with substantial regulatory reform. Some of these advances and reforms, including decimalization, have brought considerable rewards for individual investors by narrowing spreads and increasing liquidity. Most trades today can happen within fractions of a second, providing good prices and counterparties for those seeking to buy equities around the world.

But, at the same time, we have seen increased volatility and periodic dislocations. In recent years, as the Chairman mentioned, we have seen a market-wide Flash Crash, a series of mini-Flash Crashes in individual equities in Blue Chip stocks, a Flash Freeze at NASDAQ in 2013, problems with high-profile IPOs like Facebook and BATS, a glitch at the New York Stock Exchange in

July 2015 that halted trading for hours, an ETF meltdown in 2015, and numerous allegations of and settlements for misbehaviors by dark pool operators.

It is clear much work around market structure remains. So, where do policymakers go from here? Let me make four quick points.

First, in the era of microsecond trading, we need to reevaluate the way our stock markets function. Chair White has made the right call by asking the Commission to conduct a holistic market structure review. We need data to be able to rationally analyze the market so appropriate investor protections can ultimately be implemented.

Second, I believe strongly we should explore additional pilots. It has been nearly 2 years since Chair White announced her holistic review. Some have argued against conducting pilots in the interim as inconsistent with this review, but I do not think this is necessarily the case. As long as pilots are carefully crafted and done in a timely fashion, they can produce valuable data.

Last week, I saw a stunning graphic from RBC Capital Markets that charted 839 different fee schedules that are composed of 3,729 separate fee variables. When one examines these variables in detail, it appears that certain exchanges are using their fee engineers to put together bespoke pricing terms for one or a small handful of customers in order to attract and retain order flow. Given this incredible complexity, it is likely very difficult for market participants to know whether they are getting best execution and the benefit of a fair and orderly market.

To address this, there is a proposal pending before the SEC that would, for a 6-month period, eliminate rebates or comparable inducements for a random sample of 50 of the 100 most actively traded stocks. I strongly endorse this maker-taker pilot to help detect conflicts of interest, promote price transparency, and reduce inefficiencies.

Third, we should examine the role dark pools play in market structure, particularly in light of recent settlements with the SEC and the New York Attorney General. The original rationale for alternative trading venues—executing block sales, large block sales—appears to have diminished, with only an average trading size of 187 shares at the five largest dark pools, according to a recent FINRA study in 2014. I would love to hear more on that subject. The SEC has made recent studies in both enforcement and regulation of this space, recent strides, and I hope it continues.

Fourth and finally, we must have the regulatory tools necessary to conduct adequate market oversight. This means establishing the Consolidated Audit Trail (CAT) so the SEC can have real-time insight into the mechanics of the stock market. It is beyond frustrating that nearly 6 years after the Flash Crash we still have not built the CAT. Both of our witnesses today have a critical role in its approval, so I look forward to hearing their explanations on its timely completion.

Thank you, Mr. Chairman, and I look forward to our witnesses' testimony.

Chairman CRAPO. Thank you very much, Senator Warner.

I saw the same graphic you did, and it is remarkable to see the kind of analysis that can show the complexity of the markets that we are now dealing with.

And, again, I appreciate the work that both the SEC and FINRA are doing. We want to both, I think, encourage that that work proceed quickly and that we address these critical issues and get the advice and counsel of those who regulate these markets.

And, in that context, our witnesses for today's hearing on Regulatory Reforms to Improve Market Structure are Mr. Stephen Luparello, Director of the Division of Trading and Markets at the U.S. Securities and Exchange Commission, and Mr. Richard Ketchum, Chairman and CEO of Financial Industry Regulatory Authority.

As many of you may know, Rick Ketchum has announced that he is going to be retiring later this year, and I know that I will miss you, Rick. All of us will. Thank you for your service and for your dedication to improving our markets. We appreciate it very much.

Mr. KETCHUM. Thank you very much for those words.

Chairman CRAPO. Gentlemen, I think you know the rules very well. We have allocated 5 minutes to each of you, and we will have you go in the order I introduced you. And at that point, then, we will have an opportunity for some questions and dialogue.

Mr. Luparello.

STATEMENT OF STEPHEN LUPARELLO, DIRECTOR, DIVISION OF TRADING AND MARKETS, SECURITIES AND EXCHANGE COMMISSION

Mr. LUPARELLO. Chairman Crapo, Ranking Member Warner, Members of the Subcommittee, thank you for inviting me to testify regarding equity market structure. I welcome this opportunity to discuss a topic of such importance to investors, public companies, our securities markets, and capital formation.

Enhancing U.S. equity market structure continues to be a primary focus of the SEC. It was a primary focus in 2015 and will continue to be in 2016. My written testimony lays out the full range of the SEC initiatives.

In 2015, for example, the SEC published a proposal to enhance the operational transparency of alternative trading systems, proposed amendments to a rule that would require broker-dealers who engaged in proprietary trading in off-exchange venues to become members of a national securities association, and approved a pilot program to assess the effect of tick sizes on market quality for smaller issuers.

Before I touch briefly on a few upcoming initiatives, I want to give an overview of the Commission's program for equity market structure to help illuminate how particular initiatives fit into the program as a whole.

Today's equity markets, as you know, are dominated by computer algorithms. These algorithms are capable of generating, routing, and executing orders with enormous sophistication, volume, and speed. They have enabled types of market mechanisms and trading practices that were not possible in the days of manual markets.

Our regulatory regime must keep pace with and adjust appropriately in response to these market changes. But doing so requires thorough study and an appreciation of the workings of the full market. Market structure issues typically are complex and highly inter-related. Even when a particular problem is identified, efforts to develop a response must reflect the full consideration of the risk of unintended consequence.

To meet this challenge, our ongoing equity market structure review is based on three key elements. First, it is data driven. A vital first step in dealing with market structure questions is to marshal relevant data. Although data analysis alone cannot dictate particular outcomes, it is extremely valuable to help narrow the range of viable regulatory responses.

Accordingly, the SEC has made a concerted effort in recent years to strengthen its capabilities for data collection and analysis. These efforts include capturing a wider range of data sources, deploying more sophisticated technology tools and analyzing data, and employing additional personnel with the necessary quantitative skill sets.

Second, our review of equity market structure is open to a wide range of views. Many market structure issues arise in the context of proposed SEC rules, national market system plans, and exchange rules. These procedural contexts provide an extensive opportunity for public comment. But given the complexity of market structure issues, the SEC has taken an extra step of seeking out a wide range of views in contexts other than specific proposals and adoptions. These have included concept release, public roundtables, a request for comment on particular topics, and the establishment of the Equity Market Structure Advisory Committee.

Finally, our equity market structure review is comprehensive in scope. Properly assessing market structure issues requires full appreciation of the extent to which market participants, the tools they employ, and the trading venues they use are interrelated. Rarely, if ever, does a material change in one aspect of market structure not have important effects on other aspects of market structure.

Accordingly, the SEC does not address issues in isolation. Rather, as outlined in my written testimony, the SEC has advanced initiatives that encompass market stability, high frequency trading, fragmentation, broker conflicts, and the quality of markets for smaller companies. Focus on this wide range of substantive issues is intended to help address particular areas of concern while still providing an opportunity to assess the extent to which these issues and initiatives across different categories are interrelated.

I will finish by briefly mentioning four particular initiatives that should see important developments in the coming months. One, as mentioned already, is the Consolidated Audit Trail, or CAT, which would represent a major step forward in oversight of the equities markets. We have approved certain exemptions and approved the CAT project manager, clearing the way for the staff to be in a position soon to make a recommendation to the Commission for publishing the CAT plan for notice and comment.

Another noteworthy new rulemaking initiative involves institutional order routing transparency, which would expand investors'

understanding of the brokers' routing decisions—of their brokers' routing decisions—by mandating standardized order routing disclosures. I anticipate that the staff will make a recommendation on this initiative in 2016.

Another noteworthy new initiative is an anti-disruptive trading rule. Staff is developing a recommendation that would be narrowly tailored to address aggressive destabilizing strategies in conditions where they have the most possible impact to exacerbate price volatility.

And, finally, a fourth initiative is the potential for a pilot program, as discussed, on maker-taker fee structures. A subcommittee of the SEC's Equity Market Structure Advisory Committee is assessing this issue and I anticipate that it will have a recommendation ready to discuss by the full committee at its next meeting in April.

Thank you for inviting me to testify to discuss these issues and I look forward to answering your questions.

Chairman CRAPO. Thank you very much, Mr. Luparello.
Mr. Ketchum.

**STATEMENT OF RICHARD G. KETCHUM, CHAIRMAN AND CEO,
FINANCIAL INDUSTRY REGULATORY AUTHORITY**

Mr. KETCHUM. Chairman Crapo, Ranking Member Warner, and Members of the Subcommittee, I also want to thank you for the opportunity to testify today.

In recent years, there has been an increased debate about the structure of capital markets. Once the domain of regulators, market operators, and large sophisticated investors, market structure is now a topic for much broader public discourse. This discourse often, appropriately, includes questions about whether or not the markets are fair and whether they provide a level playing field for all investors.

Questions of market structure can be broad and complex and it can be difficult to pinpoint what really needs to be addressed. I believe there are three key aspects of the markets that securities market participants and regulators should always be working to strengthen: market fairness, market transparency, and market liquidity.

Investors must have confidence that they can access current, accurate market prices that reflect true investor supply and demand. That means that market structure must foster and promote accurate prices and low trading costs for retail investors. Having been in this business for a long time, I have seen many significant market structure changes that have benefited investors, but some of these changes have also led to a more complex and fragmented market.

FINRA has responsibility to oversee and regulate over-the-counter trading of exchange listed and non-exchange listed securities as well as trading in many fixed income instruments. In addition, FINRA provides automated surveillance and other regulatory services to U.S. equity and options exchanges, conducting surveillance for approximately 99 percent of the listed equity market and approximately 70 percent of the listed options market.

As a result, while the markets have become increasingly fragmented, we have been able to aggregate trading data across the markets to conduct comprehensive cross-market surveillance. This is important because we have found many instances where market participants have consciously dispersed their trading activity across multiple markets in an effort to avoid detection.

In addition, FINRA's cross-market surveillance program enables us to detect those market participants who are acting in concert to engage in market manipulation schemes. Our innovative program allows us to run dozens of surveillance patterns and threat scenarios across the data we gather to look for manipulation and front running as well as layering, spoofing, algorithmic gaming, and other abusive conduct. This sophisticated surveillance allows us to detect activities that we were not able to see before. We are also starting to design surveillance programs that will span equities and options markets together to detect potential cross-product manipulative conduct.

Transparency is another market feature of paramount importance to investors, and FINRA recently proposed a series of initiatives designed to increase the scope of trading information we receive and provide more transparency into trading activities to market participants and investors. In general terms, these efforts include a call for alternative trading systems to provide more in-depth order information for regulatory surveillance, greater transparency of volume executed away from stock exchanges, more granular audit trail information, and tighter restrictions around allowable clock drift to better ensure proper sequencing of events.

These FINRA initiatives align with broader market structure changes implemented by the SEC and other market participants. Since the May 2010 Flash Crash, the SEC, FINRA, and the U.S. stock exchanges have implemented a variety of initiatives to minimize the impact of extreme volatility. Among the changes, regulators adjusted the market-wide trading pause, which gives market participants an opportunity to assess their positions, valuation models, and operation capabilities when extreme periods of volatility occur. In addition, FINRA and the exchanges implemented a limit up-limit down initiative which addresses the type of sudden price movements that the market experienced during the Flash Crash.

We had an excellent opportunity to evaluate the effectiveness of these changes last August 24. The events of that day illustrated both the value of having appropriate controls in place and areas where those controls might be enhanced, and I look forward to discussing this in greater detail with the committee.

Many of these issues are being considered by the SEC's Equity Market Structure Advisory Committee, of which I am a member. Among other things, the committee is reviewing the current regulatory model for exchanges and other trading venues as well as the current state and impacts of Regulation NMS, and in particular, the EMSAC is considering whether rules on limiting trade throughs, capping access fees, and preventing locked and crossed markets continue to serve their intended purposes.

I appreciate the opportunity to testify today and would be happy to answer any questions you may have. Thank you.

Chairman CRAPO. Thank you very much. And, again, I appreciate the effort that both of you and your organizations have been involved in on this. And, to start with, I would note that, as Senator Warner indicated, Chair White 2½ years ago now embarked on the holistic approach and we had been looking at these issues even for a couple of years before that. I am in the mode of wanting to find out how soon we will get to go on some of the answers.

Each of you in your testimony have identified some specific areas and proposals that you think are—I assume you think are ready to move forward. So, what I would like to ask you to do, both of you to do right now for the remainder of the time I have in my questioning in this round is to pick maybe the top two proposals or actions that you think need to be made, and I am talking about in terms of what we can get to as quickly as we can, or how quickly we can get to some proposals on the table so we can start moving and then give me a little bit of a timeframe idea of what you think that we are looking at in terms of getting to these proposals. Mr. Luparello.

Mr. LUPARELLO. So, it is a fortunate coincidence that I think my top two are the ones that are next up in terms of us getting proposals out, both of which I alluded to in my oral statement, but specifically the Consolidated Audit Trail and our institutional order routing disclosure rule, which in shorthand, we call Institutional 606.

Chairman CRAPO. And I heard you say “soon” on the Consolidated Audit Trail and during 2016 on the other, so how about—can you specify that a little bit?

Mr. LUPARELLO. Well, you know, I generally get in trouble when I put specific dates on things—

[Laughter.]

Mr. LUPARELLO.—but I will at least reference that the Chair recently said that it is her desire to have the Consolidated Audit Trail approved and the plan processor selected in 2016, and if you back out some of the hard dates that go into that, that would require us to get the plan out for notice and comment in the coming few weeks.

Institutional 606 is something we are working hard to get out in somewhat a similar timeframe. One of the reasons why I think it is both an important rule and an important rule to get out soon is it works nicely in complement with our Reg ATS proposal that we put out. Both of those rules stand on their own as very good, important disclosure-based rulemakings. But, in a way, they work even better together.

Chairman CRAPO. All right. Thank you.

Mr. Ketchum.

Mr. KETCHUM. Well, let me start and agree with Steve on both of his pieces, without counting them as my two, but I will just briefly—

[Laughter.]

Chairman CRAPO. We will grant you that.

Mr. KETCHUM. But, I will briefly mention on the Consolidated Audit Trail, FINRA obviously does a substantial percentage of the market surveillance tasks where audit trail information is so critical and CAT is a huge step forward. The ability to move from a

two-step process of identifying the firms that are executing and clearing trades where they may be problematic to an ability to identify customers as opposed to having to go out to firms to get that information dramatically reduces false positives, dramatically improves our ability to identify problematic activity, and I could not be more supportive of the SEC's efforts there.

I would just note, it is a complex task, and I know, Chairman Crapo, that you have always been interested in balance and ensuring that this is done the right way, as well. I think the SEC's exemptive order, which I compliment Steve on for getting out yesterday, was a great example from what was submitted by the exchanges and FINRA of the type of efforts to both move CAT forward but also move it forward in a way that is operationally the most efficient and effective, and I look forward to the publication of the plan and moving it as quickly as possible.

Two other things I will mention. It is the right time to address and manage and look closely at the maker-taker issue. I compliment the SEC for moving forward on a pilot, working with the exchanges and FINRA, and I think there were a variety of excellent reasons to set the maker-taker pricing and access fee provisions where it was at the time the SEC did. The markets, as both, Chairman Crapo, you and Ranking Member Warner indicated, have changed dramatically since then. The arbitrage issues around maker-taker pricing today raise real questions from the standpoint of efficiency and investor confidence. It is the right time to look at it.

And, the last piece is, we collectively, both the SEC, the exchanges, and FINRA, all need to respond to the areas where there is still more to be done showing up from the standpoint of trading on August 24. Fundamentally, the markets and the steps that were put in place worked and operated well to reduce the type of volatility that we had seen earlier at the Flash Crash. But, there are a range of issues, as I indicated in my testimony, that deserve to be looked at closely, and I think that also, from an investor confidence standpoint, is something we ought to get to.

Chairman CRAPO. Well, thank you very much, and you both kept me right on time.

Senator WARNER.

Senator WARNER. I appreciate the Chairman's questions.

I am going to come at it maybe with a little more edge. I think it is great, what you have—and I say this—I know you guys are both trying to get us where we need to be, but, you know, it is 6 years on the CAT, and I hope you will take back, Steve, the notion to the Commission that at least this Senator's patience is wearing very thin. I also wonder, on the Consolidated Audit Trail, since the SEC does not have jurisdiction over the futures markets, obviously, that is CFTC, but as we saw with the Flash Crash, if you have something happen on the futures side, it can also affect the equities side.

So, I am going to get out at least two of my questions and I am going to ask you to both answer quickly, because I have got three or four more. How do we deal with that jurisdictional issue, recognizing that you have committed that we are going to get this project—the CAT finished in 2016, point number one.

Point number two, to where, Mr. Ketchum, you were at, I think the maker-taker pilot is really, really important. I do not know if—Senator Crapo and I both saw it. I do not know if Senator Warren saw the RBC chart that showed—again, I just say to say again—839 different fee models and over 3,700 different kind of fee structures, a level of complexity that even for Wall Street is over the top, that clearly is driving commissions, fees, and rebates in a way that is not transparent, that does not guarantee best markets, that under the guise of bespoke products, I think, is creating a real disservice, and my understanding, at least, in terms of a maker-taker pilot, if you decide to move forward, this would not require months and months of preparation. You could simply pick an arbitrary 100 equities, put 50 in the control batch and 50 in the noncontrol batch and flick a switch and we could start that pilot.

So, I would like you on the first round, briefly, because I have got, again, a few others to whack at—to hit on—how hard around the CAT without the jurisdiction on futures, and can we be assured that we are going to move forward on maker-taker in a timely manner, in either order.

Mr. LUPARELLO. I will be happy to start. CAT could not be a higher priority for us, and getting a recommendation to the Commission—

Senator WARNER. Six years is a long time.

Mr. LUPARELLO. I—I appreciate that, and I have lived that for—I have lived in that space for all of it, including some time living with access to inadequate information. So, we—like I said, it could not be a higher priority for the Commission, for the Chair, and especially for me and my staff, and we expect to have something very, very soon.

I think the issue of other products, it cannot be overstated. There are some jurisdictional issues. I know the CAT plan participants, and Rick is more close to this than I am, have been identifying those potential expansions into other products, because August 24 proved what I think we already knew, which is that the futures markets and the cash markets are inextricably linked, and if we do not have a good vision into those, we are still—we are going to be seeing a much more complete picture on a day in, day out basis, but during times of extreme market stress, we are going to be missing an important part of the picture if we do not have futures there.

I agree, I think maker-taker is a pilot that, unlike some other pilots, where I think we are concerned that we are adding even more complexity when you put a pilot into place, that maker-taker is one that can be done very simply. We look forward to the recommendation from the Equity Market Structure Advisory Committee. I think it will be something we will be able to act on very quickly.

Senator WARNER. When?

Mr. LUPARELLO. The subcommittee is supposed to make a recommendation to the full committee at the next full committee meeting, which is late April. And, so, that full committee will then—

Senator WARNER. Do you think there will be a recommendation, either go or no go?

Mr. LUPARELLO. I think the Subcommittee will be ready to make a recommendation to the full committee. Given the conversations that the full committee has had, I obviously cannot commit the full committee. I would expect that they would probably have some questions about the construction of a pilot, but I think there is broad-based support, which is, obviously, very important because it is a committee with a number of different market participants and constituents, that I think there will be broad-based support for a pilot. Obviously, the details of how you construct the pilot are to be determined.

Senator WARNER. Rick.

Mr. KETCHUM. As the operator of most of the market surveillance activity going on in the markets today, nothing could be more important to us than moving to CAT. We are fortunate now that we can look across markets and across products, but the Consolidated Audit Trail dramatically enhances the effectiveness of our job.

You are right, Senator Warner, that there is no question that including futures and, frankly, on the way, credit default swaps would be a huge step forward with respect to the Consolidated Audit Trail and efforts should be made to move across jurisdictional lines. We have worked closely with the MERC with respect to investigations for years and they have been tremendously cooperative. But, the only way to effectively identify or recreate markets is to have it all in one single database, and your point is absolutely correct.

Senator WARNER. Can you quickly address, since my time is out and I want to come back next round on tick size and bond market transparency, just very quickly on maker-taker.

Mr. KETCHUM. Maker-taker, I absolutely support a broader pilot. It is something that should be done from the standpoint of data. There are a lot of interesting questions around it. But, to me, sitting as just one member of the Equity Advisory Committee of the Commission, I think this is absolutely the right time to look and make changes to the maker-taker pricing.

Chairman CRAPO. Thank you, Senator Warner.

And, Senator Warren. Senator Warren has to leave to another Committee meeting, and so she is going to get a few extra minutes on this one instead of waiting for the second round, if that is all right with you, Mr. Warner.

Senator WARREN. Thank you.

Senator WARNER. Sure.

Senator WARREN. Thank you very much Mr. Chairman. I really appreciate your cooperation so I can cover two hearings, and also appreciate your calling this hearing. This business about market structure is just powerfully important. That makes this hearing very important.

I want to focus on the self-regulatory aspect of this market. FINRA is not a Government agency. It is instead an independent nonprofit organization that is responsible for regulating parts of the securities industry. So, I looked on your Web site and the Web site for FINRA says that it is dedicated to investor protection and works everyday to ensure that every investor receives the basic protections they deserve. I want to explore whether this industry self-regulation really works.

This week, three economists from the University of Chicago's Booth School of Business released a study that looked at records on 1.2 million registered financial advisors and brokers from 2000 to 2015, and they found that 1 in 13 had a documented record of criminal, civil, or regulatory misconduct. Amazingly, only about half of them had been fired by their firms because of this misconduct, and of the half that were fired, 44 percent got a job at another advisory firm within a year.

Now, the study also finds that certain advisory firms hire a huge number of advisors with a history of misconduct and those firms tend to, quote, "cater to unsophisticated consumers, particularly the elderly and those with less education." For example, a customer walking into an Oppenheimer and Company retail location looking for financial advice has a one in five chance that the advisor will have a documented history of misconduct.

Mr. Ketchum, as the head of FINRA, what are you doing to make sure that the elderly and people who can least afford bad financial advice do not fall into the net of someone who has already got a documented history of misconduct?

Mr. KETCHUM. Senator Warren, I am glad you asked that question. First, I read that study, as well, with great interest, and I do find it dismaying that firms do hire in many circumstances persons with those type of records. Those are exactly the factors we look at from the standpoint of where we focus our exams and where we focus our enforcement investigations. It is exactly those type of factors which result in us barring or suspending up to a thousand persons a year, bringing action with respect to a wide range of firms and more than a thousand actions a year. And we care very much about the issues from the standpoint of recidivism and the potential impact with respect to investors.

Senator WARREN. Well, I appreciate, Mr. Ketchum, that you care about this, but these are the data about what is going on right now. I want to know what you plan to do about it. You know, we have got FINRA-registered companies where 15 to 20 percent of the FINRA-registered advisors have a history of misconduct. What is going on here?

Mr. KETCHUM. Well, first up, and let us go back to the definition of misconduct, which is, among other things, that the firm settled an arbitration or a complaint for some amount of money without admission one way or another with respect to the investor.

Senator WARREN. But—

Mr. KETCHUM. These are absolutely incidents of exactly the type of thing we look at from an exam standpoint—

Senator WARREN. Well, I am glad you are looking at it—

Mr. KETCHUM.—but we do actually have to find somebody—

Senator WARREN.—but you are not taking them off the street. And let us be—

Mr. KETCHUM. We do when they violate the rule. Yes, we do. We bar—

Senator WARREN. Then how can it be so—

Mr. KETCHUM. We bar hundreds of—

Senator WARREN. How can there be so many? How can it be that you could walk into an Oppenheimer and Company and have a one in five chance of encountering someone who has prior—recorded

prior misconduct? And, let us keep in mind, this does not—these are not trivial.

The other thing that the study found was that advisors who have engaged in prior misconduct are five times more likely to engage in future misconduct when compared with the average advisor. So, we are talking about real risk here.

Mr. KETCHUM. And that is exactly the risk we look at with respect to our exams and enforcement investigations, and that is why many of those people get barred every year.

Senator WARREN. Well, all I can say, Mr. Ketchum, is you obviously are not getting them out of the industry. They are still there. They are there in big numbers. And they are concentrated in places where they are most likely to encounter unsophisticated consumers and I think that is a real problem that we have got.

So, let me look at another aspect of the industry self-regulation. Almost every advisory contract these days includes a forced arbitration award, and that means that if investors think they have been cheated, they cannot go to court, and if a bunch of them get cheated by the same broker in the same scheme, they cannot combine their claims into a class action. They have to come to you, to FINRA, for arbitration.

Now, it turns out that investors do not win very often in arbitration and that even if they do manage to win, they do not get paid. A recent report from the Public Investors Arbitration Bar Association found that over \$60 million in arbitration awards to investors in just 1 year, 2013, are still unpaid. And just to put that in context, that means of the people who finally made it all the way through the arbitration process and managed to actually win against their broker or advisor, about a quarter of them still have not gotten the money that they won in the arbitration award.

Now, the same issue—main issue here seems to be that these security firms do not have the money on hand to pay these awards. They stay in business, but they do not have the money. So, what is FINRA planning to do to ensure that these firms and brokers actually have the money to pay an arbitration award when they cheat people?

Mr. KETCHUM. OK. Three sets of responses to your very valid question.

First, with respect to any firm that continues to do business in the securities industry, unless they leave and become an investment advisor, we will bar them if they do not pay their awards, plain and simple as that. No one can stay in as a FINRA member and not pay their arbitration awards. And we do that—

Senator WARREN. So, you are telling me—I just want to make sure I understand what that means. You are saying of the \$60 million in arbitration awards from 2013, all of those people are now barred? They are not part of FINRA anymore?

Mr. KETCHUM. If I can get through my three answers—

Senator WARREN. OK.

Mr. KETCHUM.—I will try to address each part. If they continue to have money, if they continue to do business as a FINRA member and they do not pay their arbitration awards, we will bar them.

Now, you are right, and one of the things that we have is that firms become insolvent, leave FINRA, and in those situations, we lose our jurisdiction from that standpoint and investors—from the standpoint of barring them, they are already gone—just as, by the way, they do if they are an investment advisor bringing an action against the firm and that firm goes insolvent with respect to enforcing a court decision, they have to go to court to enforce it, and that is a big problem from the standpoint of the number of people that are not paid.

You raised exactly the right questions. The question as to whether the capital requirements are at the right level are fair questions. They are things we will look at at FINRA, although I will note capital requirements are essentially something that the SEC has taken responsibility for. Now, most of the time, we want to get these people out of the industry if they are doing bad things to investors.

But, whether there should be jumps before firms leave to ensure that they have left capital to meet their arbitration obligations that may come forward is something we are looking at. Whether, one way or another, there should be a fund to try to at least address this with respect to small investors that are terribly harmed by that. I could not agree more that each of those issues ought to be looked at.

Senator WARREN. OK. So, what I am hearing you tell me, and I just want to make sure I have this right, is that you believe that there ought to be more regulation so there is money available when people get cheated. And, second, you are telling me that all of the people who were cheated in 2013 who got arbitration awards who have not paid out, that all of those dealers and brokers are now out of the business and out of your jurisdiction. Is that right?

Mr. KETCHUM. I am not—I am saying that those that have not paid out will either be in a short period of time barred or are already out.

Senator WARREN. This is now 3 years.

Mr. KETCHUM. Well, but with respect to those, they are gone. Those are firms that have left FINRA.

Senator WARREN. All of them from 2013 are gone.

Mr. KETCHUM. Those—yes.

Senator WARREN. OK.

Mr. KETCHUM. Those are firms that have left FINRA and the collection issues are exactly the same collection issues you have when a firm goes insolvent with respect to court.

Senator WARREN. Well, I just want—

Mr. KETCHUM. But something should be done about it, and I want to repeat what you just said. I do believe this is an issue we want to be part of, we want to work with the SEC on, and it is a real concern.

Senator WARREN. Well, I just want to say on both of these, I think something should be done about brokers and dealers who put customers at risk. Brokers and dealers have arbitration awards against them and cannot even pay when there is an award against them. They are serious issues. They affect ordinary investors. FINRA is supposed to be looking out for these folks, not for the advisory firms, and I hope you will address these issues quickly.

Thank you, Mr. Chairman. Thank you for your indulgence in giving me the extra time.

Chairman CRAPO. Thank you, Senator Warren.

Senator Donnelly.

Senator DONNELLY. Thank you, Mr. Chairman.

I appreciate the efforts of the SEC and Chair White in recent years to review and improve the structure of our equity markets. They are significantly more complicated, and in recent decades, we have moved from a single dominant stock exchange to a marketplace now featuring 12 exchanges, 40 dark pools, and hundreds of broker-dealers. Additionally, trading is electronic and highly automated.

And, Mr. Ketchum, you spent 14 years with the SEC before working for the exchanges and on Wall Street. Can you describe the significant changes in market complexity you have witnessed and the effect.

Mr. KETCHUM. Well, I will try to, Senator Donnelly, and you are right. The changes are dramatic. I think over a period of years, with a combination of technological advances and the SEC's focused effort to reduce barriers to entry and encourage competition, the markets have changed dramatically. We have moved from an environment where the New York Stock Exchange and NASDAQ stock market accounted for virtually all trading that occurred, where they operated with respect to either a single specialist system or a constrained market-maker system from the standpoint of providing liquidity to the environment that Mr. Luparello described earlier in his statement where liquidity is essentially provided through a range of algorithmic active traders, some of whom have requirements and obligations built into their exchange registrations and some of whom do not.

The markets are also dramatically fragmented across large numbers of exchanges and automated trading systems, and that has changed the environment and raised issues from the standpoint of transparency, disclosure as to how orders are handled, issues from the standpoint of best execution, and, obviously, as has been discussed before, maker-taker pricing. This is an area that continues to deserve great—

Senator DONNELLY. Let me ask both of you, do you think the regulators have the tools to keep pace with the technology development and the efforts that are being put forward to try to constantly move the ball? You know, we have seen time after time some of these flash situations and others where the regulators are on this effort and the ball has already moved to this point.

Mr. LUPARELLO. So, jurisdictionally, clearly, we have the tools we need. From the ability to both gather and analyze data, we have improved dramatically over the past few years, but there is still some way to go. So, in all of these issues, we always try to start first by analyzing the data we have available. I think, as you can see with the work we have done after the August 24 event, that is still a process that is a little more burdensome, a little more cumbersome than we would like. As we make progress on that, I think the ability to analyze data in a more nimble way, use both the expertise and the jurisdiction we have, and work with the

variety of market participants, will give us the ability to react in a timely fashion to market events.

Mr. KETCHUM. I will agree with Steve that between us, and particularly the SEC has the regulatory tools necessary to address this and also analyze the markets. I will stick on the market surveillance side, where FINRA takes a primary responsibility. We have dramatically better capabilities now than we ever had before through our contracts across exchanges, both stock and options, to look across markets and identify manipulative activity that does not define the most active traders, but with respect to those aberrant ones. But, we can do better. A key tool is the Consolidated Audit Trail and I look forward to—

Senator DONNELLY. What concerns both of you the most about the current structure of the equity markets? Where, when you look, you go, here is a hole that somebody is about ready to exploit, here is a problem that we are—you know, and it is a hard question to answer. What are the problems you are missing that almost you do not know you are missing at this point?

Mr. LUPARELLO. Well, all right, the answer is what you do not know. I think we are less—we are always attentive to the issues of the robustness of the structure, but, again, I think the pattern over the past few years has demonstrated that a number of the steps that the Commission has asked for and the markets have put into place have made the market broadly a more robust place. I think you look at the events in July, where one of the major markets was out for an extended period of time, fortunately the middle of the day, neither the beginning nor the end of the day, and the markets were able to trade pretty efficiently without that one primary market being in the marketplace.

I think in terms of what we worry about, we worry about what everybody else worries about, which is cyber and those kinds of issues and whether the rules we have put into place, which are significant, are right, rightly tailored, and being adhered to to ensure that we are doing everything we can from that standpoint to make the market robust.

Senator DONNELLY. Mr. Ketchum.

Mr. KETCHUM. The market has dramatically improved from a resiliency standpoint in addressing some of the excess volatility issues when you look back to the Flash Crash, where I think the markets, as a result of the changes, were truly unsafe at any spade. We still need to step back, look at events like August 24, and identify the additional steps needed to address and ensure that those protections against unnecessary volatility continue to be improved. And we still need to enhance our audit trail to ensure we are identifying those small numbers of serious manipulative activities and creative activities in the most effective way possible.

Senator DONNELLY. If I could ask just one more question, and this is—you may consider this a little bit offbeat, but when you look and you saw that there was a whole system set up to try to race ahead of trades, to try to gather the information and race ahead of trades that were being made to make more money, and part of it was putting locations and buildings right next door to buildings next door to buildings, when you look, is there anybody in your organizations that look for unusual activities, where you go,

why are seven firms going into this building right next to this building, for instance? Do you look for things that, for want of a better way to put it, seem to have no real reason other than something may be going on?

Mr. LUPARELLO. So, there is a very important question about whether the race for speed reaches a point of diminishing returns and whether we should do things in the market that enable market participants of different speeds and different capabilities to have as good an experience as possible.

I think in the context of co-location, that is, in fact, a regulated function, that these are functions that the exchanges provide to their members. They must provide them on equal terms to all of their members. So, there is that aspect, at least, issues around speed and latency are highly regulated. It is a very important separate question about whether people are taking those speed advantages and using them for improper purposes. I think that is something that both we and FINRA—and again, FINRA is the front-line regulator—spend a lot of time both thinking about and looking at.

Mr. KETCHUM. Certainly, our primary focus of our surveillance is looking at the outcomes, the trading and whether that trading is, in one way or another, taking advantage of other investors. And, I think, there, we are far more sophisticated in identifying patterns that suggest those problems than we have ever been before.

Senator DONNELLY. Thank you, Mr. Chairman.

Chairman CRAPO. Thank you, Senator Donnelly.

We will have a second round of questions, and I will start it out with you, Mr. Ketchum. In fact, this is an issue that I think I am really sort of teeing up for Senator Warner here, but I wanted to get my bite at it first.

FINRA and the Municipal Securities Rulemaking Board are expected to finalize rules to increase the disclosure of broker fees for retail trades and bonds. How will that work, and do you expect retail investors to get better pricing?

Mr. KETCHUM. Thank you for that question, Chairman Crapo, and I think it shows—and both of you have demonstrated over time through your recognition that while there are many important issues to look at with respect to the equity market, there are also significant issues with respect to the evolving fixed income market.

Yes, when I look at the present environment with respect to fixed income securities and look at the range of trade prices that exist with respect to similar bonds, we see a pattern in which firms, although they are not engaging in illegal activity from the standpoint of the markets, they charge meaningfully significant, as in multiple times of the amount of markup. That is precisely the type of situation where additional disclosure to investors that can—will, I think, encourage a more efficient market.

We saw that happen with respect to TRACE when we began, and on the municipal security side, where trade reporting began and that resulted in more efficient pricing. I think this will, as well. It is not a cure all. And, in addition, we need to look very closely at the operational cost, which is what we will certainly continue to follow as we file these proposals with the SEC through that comment period.

Chairman CRAPO. All right. Thank you very much.

I am going to let Senator Warner dig deeper into that one, if he chooses to. I want to use the rest of my time in this questioning period with you, Mr. Luparello. Well, actually, this could be for both of you, too, so you will have to listen in, Mr. Ketchum.

The SEC Equity Market Structure Advisory Committee has four different subcommittees, and this kind of follows on my first line of questioning. I am trying to pull out of you just where we are on all of this and what we can expect to see and how soon. But, those four subcommittees are subcommittees on Reg NMS, on trading venue regulation, on retail customer issues, and on market quality. And, I realize that is a pretty broad swatch, but I am curious to hear from you just, basically, what are the main options that we are seeing develop in these subcommittees and what more decisions need to be made before we get some proposals.

Mr. LUPARELLO. So, the Equity Market Structure Advisory Committee—and it is true that Rick is on at least two of those subcommittees, so he has got a vantage point in terms of the operations of the subcommittees that I do not have—the committee itself has been in place for about a year or so. It is relatively new. The creation of the subcommittees is even newer than that. And, so, to a certain extent, how they are going to define their jurisdiction, what they are going to choose to focus on is something that they are still considering.

We talked about asking one of—we directed one of—requested that one of the subcommittees focus immediately on constructing a maker-taker pilot. I think that is an important first tangible deliverable that a subcommittee will deliver and it is absolutely the right priority.

There are a number of other things in play. I think one of the other ones we continue to think is a good area for a subcommittee to focus on and to make recommendations to us about is around issues of plan governance.

So, in some ways, the work of the committees is still fairly nascent and what they are going to choose to focus on is something that they are trying to figure out at this point. But, again, progress on an access fee pilot and progress on advice around plan governance are two very important things, and if they deliver those to the committee in the near term, they will be really delivering some valuable benefit.

Chairman CRAPO. Thank you.

Do you want to add something to that, Mr. Ketchum?

Mr. KETCHUM. Well, as Mr. Luparello indicated correctly, I am on two—lucky enough to be on two of those subcommittees, one of which is focusing on best execution and customer order routing information, the other of which is looking at venue issues from the standpoint of the operation of plans and the appropriate regulatory treatment of exchanges and automated trading systems.

The great advantage of the subcommittees, the Commission has set up these meetings so that we get input from a wide variety of persons with regard to the committee as a whole. The subcommittee allows us to also bring in a variety of experts and have more open two-way conversation to discuss potential actions, and that is what we are really trying to look through there with respect to both of my subcommittees.

I expect that this will result in very concrete recommendations for improvements with respect to the type of information that is now provided with regard to executions by both the market-making firms and the order routing firms, and also responses with respect to the appropriate environment for exchange and ATS regulation. So, I think the subcommittees help with that.

My impression is the focus now is that the—I expect in each of the areas that Steve discussed there will be concrete recommendations coming out, Mr. Chairman.

Chairman CRAPO. Well, thank you.

And, again with regard to both of you, quickly—I have got 2 minutes, basically, here—what issues in the fixed income markets, do you think, need to have some heightened attention?

Mr. LUPARELLO. I would start by complimenting Mr. Ketchum on the work that FINRA has done in preparing to get a rule filing to us as well as MSRB in the area of retail order execution transparency. I think that is an enormous step forward. It is a long time coming. For Rick and I, it is an especially long time coming. So, we are looking forward to that.

I think the other thing we are spending a lot of time on is that there has been a real development, again, mostly in the retail space, of the creation of transparency venues that basically look like ATSS that are bringing pre-trade transparency to the fixed income markets where it really has not existed before.

I think one of the things we spend, like I said, a lot of time thinking about is are there ways we can encourage and push that forward without, as the regulator, perhaps interfering with what would otherwise be positive natural developments. So, we are in conversations with many of the platforms that provide these liquidity venues and trying to figure out what we can do to make sure that that development, which is a very positive development for investors, continues to move forward.

Chairman CRAPO. Thank you.

Mr. Ketchum.

Mr. KETCHUM. I would completely agree with the two issues Steve identified. I will mention one in a slightly different area, and that is Treasury securities. The agencies responsible, including Mr. Luparello with respect to the SEC, put out, I think, an excellent study that demonstrated the lack of transparency and also the dramatic changes with respect to how Treasury securities are trading now versus just a few years ago, and the time to move forward on that, and there has been a request for comment coming out of the Treasury Department that I thought was really very well done, time to move forward to ensure first, at a minimum, that there is full regulatory reporting of all transactions involved in the Treasury market and looking closely at the question of greater transparency. This is one of the most important markets of the world, but it distinguishes itself from all other fixed income markets in the United States from the lack of transparency.

Chairman CRAPO. Well, thank you very much.

Senator Warner, the floor is yours.

Senator WARNER. Well, thank you, Mr. Chairman, and really, again, very much appreciate the fact that you have called this hearing.

And, I just want to make an editorial comment before I get to—I have got a whole series of additional questions and buckets we have not even gotten into yet. But, I think it is really important that you hear us that the public's faith in the markets and the transparency and is it going to be treated fairly, I think we are not out of the woods on that. I think Senator Warren's comments about arbitration and the failure to get paid, you know, that came up late February in the Wall Street Journal, I think we do need action and we need prompt, quick action from FINRA, Mr. Ketchum, so that there is, whether it is a reserve fund or some action, but not an action that is studied for years.

You know, on the Consolidated Audit Trail, it is complicated. I understand that, appreciate that. But, it is 6 years, 6 years since the Flash Crash. You know, on the maker-taker pilot, I have not done all the research, but just common sense says if you have got 839 different fee schedules and over 3,700 different fee variables all trying to create bespoke products that push fees and rebates to individual brokers, that is not on the up and up. And, I appreciate the idea that the subcommittee is going to recommend something in April, but we really do need to know when the full committee is going to act and when is this pilot going to take place.

Let me get out a couple more before I even start on my next round. You know, the bond market transparency that Senator Crapo raised, Senator Coburn and I raised this issue in legislative form 2 years ago, and yet we still do not have a full-fledged answer, and there are mark-ups and mark-downs and selling bonds. I mean, the bond markets ought to be the most transparent of our markets.

So, do either one of you want to respond on that, on the generic, and I have got three or four more things on specific I want to question you on. You might tell me that the subcommittee is going to act in April and the full committee is going to act by July or something.

Mr. LUPARELLO. No, I think the subcommittee will make the recommendation to the full committee in April. I expect to get the full committee's reaction to that at their meeting in April, and so—

Senator WARNER. Do you think they will actually act?

Mr. LUPARELLO. I—that is—that is our—I cannot speak for the committee, since it is an independent committee, but I would assume that a number of these—first of all—

Senator WARNER. So, it is not unrealistic to think that we might have a maker-taker pilot at least started or close to started this summer?

Mr. LUPARELLO. No. Unfortunately, a committee recommendation is just a recommendation to the staff. Again, I think you find that—that recommendation will find a very ready audience with the staff, but the staff still needs to make a recommendation to the Commission. Then the Commission would need to put it out for notice and comment. So, a Commission-mandated maker-taker pilot would take a few months after that.

Senator WARNER. Mr. Ketchum, do you want to comment on—

Mr. KETCHUM. Well, on that, I just—

Senator WARNER.—either that or on market transparency?

Mr. KETCHUM.—speak as one member of the committee and recognize in the end this will be a Commission decision, as Steve indicates. But, I certainly support a pilot. I look forward to see exactly what the subcommittee recommends, but I am pretty confident we will be supportive of it.

I just want to take a second on fixed income. You are right. This is an area that has dramatically changed. It has become more and more an area where retail investors are participating both directly and indirectly through bond funds. I think the steps we have proposed with respect to mark-up disclosure and what I expect will come out of the MSRB is critically important and there is nothing that is more important to me than to see that go forward.

And, as far as the points you made, Senator Warner, on arbitration, since I am retiring this year, I am not thinking in multiple years. This is a year that is terribly important to me as to what we do and this is something that is very important to me to make progress on.

Senator WARNER. Done this year, in terms of some level of reserve or some ability for firms not to exit and leave people holding the bag?

Mr. KETCHUM. I need to have that conversation with my board and there needs to be specific proposals, but yes, I hope so.

Senator WARNER. Mr. Chairman, can I take a couple more?

One of the areas that, Mr. Chairman, you raised at an earlier hearing and we both focused on terms of trying to provide more liquidity for small stocks, or smaller traded stocks, we talked about a tick size pilot. Again, agreement. Again, hope and expectation that that tick size pilot was going to take place this year. We saw it was supposed to take place and move forward in May. That date slipped to October. Arguably, some of the exchanges seem to have put forward proposals that seem to be more focused on preserving their own commercial interests than actually trying to provide a legitimate experiment.

Are we going to hit October? I know there were three proposals. Where does it stand?

Mr. LUPARELLO. We are—

Senator WARNER. How do we actually get this one on the “done” list?

Mr. LUPARELLO. You have identified exactly the right issues that have caused the delay, but we are going to get it done by October. We have now filings in from—

Senator WARNER. That is for the record, October, no further delay?

Mr. LUPARELLO. That is. That is from the standpoint of what we can deliver. So, we now have—we now have filings in from two of the markets that define some of the provisions, I think, in a manner more consistent than we—more consistent than had originally and more in line with what we were expecting. We assume the other markets will find that to be consistent with what their expectations of what a trade act component would look like. We are ready to move forward on all of them. I think we now have that level of consistency. We have the data gathering part of the rulemaking done, and so I think we are in very good shape to move

forward in a way perhaps we had not been in good shape up until these past few weeks.

Senator WARNER. But, it is a fair critique, not of you all, but some of the exchanges, that their first round of proposals were more about preserving their own commercial interest than actually trying to figure out how we can bring more trading frequency and liquidity to smaller cap stocks.

Mr. LUPARELLO. I guess I would say that for certain markets, the definition of trade, that is in the eye of the beholder. There was certainly differences of opinion on how that should be scoped.

Senator WARNER. One of the things that we have, when I think anyone questions, whether it is HFTs or other aspects of the market, the ever more technologically driven market, I feel at times that you get kind of a dismissive response of, well, gosh, the god of liquidity trumps everything. So, that is the answer to any question that any nonperson from the market gets. You guys just do not understand because it is all about liquidity.

Well, part of liquidity is, you know, the ability also for market making, and yet we do not have any kind of standardized definition of what a market-maker would end up looking like. Does it make sense to think about standardizing a definition around market maker? You know, should there be something that says you have got to have 99.9 percent of the time the ability to make a market? You do question some of these folks who say they are market makers, but at the end of the day have a closed out, completely closed-out position. It seems just—again, I am not as sophisticated as some, but that seems inherently contradictory of the notion that you are making a market if you have closed out your position at the end of the day.

We all know since 1987 to the Flash Crash and others market making is great when it is going up, but nobody wants to catch the knife when it is falling. So, thoughts on the whole question about some level of standardization around market making.

Mr. LUPARELLO. It is a very important issue and I think it was part of Rick's response to Senator Donnelly in terms of the dramatic changes in the market over the past couple of decades. It is fair to say that the obligations of being a market maker are considerably less than they used to be. The benefits of being a market maker are also less. So, the idea of potentially giving market makers some advantages that they do not have now in exchange for certain obligations that they do not have now is one that is a very important question and one that touches on a variety of different areas in the overall analysis of market structure.

I think it is something where, again, the expertise of the committee is something we look to rely upon, but not exclusively. But, it is a very complex question.

Mr. KETCHUM. I agree with Steve. With respect to my first SEC advisory committee, I was associated with the recommendation that this be looked at. I do think that greater definition of market-making obligations and market-making incentives is something that should be focused on. I entirely support the SEC looking at it.

Senator WARNER. But, I hope we would actually move forward, because I think, again, whether it is liquidity or market making, there are lots of broad-based rationales given that, when the stuff

hits the fan, sometimes if they are not there, then this value disappears.

Let me get even a little more out there. One of the tools that SEC has, FINRA has, the FTC has, as the markets move more and more into algorithmic computer-driven trading, we know you all have the ability in certain instances to actually go in and look at the underlying code. Now, understanding that many of these firms believe that that underlying code is their proprietary secret sauce, I understand that as somebody who used to be in the tech world. But, I wonder, does it make sense to actually tag some of those codes so that in an event of a market meltdown or enormous turmoil, in kind of a post-action report, you could have tagged that code to see which of these secret sauces may have actually contributed to market meltdowns? And is anybody thinking through that?

Mr. LUPARELLO. Yes, but I need to point out that there are a couple of assumptions that are in that that need to be validated or acted upon, one of which is that active proprietary traders are broker-dealers. I think that is something where, while most of them are now, it is important for the Commission to clarify that. It is something we are working on. And also that the code that is embedded in some of the algorithmic programs are, in fact, books and records of the broker-dealer.

So, I think, as a general matter, like I said, most active traders, most HFTs are broker-dealers. I think they generally think of those things as books and records. When push comes to shove, I would hope they continue to hold those positions. Those are very important things for the Commission to clarify and are on our list of things to do in the coming months.

But, absolutely, a better understanding of how algorithms are developed, how they are deployed, what their purposes are, and what order flow came from what algorithms is a very important piece of information that we need to have when we reconstruct markets, especially during volatile—

Senator WARNER. Right, I understand the proprietary nature and that needs to be protected, but the ability to go in after the fact and see the results—Mr. Ketchum, do you want to—

Mr. KETCHUM. I will just add two supplemental things from that standpoint. I completely agree that both being better able to identify problems with respect to an algorithm and in particular to create greater accountability from the standpoint of the supervisory obligations of the broker-dealer that is essentially providing the route to execute those orders is absolutely critical.

In the present environment where we are trying to do that, recognizing that these are very clever folks who now send their strategies when they are manipulative over multiple broker-dealers, as I indicated before, to numerous markets, we are starting to throw report cards back to the firms that are executing when we see algorithms repeating again and again, manipulative activity using multiple broker-dealers, so those firms, even if they do not see the whole activity, can recognize their accountability from a supervision standpoint to, frankly, shut that algorithm off.

Separately, as we move to a Consolidated Audit Trail, I know I am just—this is throwing a red flag at you—

Senator WARNER. Adding fire—

Mr. KETCHUM.—but as we move to a Consolidated Audit Trail—

Senator WARNER.—fuel to the fire here.

Mr. KETCHUM.—we will then have exactly the ability to pinpoint with greater granularity the specific algorithm activities. And, I could not agree more that both the accountability of supervision and getting to that point where we can pinpoint the algorithm activity is really important.

Mr. LUPARELLO. And, I guess the one thing I would add is while we absolutely have access—need to have access to the information to be able to understand the markets, we are not insensitive to the issue of the secret sauce. The number of times you would need to ask for code, the protections around asking for information of that sensitive and proprietary a nature is something that we would need to be very careful of.

Senator WARNER. I would just say, and I do not want to state the Chairman's position, but the Chairman and I want the markets to work. We are generally supportive of, you know, some of the advantages that have come out of the technological developments over the last 20 years. But, we also know, and we both went through kind of a litany in our opening statements of all of the glitches and challenges that the markets have seen even post-2008.

And, at least from this Senator, I would take as a real deep concern that the things that we need to do to keep investor trust, and not just nonsophisticated investors, all the way up the food chain, and recognizing—I think one of you mentioned—there is so much money to be made, we are always going to be chasing wherever the markets and the advances move forward.

But, when we look at the CAT taking 6 years, when we look at transparency in the bond markets, talking about it now for two-plus years, when we have been looking at questions like the tick size pilot being continued to be pushed off, when we are—I appreciate, Steve, your comments about maker-taker, but trying to get to a point of, all right, when is it going to actually happen, and this one, at least if I understand, at least, you may have to write a—put out a Notice of Proposed Rulemaking, but the ability to actually turn on—we are talking about a 100-size pilot of which 50 would be in the control and 50 would be in the noncontrol—it is not that complicated, and you cannot not look at the RBC data and not say something funky is going on here. That is a technical term.

I would just encourage us that we act with as much speed as possible, and I would appreciate your—let me add to what Senator Crapo has said—appreciate your service. But, I can think of nothing better in terms of part of your legacy than to say, at least on this issue of arbitration, people who rightfully have an ability to collect from malfeasance, that simply being able to escape the marketplace or go out of business where there needs to be some financial obligation, that would be a great legacy coming out of your tenure.

Thank you, Mr. Chairman.

Chairman CRAPO. Thank you, Senator. And, you and the others have all helped us get into a number of very critical issues here today.

I cannot help but say that, when you talked about the god of liquidity in terms of being the answer to so many of the questions, I wonder if the power behind the curtain is order flow as opposed to liquidity in some of these contexts.

But, that being said, I want to really thank you, Senator Warner, for really providing the exclamation point to the reason this hearing was called, which is that we want to—you know, we want to see things studied. We appreciate the importance of getting the appropriate data. We want to get it right.

But, there is an increasing level of frustration in terms of getting around the board and back to go again and starting to implement some of the needed reforms for our market structure. I do not think there is any disagreement, if much at all anywhere, about the fact that we need to have some movement in terms of having our regulatory system keep up with our market structure and with the dynamics that we are dealing with.

So, I appreciate both of you, our witnesses, being here and being willing to come up and be grilled in front of a Committee. But even more than that, I appreciate the work you are doing and your commitment that you have given us here today to help us get some of these issues over the goal line and help us start to move on some of these critical processes and reforms.

Unless you have anything else, Senator Warner, we will adjourn the hearing. Thank you.

[Whereupon, at 11:15 a.m., the hearing was adjourned.]

[Prepared statements and additional material supplied for the record follow:]

PREPARED STATEMENT OF CHAIRMAN MIKE CRAPO

The landscape of stock markets and trading today is substantially different than it was 20, 10, or even 5 years ago.

Regulations and technological innovation have moved stock trading from the floors of exchanges to virtually all trading being conducted electronically on automated markets. Technology and innovation has benefited investors by leading to tighter spreads, lower costs, and more efficient markets.

However, the expansion of trading venues, speed, and mandated interconnectedness of exchange and market participants has raised questions regarding market complexity and resiliency.

For the past several years the Securities Exchange Commission and the Financial Industry Regulatory Authority have been working to better understand whether their market structure rules have kept pace with changes in trading technology and practices.

In 2014, the Banking Committee held a hearing with a broad mix of market participants to examine the role of regulation in shaping today's markets as well as whether these markets are as resilient and stable as they should be.

Several witnesses at the hearing argued that Regulation NMS, a set of SEC market structure rules that passed by a 3-2 vote over 10 years ago, needed to be reexamined.

Later in the year, SEC Chair White provided an update to her market structure agenda in a response to a letter Senator Johnson and I sent and highlighted three fundamental policy questions the Commission would be focusing on:

The trade-through restrictions in Rule 611 of Regulation NMS and whether they should be rescinded or modified.

The current regulatory model for exchanges and other trading venues and whether it makes sense for today's markets.

The maker-taker fee structure, including the related issue of restrictions on locking and crossing quotations in Rule 610 of Regulation NMS.

These are complicated issues and I appreciate the data driven approach by the SEC and FINRA and the extensive comments from market participants, investors, and academics.

It will be helpful to understand from our witnesses what progress has been made in identifying and prioritizing the key concerns with our equity market structure and what options are being explored to address them.

After all, the 2010 Flash Crash is still fresh in many of our minds and additional market events have raised concerns about market integrity and resiliency.

In fact, the SEC's Equity Market Structure Advisory Committee met to diagnose and discuss one of the latest market disruptions, namely what went wrong last August 24 when dramatic price moves triggered more than 1,000 trading halts in hundreds of stocks and exchange-traded funds.

Today, this Committee hopes to hear from our witnesses about what lessons were learned from recent market disruptions and what steps need to be taken to strengthen the operation of the markets?

The U.S. capital markets are vital to the growth of our economy and we need to take the necessary steps to make sure the U.S. financial system and markets remain the preferred destination for investors throughout the world.

PREPARED STATEMENT OF STEPHEN LUPARELLO

DIRECTOR, DIVISION OF TRADING AND MARKETS
SECURITIES AND EXCHANGE COMMISSION

MARCH 3, 2016

Chairman Crapo, Ranking Member Warner, and Members of the Subcommittee:

Thank you for inviting me to testify on behalf of the U.S. Securities and Exchange Commission (SEC or Commission) regarding equity market structure. I welcome this opportunity to discuss with you a topic of such importance to investors, public companies, our securities markets, and capital formation.

The securities markets are ever-evolving and technology has been the primary driver of the changes. The ongoing challenge for regulators is to ensure that regulatory regimes are appropriately updated to respond to evolving market mechanisms and trading practices.

Today, I will update you on the SEC's efforts for meeting this challenge with respect to the U.S. equity markets. Enhancing equity market structure continued to be a primary focus of SEC efforts in 2015, as it will be in 2016. Among other things,

the SEC published a proposal to enhance the operational transparency of alternative trading systems (ATSs), proposed amendments to a rule that would require broker-dealers engaging in proprietary trading at off-exchange venues to become members of a national securities association, and approved a pilot program to assess the effect of tick sizes on market quality for smaller companies. We plan to continue to make important strides in 2016.

I. Overview of the SEC's Program for Equity Market Structure

Today's equity markets, as you know, are dominated by computer algorithms. These algorithms are capable of generating, routing, and executing orders with enormous sophistication, volume, and speed. They have introduced types of market mechanisms and trading practices that were not possible in the days of manual markets.

Our regulatory regime must keep pace with and adjust appropriately in response to these market changes. But doing so requires thorough study and an appreciation of the workings of the full market. Market structure issues typically are complex and highly interrelated. Even when a particular problem is identified, efforts to develop a response must reflect a full consideration of the risk of unintended consequences.

To meet this challenge, the SEC is engaging in an ongoing equity market review that is based on three key elements—it is data-driven, open to considering a wide range of views on all issues, and comprehensive in scope.

Data-Driven Analyses

A vital first step in dealing with market structure questions is to marshal relevant data. Although data analyses alone cannot dictate particular outcomes, they are extremely valuable in helping to narrow the range of differences in perspectives and of viable regulatory responses. Accordingly, the SEC has made concerted efforts in recent years to strengthen its capabilities for data collection and analysis. These efforts include capturing a wider range of data sources, deploying more sophisticated technology tools for analyzing data, and employing additional personnel with the necessary quantitative skill sets to use these tools.

The SEC is committed to bringing data analysis fully to bear on equity market structure issues. Many of the results of these efforts can be found on an SEC Web page that is devoted to helping inform the public debate on equity market structure.¹ The Web page includes a series of research papers, underlying data highlights, and literature reviews prepared by SEC staff that address issues such as the speed of trading, trading in off-exchange venues, high frequency trading, market fragmentation, and market quality for small capitalization companies. Most recently, staff-prepared papers were added that address two notable market events that occurred in 2015—the New York Stock Exchange (NYSE) trading suspension on July 8th and the August 24th market volatility—both of which are discussed further below.

Open to Wide Range of Views

Many market structure issues arise in the context of proposed SEC rules, national market system (NMS) plans, and exchange rules. These procedural contexts provide an opportunity for public comment. Given the complexity of market structure issues, however, the SEC has taken the extra step of seeking out a wide range of views in contexts other than specific proposals and adoptions. These have included a concept release,² public roundtables,³ and a request for comment on particular topics.⁴ The SEC also has approved over 40 exchange-level active pilots, as well as two market structure-related pilots initiated by the Commission and implemented in the form of NMS plans submitted by the exchanges and FINRA.

To further provide an opportunity for a wide range of views and inputs, the SEC established the Equity Market Structure Advisory Committee (EMSAC), which held its first meetings in 2015. The 17 members of EMSAC bring an enormous range of expertise, experience, and perspectives to their deliberations on equity market structure. EMSAC brings in an even wider range of perspectives by inviting nonmembers

¹ See <http://www.sec.gov/marketstructure/>.

² Concept Release on Equity Market Structure, Securities Exchange Act Release No. 61358, 75 FR 3594 (January 21, 2010) (File No. S7-02-10), available at <http://www.sec.gov/rules/concept/2010/34-61358fr.pdf>.

³ A roundtable on decimalization was held at the SEC on February 5, 2013, and a roundtable on market structure was held at the SEC on June 2, 2010.

⁴ Request for Comment on Exchange-Traded Products, Securities Exchange Act Release No. 75165, 80 FR 34729 (June 17, 2015), available at <https://www.gpo.gov/fdsys/pkg/FR-2015-06-17/pdf/2015-14890.pdf>.

to make presentations on key issues at each EMSAC meeting. EMSAC also has formed four subcommittees to affirmatively seek out additional viewpoints and conduct detailed evaluations of market structure issues for EMSAC's consideration. As discussed further below, EMSAC's public proceedings already have shed a great deal of light on key market structure issues,⁵ and I anticipate this will continue in 2016. To date, the EMSAC has not provided the Commission with any recommendations.

Comprehensive in Scope

The U.S. equity market is a complex ecosystem in which different types of market participants employ a range of tools and strategies to trade on 12 registered exchanges, more than 40 ATSS, and more than 200 non-ATS broker-dealers. Properly assessing market structure issues requires a full appreciation of the extent to which these market participants, tools, and trading venues are interrelated. Rarely, if ever, does a material change in one aspect of market structure not have important effects in other aspects of market structure.

Accordingly, the SEC's equity market structure program does not attempt to address issues in isolation, but rather is comprehensive in scope. As laid out in Chair White's market structure remarks in June 2014,⁶ the SEC has advanced initiatives that address five broad categories of issues: market stability, high frequency trading, fragmentation, broker conflicts, and quality of markets for smaller companies. Focus on these substantive issues is intended to help address particular areas of concern, while still providing an opportunity to assess the extent to which issues and initiatives across different categories are interconnected.

II. Equity Market Structure Developments and Initiatives

A. Market Events in 2015

There were two notable market structure events that occurred in 2015—the NYSE's suspension of trading on that exchange for more than 3 hours on July 8, 2015, and the unusual level of price volatility on August 24, 2015. While the markets generally responded well, each event brought to light certain issues and provided a useful opportunity for focused empirical analysis by SEC staff.

NYSE Trading Suspension on July 8, 2015

On July 8, 2015, the NYSE, because of a systems issue, suspended trading in all symbols on the exchange at 11:32 a.m. and reopened at 3:10 p.m.⁷ To help assess the effect of this suspension on trading, on February 3, 2016, SEC staff in the Office of Analytics and Research (OAR) within the Division of Trading and Markets published a Data Highlight on the SEC's equity market structure Web site. The Data Highlight examines trading volume, quoted spreads, and quoted depth before, during, and after the suspension.⁸

Total trading volume in NYSE-listed corporate stocks on July 8 was well within the range of observed trading volume in the first 7 months of 2015. While the NYSE's share of trading volume declined, other market centers—especially other exchanges—experienced corresponding large increases in trading volume in NYSE-listed stocks on July 8. The Data Highlight observed, however, that NYSE-listed stocks experienced substantial increases in spreads and substantial decreases in depths. Not all NYSE-listed stocks were equally affected by the NYSE trading suspension. Large cap NYSE-listed stocks experienced the biggest declines in depth, while small cap NYSE-listed stocks experienced the biggest increases in spreads.

The observations in the Data Highlight reflect the resilience of the U.S. equity market structure to the sudden withdrawal of even a large exchange, but also suggest that such a withdrawal is not without effects on market quality. In this respect, the event demonstrates the need for continued emphasis on systems reliance and integrity that has been a focus of the SEC's efforts in recent years and is discussed below.

In addition, although the NYSE was able to resume trading on July 8 prior to its closing auction, the potential that it would not be able to do so highlighted the need to address a "single point of failure" in equity market structure at the close. This type of vulnerability has been targeted by the critical market infrastructure initiative of the SEC and self-regulatory organizations (SROs). The opening and

⁵ See <http://www.sec.gov/spotlight/equity-market-structure-advisory-committee.shtml>.

⁶ Chair White's June 5, 2014 speech, entitled "Enhancing Our Equity Market Structure," is available at <https://www.sec.gov/News/Speech/Detail/Speech/1370542004312>.

⁷ See www.nyse.com/market-status/history for a description of the events leading up to the trading suspension at NYSE on July 8, 2015.

⁸ The data highlight is available at <http://www.sec.gov/marketstructure/research/highlight-2016-01.html>.

closing auctions on primary listing exchanges are integral aspects of a normal trading day and continue to be dominated by the primary listing markets. As discussed below, NASDAQ and NYSE are working to achieve redundancy in these auctions.

Price Volatility on August 24, 2015

On Monday, August 24, 2015, the U.S. equity markets and equity-related futures markets experienced unusual price volatility, particularly during the period surrounding the 9:30 a.m. opening of regular trading hours at the start of a new trading week. To help assess the operation of the U.S. equity markets under stressed conditions, SEC staff in OAR published a Research Note on the August 24 event on the SEC's equity market structure Web site.⁹ In recent years, the SEC and SROs have implemented several regulatory initiatives to address severe short-term price volatility.¹⁰ The events of August 24 provided a useful opportunity to evaluate the practical operation of these initiatives under stressed market conditions. The Research Note provides empirical data and other information to help assess trading on August 24, including several issues that have been debated among market participants and observers. These issues include the opening process at primary listing exchanges, the triggering of trading pauses under the National Market System Plan to Address Extraordinary Market Volatility (commonly known as the "Limit Up-Limit Down," or "LULD Plan"), and the effects of market volatility on trading in exchange-traded products (ETPs).

The empirical data in the Research Note suggests that, in contrast to the Flash Crash on May 6, 2010,¹¹ broad market prices did not "flash crash"—defined as a sudden and extreme price decline that is unexplained by the arrival of new information and is soon reversed. On August 24, broad market prices already had declined by 5 percent in pre-9:30 trading. At 9:30, the equity markets opened for regular trading hours at broad market price levels that were consistent with the pre-9:30 trading. The broad market then absorbed a surge in price-insensitive selling (with volume as much as 4 to 8 times higher than normal in many securities) with a relatively small price decline of 2 percent and soon recovered. Also, unlike the 2010 Flash Crash, equity market infrastructure and trading systems held up without serious incident to the high trading volume and message traffic of August 24.

However, the empirical data in the Research Note also suggests certain issues that arose on August 24 that generally fall within three broad categories and require attention.

First, in the opening minutes of trading on August 24, a significant minority of ETPs experienced what could be described as a breakdown in arbitrage—specifically, they traded at substantial discounts to the underlying indexes they were designed to track.

Second, many of these ETPs that experienced high volatility triggered trading pauses under the LULD Plan. These trading pauses helped prevent the irrational prices that occurred during the 2010 Flash Crash (such as one penny prices). The ETPs, however, did not resume trading in an orderly fashion, but traded erratically in ways that triggered additional LULD pauses. More than 80 percent of LULD pauses on August 24 occurred in ETPs, and most of these were repeat pauses in the same symbols and occurred when prices were recovering upward. Notably, although a significant minority of ETPs experienced severe volatility and multiple LULD pauses on August 24, a majority of ETPs experienced levels of volatility consistent with broad market prices, and 80 percent of ETPs did not experience a single LULD pause.

The third category of issues on August 24 related to corporate stocks. Unlike for the market broadly, prices for a relatively small number of individual corporate stocks experienced flash crashes—extreme price declines followed by quick recoveries. These included six corporate stocks with very large capitalizations. In addition, 4.7 percent of the more than 4,000 corporate stocks analyzed in the Research Note declined by 20 percent or more from the previous Friday's close price, while 19.2 percent of the more than 1,400 ETPs analyzed in the Research Note declined by 20 percent or more.

The unusual volatility on August 24 warrants continued close evaluation to consider whether regulatory responses may be appropriate. As noted below, the SRO participants in the LULD Plan are considering potential modifications, and

⁹The Research Note is available at https://www.sec.gov/marketstructure/research/equity_market_volatility.pdf.

¹⁰Such initiatives include the revision of market-wide circuit breakers that apply across the securities and futures markets and the National Market System Plan to Address Extraordinary Market Volatility (commonly known as the Limit Up-Limit Down, or LULD, Plan).

¹¹The report of the staffs of the CFTC and SEC on the May 6, 2010, Flash Crash is available at <https://www.sec.gov/news/studies/2010/marketevents-report.pdf>.

individual exchanges also are assessing their opening and reopening processes. And prior to August 24, the Commission broadly requested comment on ETPs, including the extent to which arbitrage mechanisms are effective in aligning ETP prices with their underlying indexes.¹²

SEC staff continues to examine a broad spectrum of issues related to trading on August 24. These include, among other things:

- (1) factors that may have been associated with volatility in ETPs and other securities, including the nature of selling pressure, sources of liquidity provision, and, for ETPs, create and redemption activity;
- (2) the effect of Regulation SHO short-sale restrictions;
- (3) the opening process on primary listing exchanges, including the nature of trading prior to and immediately after the opening auction on the primary listing exchange;
- (4) the reopening process following LULD pauses, including the nature of participants in the reopening auctions on primary listing exchanges and the rules and practices employed by exchanges in connection with reopenings;
- (5) the operation of the LULD Plan, particularly as it applies in the period following the opening of regular trading hours and to reopenings following LULD pauses; and
- (6) the operation of market-wide circuit breakers, particularly as they apply in the period following the opening of regular trading hours.

B. Regulatory Initiatives

The Commission advanced a series of key regulatory initiatives relating to equity market structure in 2015, and more are on the SEC's agenda for 2016.

1. Preventing Market Instability

One of the most serious concerns about highly electronic markets is the risk of instability and disruption. Sophisticated technology tools can enhance efficiency, but they also can facilitate the rapid onset of a trading disruption. These disruptions can arise when systems that drive algorithmic trading fail or malfunction, and also when high-speed trading leads to sudden gaps between liquidity demand and supply that can cause extreme price volatility. Addressing the risk of instability and disruption from these two sources has been a high priority of the SEC in recent years and will continue to be a focus in 2016.

Regulation Systems Compliance and Integrity (SCI)

The Commission adopted Regulation SCI in November 2014 to strengthen the technology infrastructure of the U.S. securities markets. Regulation SCI imposes requirements on key market participants intended to reduce the occurrence of systems issues, improve resiliency when systems problems do occur, and enhance the Commission's oversight and enforcement. Subject to a few exceptions, SCI entities were required to start complying with the requirements of Regulation SCI on November 3, 2015. The Technology Controls Program in the SEC's Office of Compliance Inspections and Examinations is now examining SCI entities for compliance with Regulation SCI.

A CyberWatch team has also been established that is responsible for triaging all system events reported to the SEC under Regulation SCI. This team currently monitors all the filings required by Regulation SCI that are submitted by SCI entities to the SEC. When a major SCI event is reported, they maintain constant communication with the SCI entity until the event is deemed resolved. Since Regulation SCI went live on November 3, 2015, CyberWatch has received 326 filing submissions, including Non-*De Minimis* Event Notifications & Filings, Quarterly *De Minimis* and System Change Reports, and Annual Review Reports.

The Commission staff, in response to Chair White's directive, is preparing recommendations for the Commission's consideration as to whether an SCI-like framework should be developed for other key market participants, such as certain broker-dealers and transfer agents, whose operations can have a significant market impact if they are disrupted.¹³

¹²Request for Comment on Exchange-Traded Products, Securities Exchange Act Release No. 75165, 80 FR 34729, 34740–34741 (June 17, 2015), available at <https://www.gpo.gov/fdsys/pkg/FR-2015-06-17/pdf/2015-14890.pdf>. The Comment period closed in August 2015, and the SEC has received 40 comment letters, which are available at <https://www.sec.gov/comments/s7-11-15/s71115.shtml>.

¹³Chair White's November 19, 2014, statement is available at <https://www.sec.gov/News/PublicStmnt/Detail/PublicStmnt/1370543489640>.

Critical Market Infrastructure

Since 2013, SEC staff has been working with the SROs, including clearing agencies, on a range of market structure and infrastructure initiatives. One of these initiatives involved improving the resiliency of systems that constitute potential single points of failure, including the securities information processors for consolidated market data feeds (SIPs). In June 2014, the SIPs implemented enhancements to their disaster recovery sites and systems to establish a “hot/warm” backup process to provide for a 10-minute fail over from the primary to the backup sites. In addition, the equity exchanges have amended their clearly erroneous rules and the options exchanges have amended and harmonized their obvious error rules to provide greater clarity to market participants regarding trade breaks. The equity and options exchanges also have been enhancing their risk mitigation mechanisms. Most recently, the NYSE and NASDAQ have progressed on an initiative to serve as each other’s backups if they are unable to fail over to their backup sites in time to run their respective closing auctions. These efforts compliment the new requirements of Regulation SCI, which are applicable to critical market infrastructure.

LULD Plan

Initially approved on a pilot basis in 2012,¹⁴ the LULD Plan establishes a market-wide mechanism that is intended to moderate extraordinary price volatility in individual securities and reduce the incidence of erroneous trades. In particular, the LULD Plan requires trading centers to have policies and procedures reasonably designed to prevent trades from occurring outside specified price bands. If the national best offer (bid) reaches the lower (upper) price band, a limit state is initiated. If such national best bid or offer does not recover to inside the price bands within 15 seconds, a 5-minute trading pause is triggered to accommodate more fundamental price moves (as opposed to erroneous trades or momentary gaps in liquidity). The LULD mechanism is intended to reduce the negative impacts of sudden, unanticipated price movements in securities, thereby protecting investors and promoting a fair and orderly market. In particular, the LULD Plan is designed to address the type of extreme short-term price volatility that occurred during the 2010 Flash Crash.

The LULD Plan continues to operate on a pilot basis. Consistent with the SEC’s data-driven approach to market structure issues, the SROs were required to provide an assessment of the LULD Plan. The SROs engaged a third-party consultant to provide an empirical assessment of the Plan’s operation, which was submitted to the SEC in May 2015.¹⁵ The consultant found that the LULD Plan generally had succeeded in preventing erroneous trades in large cap stocks during regular trading hours, and that the vast majority of limit states resolved themselves without triggering a trading pause. The consultant observed, however, that many LULD limit states and trading pauses occurred in small, low volume stocks, and that most were unnecessary and related more to difficulty in determining the opening reference price when the opening auction on the primary listing exchange did not produce a trade rather than to excess volatility.

The Commission recently published the SROs’ proposal to extend the LULD Plan for another year until April 2017.¹⁶ As noted by the SROs, extension of the pilot period will enable the SROs and the Commission to further evaluate the LULD Plan’s operation. The SROs also have proposed to amend the LULD Plan to modify the identification of the first reference price of the day for those securities that do not have an opening auction trade. The first reference price for these securities would be the closing price of the security on the primary listing exchange on the previous trading day, or if no such closing price exists, the last sale on the primary listing exchange reported by the SIP. The Commission will consider whether to approve or disapprove the proposed amendment to the LULD Plan after the notice and comment process.

The SROs are continuing to evaluate additional issues regarding the operation of the LULD Plan, including those that may have been revealed by the events of August 24, 2015. On August 24, for example, trading centers resumed trading following a LULD pause but before new price bands were disseminated by the SIP. Many of these trades were executed at prices outside the new price bands. I

¹⁴ See Securities Exchange Act Release No. 67091, 77 FR 33498 (June 6, 2012) (File No. 4–631), available at <https://www.sec.gov/rules/sro/nms/2012/34-67091.pdf>.

¹⁵ See Angel, James J., “Limit Up-Limit Down: National Market System Plan Assessment To Address Extraordinary Market Volatility” (May 28, 2015), available at <http://www.sec.gov/comments/4-631/4631-39.pdf>.

¹⁶ See 81 FR 10315 (Feb. 29, 2016). The comment period for the proposal ends on March 21, 2016.

understand that the SROs are working quickly to enhance their procedures to ensure they do not resume trading following a LULD pause without an effective price band in place, either by waiting for the message from the SIP or by temporarily calculating the new price bands internally. Given the potential for this problem to undermine the effectiveness of the LULD Plan when securities reopen following a trading pause, I have asked that each SRO enhance its procedures as soon as possible, but no later than April 1, 2016.¹⁷

I also understand that the SROs intend to propose a LULD Plan amendment to refine the operation of the LULD mechanism to eliminate the need for clearly erroneous execution rules, except in very limited objective circumstances. I expect that such an amendment will be filed for Commission consideration during the course of the next pilot period, should the Commission approve the proposed extension.

Finally, I understand that there are a number of other issues that the SROs are analyzing with a view toward possible further amendments to the LULD Plan, including: (i) a review of ETPs to determine whether adjustments should be made to the Plan to account for the particular trading characteristics of ETPs; (ii) the impact of double-wide price bands during the opening period, (iii) the advisability of coordinated reopening procedures; and (iv) potential enhancements to the categorization of securities into different tiers.

Shortening the Settlement Cycle

Currently, most securities transactions in equity and debt settle 3 days after the trade has been executed, which is referred to as “trade date plus three” (T+3). Last spring, the Industry Steering Committee (ISC),¹⁸ established by the Depository Trust Clearing Corporation and co-chaired by Securities Industry and Financial Markets Association (SIFMA) and the Investment Company Institute (ICI), published a white paper that addresses certain procedural steps it believes are necessary to achieve the move to T+2.¹⁹ The white paper also includes an implementation timeline that targets the transition to T+2 by the end of the third quarter of 2017.

Chair White and the Commissioners have expressed their support for the industry T+2 initiative,²⁰ and Chair White has asked the staff to develop a proposal to amend Rule 15c6-1. The staff is currently working on a proposal for the Commission’s consideration, and is actively engaged in discussions with the ISC regarding industry planning and preparation for the prospective migration to T+2.

Transfer Agent Regulation

On December 22, 2015, the Commission issued an advanced notice of proposed rulemaking concerning a range of potential new requirements for transfer agents.²¹ This marked the first significant action by the Commission in this area in over 40 years.²² The staff will consider comments received as it develops further recommendations to the Commission for transfer agent reform.

2. Addressing High Frequency Trading

As algorithmic trading has increasingly dominated equity market volume, concerns have been raised about the speed and fairness of the equity markets. Algorithmic trading encompasses the high frequency trading strategies employed by proprietary trading firms, as well as much of the trading by brokers acting on behalf of institutional investors. Algorithmic traders use a variety of low-latency tools.

¹⁷ See Letter from Stephen Luparello, Director, Division of Trading and Markets, SEC, to Mr. Paul Roland, Chairman of the LULD Plan Operating Committee, dated February 10, 2016 (Re: Limit Up-Limit Down Plan to Address Extraordinary Market Volatility).

¹⁸ The ISC oversees the Industry Working Group and Sub-Working Groups. All these groups are responsible for assessing the scope, requirements, and changes needed to facilitate the implementation of T+2.

¹⁹ PricewaterhouseCoopers LLP, *Shortening the Settlement Cycle: The Move to T+2* (2015), available at <http://www.ust2.com/pdfs/ssc.pdf>.

²⁰ Letter from the Hon. Mary Jo White, Chair, U.S. Securities and Exchange Commission to the ICI and SIFMA (September 16, 2015), available at: <http://src.bna.com/i7>; Statement Regarding Proposals to Shorten the Trade Settlement Cycle, Commissioner Michael S. Piwowar and Commissioner Kara M. Stein (June 29, 2015), available at <https://www.sec.gov/news/statement/statement-on-proposals-to-shorten-the-trade-settlement-cycle.html>.

²¹ See *Transfer Agent Regulations, Securities Exchange Act Release No. 34-76743* (Dec. 22, 2015), available at <http://www.sec.gov/rules/proposed/2015/34-76743.pdf>.

²² See Chair Mary Jo White, U.S. Securities and Exchange Commission, *Beyond Disclosure at the SEC in 2016* (Feb. 19, 2016), available at <http://www.sec.gov/news/speech/white-speech-beyond-disclosure-at-the-sec-in-2016-021916.html>; see also Commissioners Michael Piwowar and Kara Stein Statement of Support for the Need to Modernize the Commission’s Transfer Agent Rules (June 11, 2015), available at <http://www.sec.gov/news/statement/statement-of-support-modernize-sec-transfer-agent-rules.html>.

These include co-located services in the data facilities of trading venues and direct data feeds from these venues rather than consolidated data feeds, which are on average less than 1 millisecond slower than the direct data feeds due to the time needed for consolidation of data at the SIPs. While rolling back the technology clock is neither feasible nor appropriate, the SEC must assess the extent to which specific elements of an algorithmic trading environment may not optimally serve the interests of investors, as well the effectiveness of its regulatory oversight of high-speed and high-volume trading.

Additional Timestamps for Consolidated Data Feeds and Data Feed Usage

In response to Chair White's request to enhance the ability of market participants to monitor market data latencies, the SROs added additional timestamps to the consolidated data feeds in 2015 that reflect, for each order or execution processed by an exchange, the event processing timestamp included on the exchanges' direct data feeds. The exchanges also enhanced their procedures for clock synchronization. With a common event time reflected in both the consolidated and direct data feeds, market participants can now more readily assess the absolute and relative latencies of each, and determine which data feed best meets their trading or other business needs. In 2014, the exchanges, again in response to a request from Chair White, disclosed in their rules how they use the consolidated and direct market data feeds in their operations, thereby enhancing the opportunity for public understanding of today's equity markets.

Membership Requirements for Dealers Trading in Off-Exchange Venues

In March 2015, the SEC proposed amendments to Exchange Act Rule 15b9-1 that would require broker-dealers engaging in proprietary trading at off-exchange venues to become members of a national securities association.²³ SEC staff is reviewing comments on the proposal and is working to prepare a recommendation for the Commission to consider in 2016.

Enhanced SEC Recordkeeping Requirements for Trading Algorithms

SEC staff is developing a rulemaking recommendation for the Commission to consider that would strengthen recordkeeping requirements for algorithmic trading. Such requirements may encompass key elements of the algorithm itself, as well as a record of the orders generated by the algorithm. Such records would provide greater transparency for regulators into algorithmic trading.

Status of Unregistered Broker-Dealers

SEC staff is developing a recommendation for the Commission to consider in 2016 that would clarify the status of active proprietary traders that are not registered as broker-dealers and subject certain of them to the SEC and SRO regulatory regime for broker-dealers.

Anti-Disruptive Trading Rule

SEC staff is developing a recommendation for the Commission to consider that would address the use of aggressive, destabilizing trading strategies in conditions when they could most seriously exacerbate price volatility. Such a rule will need to be carefully 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.

EMSAC Discussions

EMSAC has formed a Market Quality subcommittee that will consider the impact of technology on the efficiency of the markets and systemic risks. Among other things, the subcommittee will consider market-maker obligations and high frequency trading strategies that may exacerbate volatility. Any advice or recommendations of the subcommittee (and other subcommittees mentioned below) would be presented to the full advisory committee for its consideration.

3. Consolidated Audit Trail

In July 2012, the SEC adopted Rule 613 under Regulation NMS requiring the SROs to submit an NMS plan to create, implement, and maintain a Consolidated Audit Trail (CAT). The CAT would capture customer and order event information for orders in NMS securities, across all markets, from the time of order inception through routing, cancellation, modification, or execution. CAT would represent a sig-

²³ Exemption for Certain Exchange Members, Securities Exchange Act Release No. 74581, 80 FR 18036 (April 2, 2015), available at <https://www.gpo.gov/fdsys/pkg/FR-2015-04-02/pdf/2015-07293.pdf>. The Commission has received 21 comment letters on the proposal, available at <https://www.sec.gov/comments/s7-05-15/s70515.shtml>.

nificant step forward in regulatory capabilities for oversight of the equity markets. In 2015, the SEC and SROs continued to make substantial progress toward a CAT.

First, the SROs filed amendments to the CAT plan in 2015 that contained additional information than the original plan necessary to the consideration of an operational plan. On February 27, 2015, the SROs filed an Amended and Restated CAT NMS Plan.²⁴ On December 24, 2015, and February 9, 2016, the SROs filed an amendment to the Amended and Restated CAT NMS Plan.²⁵

Second, the SEC approved an amendment to the CAT plan processor selection plan in June 2015 allowing the SROs to move forward with selecting the plan processor, which would build and operate the CAT. The CAT plan processor selection plan, which is separate and distinct from the CAT plan, governs the SROs' governance and selection of the CAT processor. The SEC also approved an amendment providing for recusal of plan participants in circumstances that might present conflicts of interest. In accordance with these amendments, the SROs narrowed the bids for CAT plan processor from six bidders to a shortlist of three bidders in November 2015.

Third, in anticipation of the SROs' completion of the CAT plan, we appointed a CAT project manager in November 2015. This person will be the technological point person for the development and usage of the CAT at the SEC, as well as the SEC's liaison with the SROs and the CAT plan processor. The CAT manager will maintain an open line of communication with the SROs and market participants.

Fourth, on March 1, 2016, the Commission approved exemption requests submitted by the SROs to provide the SROs the flexibility to include, in the CAT plan for notice and comment, alternative approaches to those described in Rule 613.²⁶

Fifth, SEC staff is reviewing the Amended and Restated CAT NMS Plan to provide a recommendation to the Commission regarding publication of the plan for notice and comment. Although I cannot provide exact timing, I hope the staff will be in a position to submit a recommendation to the Commission soon to publish the CAT plan for public notice and comment.

If the Commission approves publication of the plan, there would likely be a 60-day comment period during which interested parties may submit comments to the Commission on the plan as noticed. SEC staff will consider comments received and evaluate what recommendations to make to the Commission, including potential modifications to the plan. Upon Commission approval of a CAT plan, Rule 613 provides that a plan processor shall be selected within 2 months of the effective date of the plan. SROs begin reporting data within 1 year of effectiveness; SRO members, except those that qualify as small broker-dealers, begin reporting data within 2 years of effectiveness; and SRO members that qualify as small broker-dealers begin reporting with 3 years of effectiveness.

4. Enhancing Market Transparency and Examining Trading Venue Regulation

As noted earlier, equity trading volume now is divided among 12 exchanges, more than 40 ATSS, and more than 200 non-ATS broker-dealers. The competition for order flow among these venues benefits investors by encouraging services that meet particular trading needs and by keeping trading fees low. As noted above in connection with the NYSE suspension of trading on July 8, multiple trading venues also can help avoid disruptions if one venue, even a major exchange, experiences a systems problem. Fragmented markets, however, also can raise questions regarding the rules that govern their operations and intermarket trading, including the extent to which their operations are transparent to investors and whether the rules establish a fair and level playing field for competition.

Proposal To Enhance ATS Operational Transparency

In November 2015,²⁷ the SEC proposed to amend Regulation ATS to require ATSS that facilitate transactions in NMS stocks to make public disclosures on Form ATS-N about: (1) the activities of the broker-dealer that operates the ATS, and its

²⁴See Letter from the SROs, to Brent J. Fields, Secretary, Commission, dated February 27, 2015.

²⁵See Letters from the SROs to Brent J. Fields, Secretary, Commission, dated December 23, 2015, and February 8, 2016.

²⁶See Order Granting Exemptions from Certain Provisions of Rule 613 Pursuant to Section 36(a)(1) of the Securities Exchange Act of 1934, Securities Exchange Act Release No. 34-77265 (March 1, 2016).

²⁷Regulation of NMS Stock Alternative Trading Systems, Securities Exchange Act Release No. 76474, 80 FR 80998 (December 28, 2015), available at <https://www.gpo.gov/fdsys/pkg/FR-2015-12-28/pdf/2015-29890.pdf>. The comment period closed on February 26, 2016, and comments are available at <http://www.sec.gov/comments/s7-23-15/s72315.shtml>.

affiliates, that relate to the ATS; and (2) the manner in which the ATS operates, including disclosures about types of subscribers, order types, execution procedures, and use of market data. These proposed rules are designed to provide greater transparency around the operations of ATSs so market participants can better evaluate ATSs as potential trading venues and make more informed routing decisions.

The Commission also proposed rules to provide a process for the Commission to determine whether an ATS qualifies for the exemption under which it operates and declare an NMS Stock ATS's initial Form ATS-N either effective or, after notice and opportunity for hearing, ineffective. The proposal includes a process for an ATS to file, and the Commission to review, amendments to Form ATS-N. The Commission also proposed rules to provide a process for the Commission to suspend, limit, or revoke the exemption after providing notice and opportunity for hearing. Finally, the Commission proposed that all ATSs' safeguards and procedures to protect subscribers' confidential trading information be written. These proposed rules are designed to facilitate the Commission's oversight of ATSs and thus, better protect investors.

The comment period on the ATS proposal closed on February 26, 2016. SEC staff is reviewing comments on the proposal and preparing a recommendation for the Commission to consider in 2016.

SEC Staff Papers and EMSAC Discussions regarding Rule 611 of Regulation NMS and Trading Venue Regulation

In April 2015, SEC staff prepared a briefing paper on Rule 611 of Regulation NMS, which restricts the execution of trades at prices that are inferior to quoted prices.²⁸ The paper first notes Rule 611's place in the U.S. regulatory regime for equity market structure and then summarizes the Rule's requirements and the SEC's objectives for the Rule when adopted. It then addresses changes in equity market structure that have occurred since Rule 611 was adopted in 2005, supported by a series of data tables. The tables provide data on changes in the market shares of trading venues, visible and dark fragmentation, trading volume, average trade size, and trade-through rates.

EMSAC considered issues raised by the Rule 611 paper at a meeting in May 2015. It also has formed a Regulation NMS Subcommittee that will consider, among other things, the impact of Regulation NMS, including Rule 611, and whether it should be modified to reflect changes in trading technology and practices, and competition.

In October 2015, SEC staff prepared a briefing paper on the current regulatory model for trading venues and for market data dissemination.²⁹ It contrasted the regulatory model applicable to national securities exchanges, which are SROs, with that applicable to ATSs, which are registered as broker-dealers. The paper also was intended to facilitate a discussion of the SROs' role in the collection, processing, and dissemination of market data and the treatment of associated fees.

EMSAC considered issues raised in the trading venue papers at a meeting in October 2015. It also created a Trading Venues Regulation subcommittee to consider the current regulatory model for trading venues and whether it is optimally serving all market participants and the market as a whole.

5. Mitigating Broker Conflicts

Another area of focus in equity market structure is broker conflicts and how they are exacerbated or mitigated by the availability of many different trading venues. These venues offer a plethora of order types and other trading services, as well as various fees and payments related to these services. Most investors rely on their brokers to navigate market complexities of fragmented markets on their behalf, but monitoring execution quality can be difficult for even sophisticated investors.

Institutional Order Routing Transparency

SEC staff is developing a recommendation for the Commission to consider in 2016 that would expand investors' understanding of their brokers' routing decisions. Among other things, the staff's recommendation would enhance the information provided to institutional customers through standardized order routing disclosures. Requiring standardized disclosures, in combination with the recently proposed enhanced ATS operational transparency rulemaking, would be intended to provide sufficient baseline information to institutional investors to bolster their ability to: (1) assess the potential for harmful information leakage concerning their orders; (2) assess the conflicts of interest their broker-dealers may face in handling their orders;

²⁸The paper is available at <https://www.sec.gov/spotlight/emsac/memo-rule-611-regulation-nms.pdf>.

²⁹The paper is available at <http://www.sec.gov/spotlight/emsac/memo-regulatory-model-for-trading-venues.pdf>.

(3) assess the performance of a broker-dealer in handling their orders and achieving best execution; and (4) compare the services of their routing broker-dealers.

Exchange Order Type Transparency

As another means of increasing transparency in the markets, Chair White asked the exchanges in 2014 to conduct a comprehensive review of their order types and how they operate in practice.

The exchanges also were asked to consider appropriate rule changes to help clarify the nature of their order types and how they interact with each other (including a clear description of all material aspects of the operation of their order types). As a result, all of the exchanges reviewed their order types and related rules, and submitted proposed rule changes that provide substantial additional detail on their operation.

SEC Staff Papers and EMSAC Discussions regarding Maker-Taker Fee Structure and Customer Issues

In October 2015, SEC staff prepared a briefing paper on the maker-taker fee structure offered by many exchanges.³⁰ The purpose of the paper was to facilitate an objective assessment of maker-taker fees in the U.S. equity markets by outlining the development of the maker-taker fee model, summarizing the current public debate about its impact on equity market structure, and presenting both the asserted advantages and disadvantages of maker-taker fee structures. EMSAC also discussed maker-taker fee issues at multiple meetings in 2015, and its Regulation NMS subcommittee will consider approaches to a potential access fee pilot.

In January 2016, SEC staff prepared a briefing paper that was intended to facilitate consideration of certain issues affecting customers—particularly retail customers—in the current equity market structure, namely: (1) the risks of using certain order types; (2) the potential conflicts presented by payment-for-order-flow arrangements; and (3) the development of more meaningful execution quality reports.³¹ EMSAC discussed these customer issues at its February 2016 meeting and also has created a Customer Issues subcommittee to consider initiatives to protect investor interests and promote investor confidence.

6. Building Quality Markets for Smaller Companies

Smaller public companies face market structure challenges that are not the same as those of larger companies. These include the need for a sufficiently liquid market that provides their investors with a reasonably efficient means to establish and liquidate positions. A single market structure may not fit all companies, and the SEC has sought to focus concretely on how to enhance the equity market structure for smaller companies.

Tick Size Pilot

One initiative designed to address concerns about improving liquidity in the secondary market for smaller companies is the development of a pilot program that would allow smaller companies to trade at wider tick sizes. In June 2014, the SEC directed the equity exchanges and FINRA to act jointly in developing and filing a national market system plan to implement a tick pilot program. The Commission noted particularly that a pilot program could facilitate studies of the effect of tick size on liquidity, execution quality for investors, volatility, market-maker profitability, competition, transparency, and institutional ownership in the stocks of small-capitalization companies.

In May 2015, the Commission approved a plan filed by the equity exchanges and FINRA (Participants) to implement a tick size pilot program (Tick Size Pilot).³² In November 2015, the Commission issued an exemption to the Participants from implementing the Plan until October 3, 2016.³³

The Tick Size Pilot will have a 2-year duration (Pilot Period), and will include exchange-listed common stocks that have the following characteristics: (1) a market capitalization of less than \$3 billion; (2) a closing price of at least \$2 per share on the last day of the measurement period (and a closing price of not less than \$1.50

³⁰The paper is available at <https://www.sec.gov/spotlight/emsac/memo-maker-taker-fees-on-equities-exchanges.pdf>.

³¹The paper is available at <http://www.sec.gov/spotlight/equity-market-structure/issues-affecting-customers-emsac-012616.pdf>.

³²Securities Exchange Act Release No. 74892, 80 FR 27513 (May 13, 2015), available at <http://www.sec.gov/rules/sro/nms/2015/34-74892.pdf>.

³³Securities Exchange Act Release No. 76382, 80 FR 70284 (November 13, 2015), available at <http://www.sec.gov/rules/exorders/2015/34-76382.pdf>. The Tick Size Pilot was scheduled to begin in May 2016. However, in order to give the SROs and their members sufficient time to implement the Tick Size Pilot, the Commission issued the exemption to the Participants.

per share during the measurement period); (3) a consolidated average daily volume of one million shares or less; and (4) a volume-weighted average price of at least \$2 per share (Pilot Securities).

Pursuant to the Tick Size Pilot, Participants will collect data reflecting a variety of market quality metrics with respect to the Pilot Securities and transmit such data to the Commission. The collected data will be publicly available in an aggregated form. In addition, the Participants are required to conduct, and provide the Commission with, a publicly available impact assessment. The Participants are scheduled to begin collecting Tick Size Pilot data in April 2016, which is 6 months prior to the start of the Pilot Period.

The Participants have submitted to the Commission proposed rule changes to implement the quoting and trading requirements and the data collection requirements.³⁴ The Commission has approved the proposed rules to implement the data collection requirements that have been submitted, as well as one of the proposals to implement the quoting and trading proposals that have been submitted.³⁵

Venture Exchanges

On March 4, 2015, the SEC's Advisory Committee on Small and Emerging Companies held a meeting at which it considered venture exchanges and other means to increase secondary market liquidity for investors in smaller companies. Previously in 2013, this Advisory Committee had recommended the development of a separate U.S. equity market that would facilitate trading in the securities of small and emerging companies.

On March 10, 2015, the Commission submitted testimony to this Subcommittee for its hearing on venture exchanges and small capitalization companies.³⁶ The Commission stated that it was considering innovative approaches that appropriately balance the needs of smaller companies for efficient secondary markets and the interests of investors in smaller companies. It noted that venture exchanges potentially could achieve such a balance by providing investors a transparent and well-regulated environment for trading the stocks of smaller companies that offers both enhanced liquidity and strong investor protections. The Commission observed that it had previously approved a proposal for a venture exchange, but the exchange had never been launched. It emphasized, however, that, as it did with the BX Venture Market, it would carefully consider any efforts of exchanges that were particularly designed to meet the needs of smaller companies and their investors.

The Commission continues to be receptive to efforts that would appropriately balance the needs of smaller companies and the interests of their investors.

III. Conclusion

Thank you again for inviting me to discuss the SEC's efforts to strengthen the U.S. equity market structure. As is evident from the many initiatives noted above, the SEC's program for optimizing equity market structure is actively moving forward. I look forward to answering your questions.

PREPARED STATEMENT OF RICHARD G. KETCHUM

CHAIRMAN AND CEO, FINANCIAL INDUSTRY REGULATORY AUTHORITY

MARCH 3, 2016

Chairman Crapo, Ranking Member Warner and Members of the Subcommittee:

On behalf of the Financial Industry Regulatory Authority, or FINRA, I would like to thank you for the opportunity to testify today about current issues and potential regulatory changes that could improve equity market structure.

³⁴ See, e.g., Securities Exchange Act Release No. 76552 (December 3, 2015) (File No. SR-BATS-2015-108), available at <http://www.sec.gov/rules/sro/bats/2015/34-76552.pdf>; Securities Exchange Act Release No. 76229 (October 22, 2015) (File No. SR-NYSE-2015-46), available at <http://www.sec.gov/rules/sro/nyse/2015/34-76229.pdf>.

³⁵ Securities Exchange Act Release No. 77105 (February 10, 2016) (order approving BATS' rules to implement the data collection requirements of the Tick Size Pilot), available at <http://www.sec.gov/rules/sro/bats/2016/34-77105.pdf>; Securities Exchange Act Release No. 77164 (February 17, 2016) (order approving FINRA's rules to implement the data collection requirements of the Tick Size Pilot), available at <http://www.sec.gov/rules/sro/finra/2016/34-77164.pdf>; Securities Exchange Act Release No. 77218 (February 23, 2016) (order approving FINRA's rules to implement the quoting and trading requirements of the Tick Size Pilot), available at <http://www.sec.gov/rules/sro/finra/2016/34-77218.pdf>.

³⁶ A copy of that testimony is available at <http://www.sec.gov/news/testimony/testimony-venture-exchanges.html>.

In recent years, there has been increased debate about the structure of capital markets. Once the domain of regulators, market operators and large, sophisticated investors, market structure is now a topic for much broader public discourse. This discourse often includes questions about whether or not the markets are fair and whether they provide a level playing field for all investors.

Partly this concern is a reaction to volatility. For example, last August the Dow Jones Industrial Average plummeted more than 1,000 points within the first 10 minutes of trading, with message traffic nearly doubling. And the Chicago Board Options Exchange Volatility Index—the U.S. market’s so-called “fear gauge”—surged 45 percent to its highest level in nearly 4 years. While the gauge has cooled since then, it remains elevated, recently hovering around 22, which is nearly double last year’s low mark of just under 12.

While I can’t fully diagnose what may at times be ailing the equity markets, this tumult exemplifies the importance of the structure of markets for financial instruments. All of us here know today that questions of market structure can be broad and complex, and it can be difficult to home in on what really needs to be addressed. I believe there are three key aspects of the markets that securities market participants and regulators should always be working to strengthen: market fairness, market transparency and market liquidity.

SEC Chair Mary Jo White has set out a road map for potential future changes in the equity and fixed income markets, which specifically includes an important, ongoing role for FINRA and other SROs. A number of changes have already been made or are in progress; many remain under discussion and analysis. As all such changes are contemplated, it is important to consider how proposals might enhance market fairness, transparency and liquidity.

FINRA

Before I address specific market structure issues and initiatives, I’d like to provide a brief overview of FINRA and its regulatory programs. FINRA provides the first line of oversight for broker-dealers and the U.S. securities markets, and through its comprehensive regulatory programs, regulates the firms and brokers that sell securities in the United States. FINRA oversees nearly 4,000 brokerage firms and over 600,000 registered brokers. FINRA touches virtually every aspect of the broker-dealer business—from registering individuals to examining securities firms; writing rules and enforcing those rules and the Federal securities laws; informing and educating the investing public; providing trade reporting and other industry utilities; and administering the largest dispute resolution forum for investors, brokerage firms and individual brokers.

We also work behind the scenes to detect and fight fraud. In addition to our own enforcement efforts, each year we refer hundreds of fraud and insider trading cases to the Securities and Exchange Commission (SEC) and other agencies. FINRA regularly shares information with other regulators, leading to important actions that can prevent further harm to investors.

More than 10 years ago, FINRA established the FINRA Investor Education Foundation to support innovative research and educational projects aimed at improving the financial capability of all Americans. Together with the Foundation, FINRA is committed to providing investors with information and tools they need to better understand the markets and basic principles of investing—and to help them protect themselves.

In addition, FINRA operates and regulates OTC market transparency facilities that provide the public and professionals with timely quote and trade information of publicly traded equity and debt securities. They are the primary source for regulatory data on these transactions, and provide FINRA-registered firms with tools to comply with reporting obligations in secondary-market activity in fixed income and equity securities. In this role, we are continually evaluating and identifying areas where enhanced transparency can benefit investors and the markets.

Finally, and of particular relevance to today’s hearing, FINRA, directly and through our regulatory service agreements with exchanges, monitors approximately 99 percent of all trading in U.S. listed equities markets and 70 percent of the options markets. In fact, FINRA’s market surveillance systems process approximately 42 billion market events each day to closely monitor trading activity in equity, options and fixed income markets in the United States.

Evolution of Market Structure

Any sound evaluation of equity market structure should begin with an understanding of where things stand now, and how we got here. In the past 20 or so years, the equity markets have changed in many fundamental ways. Perhaps the most significant development has been the shift from human-intermediated markets

to electronic intermediation. While some observers have noted that high frequency trading (HFT) activity may be declining since its peak around 2009, it is nevertheless clear from various estimates that automated trading has become the predominant force in equities markets. We have seen many of the traditional floor-based brokers and market-maker specialists of previous years replaced by firms commonly characterized as HFT.

Market structure arrived at its current state because of several interrelated factors. Technological advancements have most obviously allowed for the rise of highly automated, low-latency trading systems capable of digitally ingesting orders, trades and news and making advanced trading decisions. Many also point to the impact of regulatory action, including Regulation ATS, decimalization, and Regulation NMS, all of which have the underlying goals of promoting competition, lowering trading costs, and enhancing best execution.

However, as SEC staff has observed recently in a number of detailed, thoughtful papers, there are no easy explanations. For example, while Regulation NMS is commonly cited as a cause of market fragmentation and the proliferation of HFT, even prior to Regulation NMS, Nasdaq had undergone a major transformation from a traditional dealer model to a new, electronic market structure. Similarly, some believe HFT owes its existence to the increase in the number of trading venues, yet HFT is also a significant force in the E-Mini futures contract, which trades in a highly centralized market.

The fact that market structure developments cannot always be easily explained does not prevent regulatory improvement. It simply underscores the need for careful data analysis. For example, the SEC's MIDAS project has been providing greatly enhanced insight into the functioning of markets and has helped provide a foundation for market structure refinements. Similarly, FINRA, through its Order Audit Trail System called OATS, collects and processes billions of order-related events each day that also helps shed light on some of the fundamental market structure policy questions.

There is undoubtedly more work to be done. The rise of automation has delivered many benefits to investors, who are now able to trade much more quickly and cheaply than ever before. But there are potential inefficiencies in today's market structure that we must continually evaluate to make sure markets are fair, transparent and liquid.

Market Fairness

Investors must have confidence that they can access current, accurate, bona fide market prices that reflect true investor supply and demand. That means that the market structure established, including the regulatory framework supporting it, must foster and promote accurate prices and low trading costs for retail investors. Having been in this business for a long time, I've been part of many significant regulatory changes that have benefited investors. However, competition and regulatory changes have also led to a more complex, fragmented market. In today's increasingly fragmented market, bad actors can consciously disperse their trading activity across markets, asset classes and broker-dealers in an attempt to hide their footprints and avoid detection. It is part of our job at FINRA to monitor what's happening in the market and ensure that the markets operate fairly.

FINRA has responsibility to oversee and regulate over-the-counter (OTC) trading of exchange-listed and non-exchange-listed securities, as well as trading in corporate and municipal debt instruments and other fixed income instruments. FINRA also conducts examinations of market making and trading firms to assess compliance with FINRA trading rules and the Federal securities laws. In addition, FINRA provides automated surveillance and other regulatory services to U.S. equity and options exchanges. FINRA has regulatory service agreements ("RSAs") in place with 10 of the 12 U.S. equity exchanges and all U.S. options exchanges. By virtue of these agreements, FINRA conducts market surveillance for approximately 99 percent of the listed equity market and approximately 70 percent of the listed options market. As a result, while the markets have become increasingly fragmented, through our contracts with exchange clients, FINRA has been able to aggregate trading data across the markets to conduct comprehensive, cross market surveillance. This is important because FINRA has found many instances where market participants have consciously dispersed their trading activity across multiple markets in an effort to avoid detection. In addition, FINRA's cross market surveillance enables us to detect those market participants who are acting in concert to engage in market manipulation schemes. We have found that such activity accounts for a significant percentage of our cross market surveillance alerts.

We developed an innovative cross-market surveillance program that allows us to run dozens of surveillance patterns and threat scenarios across the data we gather

to look for manipulation and frontrunning, as well as layering, spoofing, algorithmic gaming, and other abusive conduct. This sophisticated surveillance allows us to detect activities that we were not able to see before. For example, 51 percent of our cross-market alerts identify potential manipulative activity by two or more market participants acting in concert. And 57 percent of our cross-market alerts identify potential manipulation by a market participant on multiple markets. FINRA also is starting to design surveillance programs that will span equities and options markets together to detect potential cross-product manipulative conduct.

In addition to SEC and FINRA oversight, firms themselves have a fundamental obligation to supervise their own trading activity to ensure that the activity does not violate any applicable SEC or FINRA rules. A number of existing SEC and FINRA rules specifically govern firms' trading activities including the SEC's Market Access Rule, which requires firms with market access to have a system of effective risk management controls and supervisory procedures. Although a reasonable supervision and control program may not foresee every potential failure or prevent every undesirable consequence, it is an additional protective measure in today's regulatory structure that promotes and supports market fairness.

And as you know, in July 2012, the SEC adopted Exchange Act Rule 613 requiring 19 SROs—FINRA and the 18 national securities exchanges—to work together to jointly file a NMS plan to govern the creation, implementation, and maintenance of a Consolidated Audit Trail, or CAT, which will collect information on virtually every order and trade in equity securities and options in the United States. The CAT will be the world's largest repository of securities data, processing approximately 58 billion records on a daily basis.

FINRA strongly supports the SEC's action to require the development of the CAT, an important initiative that will even further enhance regulators' ability to conduct surveillance of trading activity across multiple markets and perform market reconstruction and analysis. Comprehensive intermarket surveillance is essential to ensuring the overall integrity of the U.S. securities markets and maintaining the confidence of investors in those markets.

Market Transparency

Transparency is of paramount importance to the equity markets. The SEC said recently, and I agree, that transparency is a primary tool by which investors protect their own interests. To this end, the FINRA Board of Governors formed a Working Group to assess FINRA's rules and regulatory programs related to HFT, which resulted in a series of initiatives designed to increase the scope of trading information FINRA receives and provide more transparency into trading activities to market participants and investors.

In general terms, these efforts include a call for alternative trading systems (ATSs) to provide more in-depth order information for regulatory surveillance, greater transparency of volume executed away from stock exchanges, more granular audit trail information and tighter restrictions around allowable clock drift to better ensure proper sequencing of events.

These initiatives build on an earlier initiative from 2014, when FINRA began publishing on its Web site weekly volume information regarding transactions in equity securities executed within ATSs. Since that time, FINRA has been considering additional data that may be useful to market participants and investors and is expanding this initiative to provide more insight into larger-sized, or "block," trades. Later this year, FINRA will begin publishing monthly aggregate ATS block trading statistics, which will provide interested parties with more detailed information on ATS trading activities, thus further enhancing transparency in the over-the-counter market. In addition, FINRA will be further expanding its transparency initiative by publishing the remaining equity volume executed over-the-counter by FINRA member firms, including the trading activity of non-ATS electronic trading systems and internalized trades. The ATS and non-ATS volume data on FINRA's Web site will be free of charge to all users.

Data from FINRA's ATS transparency initiative helped inform the SEC's recent proposal to significantly revise the disclosure regime for NMS Stock ATSs. The SEC's proposal would, among other things, require greater public disclosure concerning the operation of business dealings of NMS Stock ATSs and would provide for enhanced oversight of these ATSs' filings. As it stated in its recent comment letter on the proposal, FINRA fully supports the proposal's objective of enhancing market transparency.

Market Liquidity and Volatility

Since the May 2010 Flash Crash, the SEC, FINRA and U.S. stock exchanges have implemented a variety of initiatives to minimize the impact of extreme volatility,

the causes of which can vary from market forces to technological malfunctions. These initiatives have created a multi-faceted safety net for the markets and are designed to promote investor confidence. Among the changes, regulators adjusted the market-wide trading pause, which gives market participants an opportunity to assess their positions, valuation models and operational capabilities when extreme periods of volatility occur.

On top of that, FINRA and the exchanges implemented a limit up/limit down initiative, which addresses the type of sudden price movements that the market experienced during the Flash Crash. Under the plan, a limit up and limit down mechanism prevents trades in NMS stocks from occurring at prices outside of certain ranges. And if the changes in price are more significant and prolonged, the limit up/limit down plan would trigger a trading pause in that security.

We had an excellent opportunity to evaluate the effectiveness of these changes last August 24th, when the Dow plummeted more than 1,000 points within the first 10 minutes of trading. The events of that day illustrated not a market out of control, but the value of having appropriate controls in place. Were it not for the limit up/limit down procedures, the market fluctuations last August would have been more dramatic. There were over 1,200 trading pauses that day, with over 1,000 occurring in exchange-traded products (ETPs), many which were repeats in the same ETP.

Clearly, the August events showed these processes are serving a crucial function, but also showed that additional refinements are necessary. One of the issues that day was the big gaps between the value of underlying indexes and the exchange-traded funds (ETFs) that track them. ETFs combine aspects of mutual funds and conventional stocks. They operate like a mutual fund by offering an investor an interest in a professionally managed, diversified portfolio of investments. Unlike mutual funds, however, ETF shares trade like stocks on exchanges and can be bought or sold throughout the trading day at fluctuating prices, whereas mutual funds are priced just once at the end of the trading day. On August 24th, unusual trading affected many of the major ETFs as well as many less liquid ones. While trading volume surged, public display of trading interest—or liquidity—dropped. And we saw pricing volatility in ETFs because of the conflicts between halts on the underlying stocks within the indices and the pricing of the index.

The volatility and the issues we saw with ETFs offers up a great opportunity for regulators to take another look at the effectiveness of the initiatives put in place after the 2010 Flash Crash, as well as our market structure generally. Among the issues ripe for review are the opening processes on primary listing exchanges; the operation of the limit up/limit down at the opening of trading, at re-openings after a trading pause and where the price is rebounding; the use of single market prices rather than consolidated prices for index calculations at times when the primary market opens outside its normal process; the use of stop orders, which become market orders when triggered and can execute at a price substantially worse than anticipated by the investor, particularly in volatile markets; and whether market-maker quoting obligations are stringent enough to promote market stability.

Liquidity in the U.S. markets has thrived because of confidence in the markets. Investors need to be sure that markets will operate predictably. And it's important for us as regulators to implement programs that minimize the impact of market volatility and to limit market disruption while also promoting an efficient price discovery that encourages the provision of liquidity.

Work of the SEC's Equity Market Structure Advisory Committee

As noted in the Subcommittee's invitation to testify, the questions enumerated above as well as a number of other market structure issues are also being considered by the SEC's Equity Market Structure Advisory Committee (EMSAC), of which I am a member. In addition, given the number and broad ranging issues to address, the EMSAC created four subcommittees to focus on specific equity market structure areas: Regulation NMS, Trading Venues Regulation, Customer Issues and Market Quality. These subcommittees have met several times between full EMSAC meetings. Both the SEC staff and EMSAC members have dedicated significant time and effort with good progress being made, and I look forward to seeing where the process takes us.

EMSAC discussions have ranged from more broad, thematic topics such as increased coordination between the equities and futures markets to more specific regulatory and market-based improvements, like retail investors' use of certain order types. For example, discussions have included efforts to update the SEC's rules on the public disclosure of execution-quality statistics and order-routing practices. These rules brought much needed transparency to the markets when they first were adopted, but market structure has been largely transformed since then and they are in need of updating to better reflect the current market structure.

In addition, the committee is reviewing the current regulatory model for exchanges and other trading venues, as well as the current state and impacts of Regulation NMS. In particular, the EMSAC and its subcommittees are considering whether the Regulation NMS rules on limiting trade throughs, capping access fees, and preventing locked or crossed markets continue to serve their intended purpose. These rules were generally intended to bolster investor protection when they were adopted, but some market observers have questioned whether they might also have contributed to market fragmentation and rebate arbitrage.

The EMSAC also is actively considering many of the questions about market volatility highlighted above, including the operation of limit up/limit down and whether firms could better educate their customers about the risks of market and stop orders. This issue is one example of a place where FINRA believes it can work in parallel to complement EMSAC efforts. Guided by the recent EMSAC discussion, and based on FINRA's own regulatory analysis, FINRA is currently considering providing additional guidance to firms to underscore the importance of investor education in this area. The EMSAC has heard a variety of views on these important market structure questions, which is why, as I noted above, I believe it is critical to use data as the guide forward as we evaluate how any potential changes may impact market fairness, transparency and liquidity. I look forward to continuing to offer my and FINRA's experience and expertise as the EMSAC moves forward with its work.

Small Company Issues

Issues related to small company issues deserve careful consideration as well. FINRA has been involved in several projects focused on this segment of the market.

Tick Size Pilot Program

On May 6, 2015, the SEC approved an NMS Plan submitted by the SRO Participants to implement a Tick Size Pilot Program. The Order approved the NMS Plan for a 2-year period, which is to commence on October 3, 2016. The Plan is designed to allow the Commission, market participants, and the public to assess the impact of increment conventions (commonly referred to as tick sizes) on the liquidity and trading of the common stock of small-capitalization companies. The Tick Size Pilot is a data-driven test and will evaluate whether or not widening the tick size for securities of smaller capitalization companies would impact trading, liquidity and market quality of those securities. The pilot will consist of a control group and three test groups, with each test group having approximately 400 securities. Each SRO Participant, including FINRA, is required to comply, and to enforce compliance by its member organizations, as applicable, with the provisions of the Plan. The SROs have filed rule changes in furtherance of the Pilot and have been working closely with the industry on implementation issues, including the data reporting requirements necessary to allow for effective data and impact analysis of the different test groups.

JOBS Act Implementation

In order to fulfill our mandate under the JOBS Act crowdfunding provisions, we filed proposed rules and forms with the SEC for SEC-registered funding portals that become FINRA members. FINRA streamlined the rules to reflect the limited scope of activity that Congress permitted to funding portals while also maintaining investor protection. The SEC approved FINRA's Funding Portal Rules, which became effective on January 29, 2016. FINRA's systems were ready as of that date to begin receiving applications from prospective funding portals. FINRA's regulatory program is fully prepared for the May 16, 2016, effective date of the SEC's Regulation Crowdfunding.

Conclusion

FINRA appreciates this opportunity to discuss these important market structure issues and its programs with the subcommittee. We remain committed to working closely with the SEC, other regulators, this subcommittee and the full committee as we continue to work toward our dual mission of protecting investors and safeguarding market integrity.

ADDITIONAL MATERIAL SUPPLIED FOR THE RECORD



THE CHAIR

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

December 23, 2014

The Honorable Tim Johnson
Chairman
Committee on Banking, Housing,
and Urban Affairs
United States Senate
534 Dirksen Senate Office Building
Washington, DC 20510-6075

Senator Mike Crapo
Ranking Minority Member
Committee on Banking, Housing,
and Urban Affairs
United States Senate
534 Dirksen Senate Office Building
Washington, DC 20510-6075

Dear Chairman Johnson and Ranking Member Crapo:

Thank you for your December 8, 2014 letter regarding the SEC's progress in its review of equity market structure, which has been a top priority of mine since joining the Commission. The U.S. equity markets are engines of capital formation and economic growth and, as you note, are the preferred destination for investors and companies throughout the world. We are working to help ensure that the equity markets remain the deepest and fairest in the world. As such, I appreciate the opportunity to update you on our progress.

I was pleased that the empirical evidence of improved equity markets for investors was widely recognized at your Committee's July 2014 hearing. As you note in your letter, the SEC is the steward of the equity markets, and we must continue to assess them to ensure that they serve their vitally important role in promoting economic growth. Our markets are certainly not in any way broken, but they also are not static nor without issues to address. In a real sense, our work on market structure is never finished – the speed with which technology and markets change makes that impossible. Instead, we must always be focused on what in our market structure can be improved for the benefit of investors and companies.

While, of course, work remains to be done, the SEC has made significant progress on a number of market structure issues. Among other matters, recently the SEC has:

- Adopted Regulation Systems Compliance and Integrity ("Regulation SCI"), creating for the first time mandatory technology and systems standards and reporting for significant market participants;
- Published a proposal for a tick size pilot for smaller and less liquid issuers;
- Requested that all exchanges conduct an in-depth analysis of order types and report those findings to the staff, and to disclose how they use securities information processor ("SIP") feeds and direct feeds;
- Asked the exchanges and the SIPs to incorporate a time stamp in their data feeds, to facilitate greater transparency on the issue of data latency; and

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- Brought a number of significant enforcement actions for violations of market integrity rules.

Your letter included four specific requests for information relating to the SEC's equity market structure program. Responses to your requests are set forth below.

1. Please indicate what progress has been made at the SEC since your October 2013 speech regarding an equity market structure review and review of regulations, including Regulation NMS.

At my direction, SEC staff is pursuing a broad and ambitious market structure agenda. Below is a high level description of those efforts.

High Frequency Trading and Fairness

Over the last year, debate has centered on high frequency trading, speed, and fairness. These have been important issues for some time. Algorithmic trading, which includes high frequency trading and a large percentage of institutional trading, likely represents a majority of trading volume. Traders using algorithms employ a variety of low latency tools, including (1) co-located servers in exchange data facilities and (2) direct data feeds from exchanges rather than the consolidated data feeds. Much of the recent public focus has been on high frequency trading firms, but it is important to remember that the exchanges are required to make these low-latency tools available on terms that are equitable and not unfairly discriminatory, and that agency brokers are as likely to use these tools on behalf of their customers as high frequency trading firms are to use them for their own accounts.

We and the self-regulatory organizations ("SROs") are working on targeted initiatives to help ensure that today's computer-driven trading environment works optimally for investors. In particular, SEC staff is preparing a series of recommendations for the Commission to consider as ways to strengthen regulatory oversight over algorithmic trading, including active proprietary trading firms and their strategies.

One of these recommendations is for an anti-disruptive trading rule. Such a rule proposal would address the use of aggressive, destabilizing trading strategies in vulnerable market conditions when they could most seriously exacerbate price volatility. Any such rule would need to be carefully tailored to apply to active proprietary traders in short time periods when liquidity is most vulnerable and risk of price disruption caused by aggressive short-term trading strategies is highest. SEC staff also is working on a recommendation for a rule to clarify the status of unregistered active proprietary traders to subject them to our rules as dealers, and for a rule proposal eliminating an exception from FINRA membership requirements for dealers that trade in off-exchange venues. Finally, the staff is preparing recommendations for rules designed to improve firms' risk management of all types of trading algorithms and to enhance regulatory oversight of their use. I anticipate that the SEC will consider these recommendations in 2015.

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In addition to these SEC efforts, the SROs have been directed to address concerns about the integrity and fairness of their markets. For example, to help investors and market participants monitor the latency of consolidated data feeds, I asked the SROs to consider including a time stamp in those feeds that indicates when a trading venue processed the display of an order or execution of a trade. The SROs have since decided to add such a timestamp. The purpose of the new timestamp is to enable users of consolidated data to calculate the difference between the existing outbound timestamp and the matching engine timestamp of an exchange when an order or trade occurs. The exchanges and FINRA also are enhancing their clock synchronization procedures to improve the comparability of the timestamp information across different venues. This new information will give consolidated data users a significantly better empirical basis to assess the latency of the consolidated data feeds, both on average and during stressed trading conditions. The exchanges and FINRA have announced that the change will be implemented in April 2015.

As referenced in my public remarks in June, I also asked the exchanges to develop proposed rule changes to disclose how – and for what purpose – they are using consolidated and direct data feeds. All of the exchanges have now submitted such filings describing their practices. The filings provide much improved transparency for investors and the public on how the exchanges operate.

In addition, in September 2014, the FINRA Board, responding in part to the program laid out in my June speech, authorized its staff to issue a notice to members seeking comment on a proposal to establish a registration requirement for associated persons who are: (1) primarily responsible for the design, development or for directing the significant modification of an algorithmic strategy; or (2) responsible for supervising such functions. The FINRA Board also authorized its staff to publish a notice to members reminding firms of their existing supervisory obligations with regard to the development and deployment of algorithmic trading strategies.

Market Transparency and Trading Venue Regulation

The volume of trading executed at off-exchange venues that do not publicly display quotations has increased steadily from approximately 25% in 2009 to approximately 35% today. Dark venues lack transparency, however, in other important respects beyond simply not displaying quotations. Although the trades of dark venues are reported in real time, the identity of the dark venue is not disclosed to the public, and dark venues generally provide limited information about how they operate. The SEC and FINRA, as the primary self-regulator for the off-exchange market, are taking important steps to enhance transparency in this aspect of the market.

In May 2014, FINRA began disseminating aggregate information on the trading volume of individual alternative trading systems (“ATSs”). This summer I publicly recognized this important step toward greater market transparency, and noted that ATSs represent less than half of dark venue volume. I also supported FINRA in considering expansion of its trading volume disclosure regime to off-exchange market makers and other broker-dealers. In September 2014,

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the FINRA Board responded by authorizing its staff to publish a notice to members soliciting comment on a proposal to expand its transparency initiative to all off-exchange venues.

While some operators of dark venues have begun to offer greater transparency about their operations, a broader effort is needed. To this end, SEC staff has been preparing a recommendation to expand the information that ATSs disclose to the SEC about their operations and, for the first time, to make ATS operational information available to the public. I anticipate that the Commission will consider such a recommendation in 2015.

Mitigating Broker Conflicts

In a market structure with many different trading venues, investors should be able to rely on their brokers to navigate the dispersed market ecosystem on their behalf. But the number of trading venues and order types available to brokers make monitoring the execution quality and costs of orders difficult for even the most sophisticated investors. For example, the cost to the broker for executing in various venues can vary widely. Some venues make payments directly to brokers as a means to attract particular types of order flow, including the liquidity rebates paid by exchanges that use a maker-taker fee structure.

Order Routing Practices. To help enhance the transparency of broker routing practices, SEC staff has been preparing a recommendation for a rule requiring disclosure of customer-specific information that a broker would be expected to provide to each institutional customer on request. The staff's work will be helped considerably by the ongoing industry efforts in this direction. In October 2014, the Investment Company Institute, Managed Funds Association, and the Securities Industry and Financial Markets Association jointly submitted to the SEC an order routing disclosure template. It sets out minimum disclosures for order routing and execution quality information that institutional investors could request from their brokers. Staff is considering this template, and I anticipate a recommendation in this area will be considered by the SEC in 2015.

Order Types. Another source of broker conflicts is the large number of complex order types offered by the exchanges. These order types have been a recent focus of the SEC's examination program. The majority of these order types are designed to deal with the maker-taker fee model and the SEC's rule against locking quotations. To help brokers and their customers better understand the types of orders offered by an exchange and how they operate, this past summer SEC staff requested that the exchanges conduct a comprehensive review of their order types and how they operate in practice. All of the exchanges have conducted this order type review. As part of the review, the exchanges considered appropriate rule changes to help clarify the nature of their order types, how they interact with each other, and how they support fair, orderly, and efficient markets. SEC staff has analyzed the reviews performed by the exchanges, and the exchanges currently are working on filings that will reflect those reviews. The filings will be published for comment, and I anticipate they will greatly enhance public transparency about this aspect of exchange operations.

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Engagement on Key Issues

While our review already has resulted in discrete actions targeting specific issues, the more fundamental policy questions demand – and are receiving – close and continuing attention. While we are not seeking perfect solutions, our regulatory changes must be informed by clear-eyed, unbiased, and fact-based assessments of the likely impacts – positive and negative – on market quality for investors and public companies. Continued engagement by all market participants on these issues is critical.

To facilitate this engagement, SEC staff, among other initiatives, is working on discussion papers focused on key issues that will provide a framework for further analysis. These papers will identify areas that the staff is focused on and where the perspectives of all market participants are essential. These papers will be posted on the SEC’s market structure website. I anticipate that the first papers in this series of initiatives will address three fundamental policy questions on which many hold strong, and often-varying, views: (1) the trade-through restrictions in Rule 611 of Regulation National Market System (“Regulation NMS”) and whether they should be rescinded or modified; (2) the current regulatory model for exchanges and other trading venues and whether it makes sense for today’s markets; and (3) the maker-taker fee structure, including the related issue of restrictions on locking and crossing quotations in Rule 610 of Regulation NMS.

2. Please indicate what is being done to ensure that the existing equity market structure is resilient and durable.

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 this end, the SEC has taken a multi-layered approach employing SEC regulation, examination, and enforcement along with important SEC-directed initiatives by the SROs to address and prevent technological failures in the markets. Perhaps the most important focus of our efforts is operational integrity. In the October 2013 speech you reference in your letter, I highlighted the need for progress in this area, particularly with respect to (1) Regulation SCI, which had been proposed in March 2013, and (2) the efforts of the relevant SROs – the equity exchanges and FINRA – to enhance critical market infrastructures, launched immediately after the disruptive shutdown of the NASDAQ consolidated data processor in August 2013. I am pleased that the SEC adopted Regulation SCI in November 2014 and that the SROs have made substantial progress in enhancing the market infrastructure.

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 conducted inspections of the trading and related systems of national securities

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exchanges and associations, certain ATs, clearing agencies, and SIPs to assess their information technology programs, identify weaknesses, and recommend improvements.

To strengthen this regulatory regime, Regulation SCI has superseded and replaced the ARP inspection program with a mandatory set of expanded and more robust rules. I believe that the new rules mark an historic shift in the SEC's regulation of the U.S. securities markets. They will better protect investors by mandating comprehensive new controls for the technological systems that form the core of our current markets. The rules also provide comprehensive mandatory reporting to market participants and the SEC and greater accountability for those responsible for our critical market systems, helping ensure that such systems operate effectively and that any issues are promptly corrected and communicated to those who need to know. Further, the staff is considering proposals to extend the principles of Regulation SCI to other classes of registrants.

Under Regulation SCI, the SROs, ATs that exceed certain trading volume thresholds, market data plan processors, and certain exempt clearing agencies will be required to have comprehensive policies and procedures in place for their technological systems. The rules also provide a framework for these entities to, among other things, take appropriate corrective action when systems issues occur; provide notifications and reports to the SEC regarding systems problems and systems changes; inform members and participants about systems issues; conduct business continuity testing; and conduct annual reviews of their automated systems.

Critical Market Infrastructure

Following the interruption of trading in NASDAQ-listed securities in August 2013 that resulted from the failure of the NASDAQ SIP for several hours, I requested that the leaders of the SROs promptly enhance the technological resilience of the consolidated market data systems and other critical market infrastructure. In November 2013, the exchanges provided the SEC with their short- and long-term action plans for addressing these issues and, since then, have begun implementing them.

With respect to the SIPs, audits were performed on 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 also have advanced new backup recovery processes for each SIP. In June 2014, each SIP was 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 relatively short timeframe.

As you note in your letter, the SIPs recently have experienced disruptions. Thanks to the improved backup facilities, these recent problems were much more short-lived than the lengthy interruption in August 2013. The recent disruptions, however, have offered valuable lessons in further shortening the time needed to failover to backup sites and resume normal operations. The SROs are working to incorporate these lessons learned in their backup recovery processes. 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

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failed. Several equity exchanges have already rolled out new kill switch mechanisms and are actively encouraging use of these new risk monitoring tools by their member firms.

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. 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 staff will assess the operation of the limit up-limit down mechanism during the pilot period, and propose further adjustments as warranted.

Prior to expiration of the pilot, the SEC and the public will have the opportunity to review statistical analyses by the SROs, as well as by the SEC’s Division of Economic and Risk Analysis (“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.

The trading in Apple Inc. (AAPL) on December 1, 2014 provides a good example of how the plan operates. At 9:49:55 a.m., AAPL dropped 5.35% in 48 seconds (down 6.35% from its opening price). The price bounced on and off the limit down band for the next few seconds, without remaining there for the length of time that would have triggered a trading pause and reopening. At this point, the price reversed and more than half of the rapid drop was erased in the next 10 minutes. In this respect, the plan worked as intended to moderate a rapid price move and reversal that, in the absence of a volatility moderator, might have been much more severe.

Enforcement

It is critical that market participants and, in particular, those that play key roles in securities transactions – namely, exchanges, ATSS, 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. Below are four recent examples:

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- In December 2014, the SEC penalized Morgan Stanley & Co. LLC for violating the Market Access Rule¹ when it failed to uphold credit limits for a customer firm with a rogue trader who engaged in fraudulent trading of Apple Inc. stock. Morgan Stanley agreed to pay a \$4 million penalty for violating the Market Access Rule.
- In July 2014, LavaFlow Inc. agreed to pay \$5 million, including a \$2.85 million penalty, to settle SEC charges concerning its LavaFlow ECN ATS for failing to establish adequate safeguards and procedures to protect the LavaFlow ECN subscribers' confidential trading information and failing to amend its Form ATS regarding material changes to the LavaFlow ECN's operations.
- 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 May 2013, 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.

¹ The Market Access Rule is designed to reduce the risks faced by broker-dealers, as well as the markets and the financial system as a whole, as a result of various market access arrangements, by requiring effective financial and regulatory risk management controls reasonably designed to limit financial exposure and ensure compliance with applicable regulatory requirements to be implemented on a market-wide basis. In addition, the rule is designed to ensure that broker-dealers appropriately control the risks associated with market access, so as not to jeopardize their own financial condition, that of other market participants, the integrity of trading on the securities markets, and the stability of the financial system.

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3. Given the importance of an equity market structure being holistic, data driven and empirically based, please indicate what data analysis and formulation for a holistic review has the SEC conducted to date and when will the SEC provide the public with the ability to comment on such a review in order to inform it.

Another focus of my October 2013 speech was the need to ground market structure assessments in empirical evidence. At that time, I announced the rollout of a new SEC website devoted exclusively to equity market structure. The website is intended to serve as a central location to publicly share data, research, and analysis relating to equity market structure and to provide the public a forum to review the information and express their views. Over the last year, SEC staff has populated the website with data highlights and research papers that address many of the most pressing market structure questions. These include the speed of trading, order cancellations, high frequency trading, market fragmentation, off-exchange trading, and market quality for small cap stocks. These and other initiatives to promote a better empirical understanding of the equity markets are discussed below.

Of course, enhancing our empirical understanding of the equity markets is not an end in itself. Rather, the ultimate objective is to sharpen our assessments of market structure and rules and, where needed, initiate appropriate steps to improve them. As discussed above, a number of specific regulatory steps have been, or are being, taken to improve equity market structure. In addition to these steps, the broader policy questions, such as those raised by our review of Regulation NMS, the self-regulatory model for exchanges, and the maker-taker pricing model, demand, and are receiving close attention at the SEC.

The SEC's website dedicated to market structure data and analysis currently provides a wealth of information about the equity markets. Part of this initiative is to disseminate data and related observations drawn from the SEC's Market Information and Data Analysis System ("MIDAS"). These data highlights address a wide range of topics, including the nature and quality of displayed liquidity across the full range of U.S.-listed equities – from the life-time of quotes to the speed of the market to the nature of order cancellations. The website allows users to explore these key metrics and trends based on aggregate analyses of tens of billions of MIDAS records over the last two years.

In addition to these data highlights, SEC staff has posted research papers on the website based on analyses of regulatory data and on MIDAS data. SEC staff in DERA has posted two papers that examine data from FINRA's Order Audit Trail System that shed light on the extent and nature of activity at off-exchange trading venues. One paper addresses trading in ATSS, and another addresses the larger share of off-exchange trading executed by non-ATS broker-dealers. The scarcity of data on off-exchange trading has limited the extent to which investors and other market participants are able to assess how orders are handled and executed by these venues. The papers are intended to provide basic descriptive statistics on this segment of the equity markets and to serve as a resource inside the SEC as well as to the public.

In addition, staff in the Office of Analytics and Research in our Division of Trading and Markets has posted a paper that uses MIDAS data to characterize the market for small

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capitalization equities ("Small Cap Paper"). It tabulates some widely-used market quality measures, such as quoted and effective spreads and trading volume, as well as the aggregate displayed depth of the limit order book for these stocks. Among other things, this data analysis is particularly useful in assessing the impact of widening tick sizes for smaller companies (discussed in response to Request No. 4 below). If a pilot is implemented widening tick sizes for such companies, the paper will provide a valuable baseline for assessing performance of the pilot.

The SEC website also includes two research literature reviews that summarize working papers and published research examining empirical data relevant to equity market structure. One such review addresses the topic of market fragmentation, both visible and dark, and the other addresses high frequency trading. The research was conducted by academics, regulators, and others, and offers one of the most significant sources of empirical analysis of market structure questions. For example, these reviews collectively summarize 56 papers that reflect the work of 75 authors and co-authors and are intended to make this valuable source of information more accessible to the public.

Another rich source of information on the U.S. equity markets can be found in the public comment file for the SEC's 2010 Concept Release on Equity Market Structure. The file currently includes more than 400 comments submitted since the Release was published. It has continued to provide a forum for a wide range of market participants and others to submit their views throughout 2014.

In addition to these existing sources of information on the U.S. equity markets, I anticipate that, as we move forward with our rulemaking program in 2015, a wealth of relevant data will be included in the proposing releases to support the proposals and to help the public in formulating their views. All of the proposals, of course, will provide a full opportunity for public comment prior to the SEC considering them for adoption.

Moreover, as discussed above, SEC staff will be populating the SEC market structure website with discussion papers focused on key issues that are designed to provide a framework for analysis. These papers will identify areas that the staff is focused on and where public perspectives are essential. Importantly, these papers are not designed to support specific policy recommendations. Rather, they will serve as neutral briefing papers that provide relevant empirical data and lay out a range of potential approaches to addressing the issues. The papers will be available on the SEC's website and will give the public an opportunity to review the materials and respond with their own views.

In addition, I also have recommended to the Commission the creation of a new SEC Market Structure Advisory Committee to be composed of experts with a diversity of backgrounds and viewpoints. I anticipate that this Committee will be formed soon and that it will serve as an additional forum and resource for market structure initiatives.

Finally, I should note that over the course of the past year SEC staff has been actively monitoring and supporting the efforts of the SROs as they have been developing a national

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market system plan to create, implement, and maintain a consolidated audit trail for the U.S. securities markets. The consolidated audit trail would capture customer and order event information for all exchange-listed securities, across all markets, from the time of order inception through routing, cancellation, modification, or execution. As a result, the consolidated audit trail would, for the first time, give regulators access to comprehensive and timely information about orders across the U.S. securities markets, which should, among other things, substantially enhance the SEC's ability to conduct data driven and empirically based market structure assessments.

4. What is the SEC currently doing to address the market structure concerns of small companies and to ensure a liquid secondary market for small company stocks?

The market structure for stocks of smaller companies is one area that demands attention. I have previously emphasized that we should no longer assume that our market structure should be "one-size-fits-all." As a step in this direction, SEC staff has been moving forward on work with the equity exchanges to develop a plan to implement a pilot program that would allow smaller companies to use wider tick sizes – one of the initiatives recommended in 2013 by the SEC's Advisory Committee on Small and Emerging Companies.

I am pleased that these efforts have progressed over the last year. In November 2014, the SEC published for public comment a national market system plan submitted by the SROs to implement a tick size increase for the stocks of smaller companies. The comment period ended on December 22, 2014, and we will closely consider the comments in assessing how to proceed.

The need to focus on small company market quality also is highlighted by the Small Cap Paper noted above. This paper, which was posted on the SEC's website in September 2014, provides additional evidence of the need to devote appropriate attention to this segment of the market. It finds that all metrics of market quality are significantly inferior for smaller capitalization companies compared to mid-sized companies. While these metrics of market quality can be expected to be less favorable for smaller companies as compared to larger companies, the extent of the disparity documented in the Small Cap Paper highlights the need to consider steps that might lead to improvements for smaller companies that at least narrow the gap.

The proposed tick size pilot plan is one such initiative that potentially could generate useful data. Such a pilot also raises potential risks, as evidenced by a recommendation of the SEC's Investor Advisory Committee that the SEC should not conduct such a pilot program. The Investor Advisory Committee was concerned that a pilot that widens the minimum quoting increment would disproportionately harm retail investors because their trading costs would rise. After the comment period expires on the proposed plan, we will closely consider the views of all commenters in deciding whether and how to proceed with the plan and whether it should be modified in some respects.

Aside from the tick size initiative, innovative efforts by exchanges and the securities industry provide a potentially promising avenue of improvement for small company markets.

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The Advisory Committee on Small and Emerging Companies has recommended that the SEC should facilitate and encourage the creation of a separate equity market for smaller companies. One of the strengths of our current competitive market structure is that it affords trading venues considerable flexibility in designing business models to address particular segments of the market. I would welcome industry efforts in this direction. The design of the market can evolve competitively, employing industry expertise with appropriate SEC review, as well as through direct regulatory action when necessary. I am open to requests that would facilitate industry efforts, such as through the use of the SEC's general exemptive authority or its authority to create subsystems of stocks in the national market system.

In addition, as you note in your letter, the SEC's Advisory Committee on Small and Emerging Companies has submitted recommendations to improve the equity markets for smaller companies in other ways. Among other things, these include tailoring the SEC's offering and reporting requirements to the needs of smaller companies. Staff in the Division of Corporation Finance is considering these recommendations and other potential reforms, with a focus on reforms that could facilitate the secondary market trading of securities issued by small businesses. This will be particularly important upon completion of the JOBS Act's Regulation A+ and crowdfunding rulemakings, as the ability to resell privately-issued shares in the secondary markets will be critical to attracting potential investors. Obviously, any potential reforms will be considered carefully and would ultimately be subject to public notice and comment rulemaking, including a thorough economic analysis.

Thank you again for your inquiry. If you have additional question, please call me at (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