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COMPUTERIZED TRADING VENUES: WHAT SHOULD THE RULES OF THE ROAD BE?

HEARING

BEFORE THE

SUBCOMMITTEE ON
SECURITIES, INSURANCE, AND INVESTMENT

OF THE

COMMITTEE ON
BANKING, HOUSING, AND URBAN AFFAIRS
UNITED STATES SENATE

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SECOND SESSION

ON

EXAMINING COMPUTERIZED TRADING VENUES

DECEMBER 18, 2012

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C O N T E N T S

TUESDAY, DECEMBER 18, 2012

WITNESSES

COMPUTERIZED TRADING VENUES: WHAT SHOULD THE RULES OF THE ROAD BE?

TUESDAY, DECEMBER 18, 2012

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

The Subcommittee met at 9:31 a.m., in room SD–538, Dirksen Senate Office Building, Hon. Jack Reed, Chairman of the Subcommittee, presiding.

OPENING STATEMENT OF CHAIRMAN JACK REED

Chairman REED. Let me call the hearing to order, and let me welcome our witnesses. I thank my colleague, the Ranking Member, Senator Crapo, for joining us this morning.

This hearing will be focused on how computers, market regulation, and competition have dramatically changed equity markets in the United States. In recent decades, the United States equity markets have experienced tremendous technological innovation and intensified competition between an expanding set of trading venues, some of which have been driven by regulatory changes.

As of December 2012, there are 13 official stock exchanges registered with the Securities and Exchange Commission. In addition, there are nearly 40 ATSs, alternative trading systems, through which broker-dealers can access the market. Included among the ATSs are the so-called dark pools that do not publicly display quotes or prices. There are also more than 200 broker-dealers that execute orders in-house in a process known as "internalization." In short, liquidity has fragmented over numerous trading venues as competition has intensified.

Two SEC regulations dramatically changed or accelerated changes in the structure of our financial markets. In 1998, the Securities and Exchange Commission adopted Regulation ATS to encourage the development of innovative new market centers. Regulation ATS exempted these alternative trading systems from having to register as exchanges. And in 2005, the SEC adopted Regulation National Market System, or Regulation NMS, a series of rules and regulations designed to modernize and strengthen the national market system for equities. Implemented in 2007, Regulation NMS is credited by some to have caused the biggest change of the two by requiring that orders be sent to the trading platform with the best price.

The adoption of Regulation ATS and Regulation NMS led to a proliferation of new trading platforms. It also put a premium on speed, giving an advantage to firms that could place orders first and take advantage of minuscule price differentials between the trading venues. Such high-frequency, computer-based training has grown in recent years, representing about 50 percent of equity trading in the United States. High-frequency trades employ many different automatic strategies with rapid orders and short-term holding periods. High-frequency trading, advanced computer technology, and trading strategies have led to changes in the marketplace that minimize latency or the time it takes to send and execute a trade.

In response to the demand for faster execution, exchanges are allowing trading firms to place or collocate their service in the exchanges' data centers. Some trading venues also allow direct access through which certain trading firms access the exchanges' matching engine directly. Exchanges also offer direct data feeds on a proprietary basis to their customers. These feeds cost more, but the data arrives sooner. It has been reported that some exchanges and trading firms have developed an ultra-fast micro wavelength to provide even faster speeds.

The growth of new trading venues and the increasing use of automation and advanced computing technology have raised questions about the effect that these changes have had on the stability, fairness, and integrity of our marketplaces. Flash Crash, the BATS and Facebook IPOs, and Knight's trading debacle all bring into question the very rules that govern our market structure.

Do market rules reflect the realities of today's market structure? Are the markets fair and transparent? Is the marketplace too complex or to fragmented? Should all markets have the same rules? Is there a great potential for systemic risk propagation as a result of the interconnection of highly computerized markets? Or, essentially, the ultimate question, do the rules of the road need to be changed?

I look forward to our witnesses' testimony and a robust discussion of these issues.

I will now turn to my colleague Senator Crapo and thank him for his indulgence for my long opening statement. Thank you.

STATEMENT OF SENATOR MIKE CRAPO

Senator CRAPO. Thank you very much, Mr. Chairman. I appreciate you holding this important hearing today. It is our second in a series of hearings on computerized trading.

At our last hearing, we heard from witnesses representing the buy side: high-frequency traders and the research and advisory firms. Today we are going to hear from witnesses representing exchanges and alternative trading venues.

Because there have been too many market disruptions caused by software errors since the Flash Crash of 2010, there has been a lot of discussion on how to fortify our markets during times of market stress.

In October, the Securities and Exchange Commission held a Technology Roundtable on how to minimize trading errors and market malfunctions as well as how to respond to them in real

time. The use of kill switches, automated switches that would turn off trading at securities firms when their volume exceeded preset maximums, appears to be the first choice of many market participants. Our market infrastructure should be able to handle a trading error or technology failure in an appropriate way to minimize disruptions.

I am interested in learning more about how effective kill switches can be and what their effectiveness is with regard to other safeguards.

I also look forward to hearing from our witnesses about how the industry, working with the SEC, has made progress in implementing kill switches since the Technology Roundtable. In addition, I look forward to a discussion about the changing landscape of our securities markets and how different trading venues impact investor protection, market integrity, and capital formation.

Our witnesses today provide a deep expertise on these and other issues, and I appreciate them being here and bringing us their expertise and their thoughtfulness in addressing these questions.

Again, Mr. Chairman, I appreciate you, not only our working relationship but holding this hearing, and I look forward to working on this and other issues with you as we move forward.

Chairman REED. Thank you very much, and I also look forward to working with you, Senator Crapo.

Senator Corker, do you have a statement?

Senator CORKER. No.

Chairman REED. Thank you very much, Senator Corker.

Let me introduce our witnesses now and then ask them to present their testimony.

Our first witness is Mr. Joe Mecane. Mr. Mecane is an executive vice president with NYSE Euronext and oversees strategy, business development, and operations for the company's U.S. equities platforms. Prior to joining the company, Mr. Mecane was managing director in the Equities Division of the UBS Investment Bank. Thank you, for joining us.

Mr. Dan Mathisson is the head of Advanced Execution Services at Credit Suisse. AES is a full-service suite of algorithms, strategies, tools, and analytics for trading securities throughout the world. He is on the board of directors of BATS trading, the Credit Suisse Global Equities Operating Committee, and is a member of the New York Stock Exchange Electronic Traders Advisory Committee. Thank you, Mr. Mathisson.

Mr. Eric Noll is executive vice president, Transaction Services, of the Nasdaq OMX Group, Inc., the world's largest exchange. Mr. Noll oversees the trading operations of all U.S. transaction services businesses. Mr. Noll joined Nasdaq OMX from Susquehanna International Group. Thank you very much, Mr. Noll.

And our final witness is Mr. Robert Gasser. Mr. Gasser is chief executive officer and president of Investment Technology Group, Inc., ITG. Before joining this organization, Mr. Gasser was head of U.S. equity trading a JPMorgan. Thank you very much.

Gentlemen, all of your testimony will be made part of the record. We ask you to summarize within the 5 minutes allocated to you, and we will begin with Mr. Mecane. Thank you, Mr. Mecane.

STATEMENT OF JOSEPH MECANE, EXECUTIVE VICE PRESIDENT AND HEAD OF U.S. EQUITIES, NYSE EURONEXT

Mr. MECANE. Chairman Reed, Ranking Member Crapo, and Members of the Subcommittee, my name is Joe Mecane, and I am EVP and head of U.S. Equities at NYSE Euronext—a leading global operator of financial markets and provider of trading technologies.

While the U.S. continues to have the most liquid markets in the world and remains at the forefront of innovative technology used to conduct electronic trading, the infrastructure used to operate the markets each day has grown so sophisticated that few fully appreciate how well our markets actually operate in a highly competitive and complex environment.

This has made it difficult for market participants, regulators, and Congress to determine if the growth in the number of trading venues and use of automated trading is beneficial.

However, in light of the market events that have occurred in recent years, I would like to focus on how technology and our market structure have created both unnecessary complexity and mistrust of markets; and, relatedly, what we believe the industry, regulators, and Congress should be doing to address it.

Electronic trading has added tremendous benefits to the capital markets, including lower costs of trading, faster speed of execution, and in some cases greater transparency. However, there were several regulatory changes that drove the market to become more electronic. One significant factor was decimalization of the markets in 2001, which had an effect of decreasing average spreads by roughly 38 percent, directly benefiting end investors. The narrowing of spreads led to a huge expansion of electronic trading because human traders could no longer effectively make markets in this environment and because institutions and brokers began relying more on algorithmic trading to access the markets and reduce their costs of trading. This process started before Regulation NMS. In fact, almost all reductions in spreads occurred during the pre-Regulation NMS period.

In 2007, just as the technology was becoming more sophisticated, the SEC adopted Regulation NMS through which exchanges began to compete by establishing the NBBO, and speed became the competitive differentiator based on one market's ability to set the national best bid or offer faster than a competing market.

Regulation NMS also established the Order Protection Rule to protect visible orders and encourage displaying quotes, yet today over 3,000 securities have 40 percent of their volume occurring off-exchange. This level of off-exchange activity erodes the incentive for market makers to continue to trade the less active securities and threatens to further decrease the incentives for companies to go public.

Today, there are 60 execution venues in the U.S. markets. Exchanges find themselves competing more directly with other venues that are able to employ different practices than exchanges with less oversight and disclosure. As a result of these advantages, broker-dealers continue to move more order flow into their own trading venues before routing to the public markets.

As you can see, the technology and the rules that govern the U.S. equity markets have resulted in the creation of a trading infrastructure primarily focused on speed and complexity through which traders can identify and access liquidity. To accomplish this, exchanges, brokers, and vendors have had to build expensive networks with robust capacity, as well as learn how to interact in a very complex ecosystem.

In response to this new flow of orders, exchanges have developed new order types and evolved their market structures. Regardless of the reason for the specific order type, most are premised on the goal of attracting liquidity to the public markets, and all must be reviewed by the SEC and published for public comment, something unique to national securities exchanges.

The bottom line is that our market structure incentivizes these various levels of increased complexity. Our main message today is that if we want to reduce the complexity of technology and the related framework of our markets, we should simplify the overall market structure.

NYX believes that the SEC is best suited to propose meaningful market structure changes, and regulators in other global markets, including Canada, Australia, and Europe, are already taking action. With congressional oversight, the SEC should continue with the holistic review it began in 2010 with the Concept Release on Equity Market Structure by proposing changes that will promote transparency, fairness, and long-term capital formation.

We believe that changes to be considered should include a review of market maker obligations, the Sub-Penny Rule, the Order Protection Rule, tick sizes for illiquid securities, and addressing the conflicts and overlap between broker-dealers and exchanges, including the obligations and responsibilities of each when providing like services.

The Consolidated Audit Trail, proposed by the SEC, also is a vital component to ensuring effective surveillance in a highly fragmented marketplace.

NYX also believes that, in light of the existing complexity of the markets and the trading glitches that have occurred this year, all trading venues should ensure a robust set of policies and procedures around their systems development life cycle. Although testing may not be the most exciting part of the industry's initiatives, the hyper-competition that exists in the securities markets lends itself to excessive levels of change to remain competitive and compliant with new regulatory requirements.

In closing, I want to reiterate our belief that although our capital markets are the best in the world, there remains room for improvement. Our recommendations for change have a simple premise: implement market structure changes that enhance transparency for investors and level the playing field for trading venues.

Thank you for inviting me to testify, and I look forward to your questions.

Chairman REED. Thank you very much.

Mr. Mathisson, please.

STATEMENT OF DANIEL MATHISSON, HEAD OF U.S. EQUITY TRADING, CREDIT SUISSE SECURITIES LLC

Mr. MATHISSON. Thank you, Chairman Reed, Ranking Member Crapo, and Members of the Subcommittee. My name is Dan Mathisson, and I am the head of U.S. Equity Trading for Credit Suisse. Credit Suisse's U.S. broker-dealer unit, formerly called First Boston, has been in operation in the U.S. since 1932, and today Credit Suisse employs 9,200 people in the United States. We are one of the largest U.S. broker-dealers, having executed 12.4 percent of total volume in 2012, and we own and operate two alternative trading systems: Crossfinder, which has been the largest ATS in the U.S. since 2009, and Light Pool, a newer ATS that publicly displays bids and offers.

I have been working in the equity markets for over 20 years, and it is a privilege to have the opportunity to speak here today.

Credit Suisse believes that the U.S. equity markets are better than they have ever been and remain the envy of the world. We recently published a broad survey of market quality where we found that the markets have improved in almost every measurable way. We believe that Regulation ATS, decimalization, and Regulation NMS were successful at making the U.S. markets more efficient, fair, and equitable. However, while they are good, the markets are not perfect, and we have seen several market disruptions that became big news stories in the past few years. But we believe that the SEC has moved aggressively and thoughtfully to fix these issues, and Credit Suisse fully supports the pending Limit Up/Limit Down rule, the consolidated audit trail, the market access rule, the tighter marketwide circuit breakers, and the creation of the SEC's new Office of Analytics and Research. We applaud the SEC for these actions and believe they will serve to significantly reduce the risks of disruptions in the future.

In addition to those SEC actions, we have a further suggestion that we believe will decrease the likelihood of disruptions. We recommend that the SRO status of the exchanges be examined. The trading errors that occurred on the day of the Facebook IPO last May served to highlight a peculiar quirk of the U.S. market structure: that exchanges do not have material liability for their failures. As SROs, exchanges have long been considered by courts to be quasi-governmental entities and are therefore entitled to the common law doctrine of sovereign immunity, which protects Government entities from liability judgments.

Yet exchanges today are clearly not governmental entities. They are for-profit private companies that are not particularly different from broker-dealers. While they still have a few vestigial regulatory functions, the majority of their regulatory responsibilities are typically outsourced to FINRA. We believe that exchanges should not have been allowed to retain their SRO status when they converted to for-profit entities 6 years ago. Businesses or individuals are inherently more cautious when they have the potential to be found liable for their actions. It is time for policy makers to correct this mistake.

Our second suggestion is that it is time for the regulators to do a comprehensive review and overhaul of the market data revenue plans. The Consolidated Tape Association has a legal monopoly on

providing a stream of real-time data from our Nation's stock markets. The CTA is the only source of this data, and it sells it at a high cost to the investing public. After all of its operational and administrative costs, the CTA makes a profit of approximately $400 million a year, which is then rebated to the exchanges based on a complex formula.

Historically, the SEC has justified granting exchanges this exclusive right to sell market data as a form of user tax to fund the exchanges' regulatory expenses. However, based on what we can glean from earnings reports and SEC filings, the amounts earned by the exchanges today far exceed the regulatory expenses, and tape revenue acts as a major profit center for the exchanges. It appears that somewhere along the way market data revenue became a Government-granted windfall at the expense of the investing public. The current market data system was passed in November 1972. After 40 years, we believe it is time to give it a fresh look.

In summary, removing immunity from exchanges would increase reliability over the long term and, therefore, reduce market disruptions, and overhauling the tape revenue system would reduce costs for the investing public.

Thank you for the opportunity to appear here today, and I will be happy to answer any questions that you may have.

Chairman REED. Thank you very much, Mr. Mathisson.

Mr. Noll, please.

STATEMENT OF ERIC NOLL, EXECUTIVE VICE PRESIDENT AND HEAD, NASDAQ OMX TRANSACTION SERVICES

Mr. NOLL. Good morning. Thank you, Chairman Reed and Ranking Member Crapo, for the opportunity to testify today on computerized trading. My name is Eric Noll. I am the executive vice president of Nasdaq Transaction Services for Nasdaq OMX.

Computerized trading is a fact of life and the default method for billions of trades over the past several years—billions of trades that happen without any concern or problem in the market every day. While there are issues, computerized trading has a proven track record of delivering benefits for investors, equalizing the information advantage that was the staple of manual markets, lowering trading costs, and allowing the market to handle trade traffic that would freeze otherwise manual markets.

In light of recent events, do not forget the unique role exchanges continue to play in the U.S. equity markets. All that your constituents associate with "the market" starts with an exchange. The iconic public companies—Apple, Google, eBay, and Amazon—must satisfy exchanges listing standards and regulations against corporate fraud and abuse. Only equity exchanges carry the important responsibility to support that growth and wealth creation from those companies.

Exchanges have heavy responsibilities to create a safe market for investors, characterized by fair access, transparency, and efficiency. No other market participant is charged with or even permitted to undertake that burden. One need only look at the list of SRO responsibilities that registration triggers to understand why so few of our lightly regulated competitors voluntarily take that step.

All of the buying and selling and active trading in the markets is not a grand game of speculators. It has real job creators and investors relying on the market's best information to make rational business and investing decisions. Price discovery, the best bid and offer, and visible liquidity are very important to public companies seeking activities like secondary offerings for expansion and to use their stock as a currency in the marketplace to achieve strategic goals like acquisitions.

Exchanges are not in the business just to see trading for trading's sake. We are in the business to produce transparent quoting and trading that helps price discovery, helps add liquidity, tightens spreads, and benefits the continuous market, ultimately helping job creation and economic growth.

U.S. markets are complex, fragmented, and interconnected. We are working tirelessly to ensure that markets are strong and fair, and that as the pace of trading accelerates, so too does the pace of regulation and investor protection.

For example, after May 6th, the SEC and the exchanges worked quickly and cooperatively to devise new protections and reform rules for breaking trades, instituted single stock circuit breakers, and will implement updated marketwide circuit breakers and the Limit Up/Limit Down mechanism in the first quarter next year. Nasdaq also fully supports and is helping to lead and define the implementation of Peak Net Notional Exposure levels, or what is commonly known as "kill switches."

On the issue of high-frequency trading, many vilify HFT as a business model. We urge caution against that sweeping criticism. It seems the tenor of the debate about HFT has become too broadly negative toward it as a business model. Academic evidence, like the British Beddington study, suggests that HFT trading tightens spreads and adds valuable liquidity—certainly positives for the market.

It is not enough simply to vilify fast trading. Regulators and exchanges are working to identify and address specific bad actors and specific bad outcomes such as false, misleading, or deceptive practices.

To improve our own regulatory program and the regulatory programs of exchanges around the world, in 2010 Nasdaq acquired The SMARTS Group, the leading provider of automated surveillance for post-trade high-speed trading.

As you have heard, our markets are complex: 13 exchanges and 40-plus alternative venues. Each venue has its own systems and competes for orders. Each has its own order types and is continually developing new ones with input from investors.

While some order types have come under scrutiny, let me be clear: Nasdaq OMX order types do not provide advantages to certain users allowing them to jump ahead in line at a given price level. We believe that order types should be designed to make our markets better, improve transparency, and improve price discovery. We go through a rigorous process to get our order types approved and to expose our innovative ideas to the market through the notice and comment period at the SEC, often allowing competitors to mimic our ideas and beat us to the market. That is part of our SRO burden. To help members understand our order types, we recently

posted on our Web site a plain-language list and a description of Nasdaq's order types.

We are passionate about the critical role we play in capital formation, and while it presents challenges to everyone, ultimately we believe technology is an important part of that solution. We appreciate the opportunity to testify. I look forward to your questions.

Chairman REED. Thank you very much, Mr. Noll.

Mr. Gasser, please.

STATEMENT OF ROBERT C. GASSER, CHIEF EXECUTIVE OFFICER AND PRESIDENT, ITG

Mr. GASSER. Chairman Reed, Ranking Member Crapo, and other Members of the Subcommittee, thank you for the opportunity to testify this morning on the topic of rules of the road for computerized trading venues. On behalf of a leading agency broker, my goal is to offer an unbiased, fact-based view on the current state of U.S. equity market structure.

ITG is a New York Stock Exchange-listed company with 17 offices across 10 countries and nearly 1,100 employees. As an agency broker, ITG provides trading services, technology, analytics, and research to a wide array of leading asset managers. Throughout our 25-year history, we have worked in partnership with major mutual funds, pension funds, and other institutional investors, innovating to improve trading and investment performance. In my testimony today I would like to offer a brief overview of current market structure, discuss some recent events which have impacted investor confidence, and look at some ways to restore this confidence. This morning we hope we can infuse some data and analysis into the debate.

Competition amongst market centers and broker-dealers spawned by the passage of Regulation ATS in December 1998 has led to intense competition for liquidity and ultimately to fragmentation. This fragmentation has undoubtedly introduced complexity into our marketplace but has been a positive force in reducing execution costs.

Technology has provided market participants, including retail investors and mutual funds, with the tools necessary to aggregate liquidity and derive the full benefit of free market competition for order flow.

Global asset managers, as fiduciaries, have an obligation to achieve best execution. The global market standard requires all asset managers of size to measure the quality of their execution and its effect on the investment process. ITG is the world's largest provider of TCA, or transaction cost analysis. We measure millions of trades executed on behalf of hundreds of global asset managers. Our TCA data clearly demonstrates that institutional investors have benefited greatly from the evolution of U.S. market structure. Over the past 12 years, there has been a 70-percent decrease in average total equity trading costs in the U.S. As the data indicates, market structure is not broken. The current ecosystem of displayed and dark markets has resulted in significantly reduced costs that in almost all cases have been distributed back to investors. There is no evidence to suggest that competition and fragmentation have damaged price discovery or harmed capital formation.

ITG is not a market maker, and we do not take on proprietary positions. In other words, we do not have "skin in the game" when it comes to the debates around broker internalization, as our system provides "meaningful price improvement" to buy-side investors as described in Regulation NMS.

Based on our data, we would conclude that broker-dealer internalizers, or "broker-dealer dark pools," as they are sometimes known, provide a useful permeable layer between the client and the displayed markets. Brokers have a fiduciary responsibility to their clients while exchanges do not, and these liquidity pools would not exist unless benefit was derived by the customer.

Most recently, Australia and Canada have imposed regulations around internalization that will provide us with data sets to examine when considering the implications of potentially taking similar action here in the U.S. Early returns do not look promising in terms of the effects on liquidity and trading costs. Regressing to an oligopoly of exchanges is clearly not the answer.

Unfortunately, the evidence also suggests that the investing public has become disenchanted with equities. According to the Investment Company Institute, over half a trillion dollars has been pulled from U.S. equity mutual funds since the start of 2008.

Much of this can be attributed to the reduced risk appetite of baby boomers and the relative safety of bonds supported by easy monetary policy.

The May 2010 Flash Crash, the Facebook IPO, and Knight Capital's trading debacle this past summer provide little comfort that U.S. equity markets are a safe place to trade or invest. Add in the suspicions that the investing public has about high-frequency trading and its perceived impact on the quality of markets, and you have a recipe for anecdote and conjecture overcoming facts and reason.

In our opinion, we can focus on five tangible initiatives to accomplish restoring confidence:

The SEC's Consolidated Audit Trail, if implemented properly and cost effectively, will give investors confidence that regulators can police bad actors and predatory strategies.

The consistent application of the market wide circuit breakers and the Limit Up/Limit Down Plan to all market centers would likely prevent a market disruption of Flash Crash proportions.

Costs should be borne by market participants who create excessive quote traffic without executing order flow.

Market data should be distributed to all market participants equally.

Marketwide risk should be monitored at a central clearinghouse that would have the ability to terminate a broker-dealer's connectivity to the national market system in the event of a rogue program released to the market.

These five measures would give the investing public the protections they need to confidently invest in the world's strongest and most resilient market while still deriving all of the cost savings and liquidity benefits which have been achieved over the past decade.

Last, as the regulations called for by the Dodd-Frank Act begin to take hold across other asset classes, the lessons we have learned in equities will be applied to those markets. Price discovery, central

clearing, transaction cost analysis, and pre- and post-trade transparency will become as deeply integrated into foreign exchange and fixed-income markets as they are in equity markets. And innovation will come more quickly to those markets because of the lessons learned. For this reason, our equity market structure is all the more important to our broader financial system.

Thank you again for the opportunity to share our views on these important questions. I would be happy to answer any questions at the appropriate time.

Chairman REED. Thank you very much, gentlemen, for your excellent testimony. One of the major driving forces of this discussion is technology, and one of the things about technology, it tends to make good things better and bad things worse. So when it comes to markets, there has been, I think, evidence showing a decrease in spreads and savings to investors, but I think our job is to applaud those good things, but also look very seriously about what the costs might be because of this new technology and new markets. And it raises a threshold question about—and you all alluded to it, but let me start with Mr. Gasser—the complexity of markets. I think the dark pools, internalization, in fact, I think every one of the exchanges—and correct me, Mr. Noll and Mr. Mecane—has their own dark pools. Is that accurate?

Mr. NOLL. We do not have——

Chairman REED. You do not have a dark pool? Do you?

Mr. MECANE. We have a small investment in an ATS.

Chairman REED. But the trend is that the proliferation of dark pools, the internalization, and it goes to the issues which—your question about investor confidence, investor enthusiasm. Price discovery, is that—even if you are saving prices, in the dark pools is price discovery for the average investor being compromised or complicated? What about capital formation for new companies? A lot of this trading is being done in a very small range of stocks, not all the stocks that are listed. So can you talk, again, accepting the benefits, what are the costs, the complexity, and what things might we do—and I would like everyone to respond—to make it a little simpler and a little more easy to bear?

Mr. GASSER. Thank you, Senator. I think as we think about complexity, as I alluded to earlier, I think we need to retain the benefits that we have derived from current market structure while making the markets less opaque to retail investors. There is no evidence to suggest that the market share of internalization or trades that are executed away from the exchanges is harming price discovery. There has been a lot of academic focus on that. So we tend to go back to transaction costs and how they affect the institutional investor, which is our core constituency.

But, clearly, the complexity, it has given rise to this view that there is a certain opacity to our marketplace. I would say that, you know, the IPO market in the U.S. has actually been leading the globe in terms of capital formation. It is not a great number this year, but I would submit to you that it is a function of the economy, of Sarbox, of some of the things that have been certainly imposed on growth companies that make it difficult for them to think about the critical mass they need in terms of market capitalization, to really think about the public equity markets as opposed to a pri-

vate equity market or a recapitalization somewhere else on their balance sheet.

So at the end of the day, I think there is a lot of market forces, a lot of macroeconomic forces that come to bear as well on that equation. But I think in terms of speed and latency, we have gotten to a place now where it is a law of diminishing returns. Do we need to trade in micro seconds? I do not think so. That might be heretical for someone who has spent almost their entire professional career trying to improve markets through technology at delivery. But at this stage of the game, micro seconds are, I think, a vast overachievement, if you will, technologically in terms of the benefits that people derive from it, and it just creates more and more suspicion that the market is controlled by dark forces sitting in a data center and deploying more and more servers and software to attack a business motive.

So I think at this stage of the game, there are some very clear things—consolidated audit trail, clearly. If folks have confidence that the SEC can enforce and regulate—and I think by their own admission it has been very difficult to do that given the complexity of the market—I think it will restore quite a bit of investor confidence. So I think the CAT, as it is commonly referred to, is very, very important.

Chairman REED. Let me ask Mr. Noll and the whole panel to respond to this question. Then I will ask Senator Crapo for his questions, and then we will do a second round.

Mr. Noll, the same issue, the general issue of complexity, and also I think when you talk about the SEC, there are two issues: one is the authority and one is the resources. So we have to make sure that if they get authority, they also have resources, but that is an aside.

Mr. Noll, please, your comments.

Mr. NOLL. Thank you, Chairman. A couple of comments around this.

First of all, I do think the markets are incredibly complex. I disagree with Mr. Gasser, respectfully, that the increase in off-exchange trading is not harming price discovery. We have started to see some evidences of that. I want to be clear, though, however, in responding to that. We do think there is an important role for off-exchange trading. We think there is an important role for ATSs. We think there is an important role for dark trading.

Our concern is really about the primacy of price discovery and price formation. And to the extent that those are being negatively impacted by current market structure, we think that those issues should be revisited as we move forward.

Other issues, you know, clearly to address more directly your question about the SEC, I do believe that they have the regulatory authority here. I do think that they are incredibly interested in this topic, concerned, and working very hard to address some of these issues. Some of the steps that we have taken as an industry, like the adoption of CAT, will give them some of the tools that they need in order to correctly assess what is going on in the marketplace as we move forward.

Clearly, they are also deeply embedded in some of the other issues that we are debating and rolling out and implementing. Cir-

cuit breakers were the first of many. They are intimately involved with the Limit Up/Limit Down scenario currently being worked on by the industry as we roll that forward, and we have to address Senator Crapo's earlier comment. The exchanges, working with the industry, are working with the SEC to adopt a format of kill switches that will prevent runaway algorithms from damaging the marketplace.

So I do think that they certainly have the regulatory authority, they certainly have the commitment to be involved in this space. And to finalize my answer here, I think one of the important things to look at is complexity in and of itself is not a bad thing. Technology in and of itself is not a bad thing. What we should be doing around market structure is making sure that we can recover from incidents and that we do not create scenarios whereby incidents are much more likely to happen.

And so much of the efforts that we are working on at Nasdaq and with the industry and our fellow exchanges are designed really to either recover from incidents or prevent new incidents from occurring. But the competition around the development and innovation around new market structure, new developments in the marketplace, is important. I think it adds value, and I think it brings real benefits to investors.

Chairman REED. Thank you.

Mr. Mathisson, please, and then Mr. Mecane.

Mr. MATHISSON. Thank you. Mr. Noll just commented on the move to off-exchange trading, and I would actually dispute the data that there has been a move to off-exchange trading. In October of 2012, 33 percent of the volume was traded on what is called the TRF, the Trade Reporting Facility, which is the trading that is done off-exchanges. If you go back 5 years to October of 2007, 30 percent of the volume was traded on the TRF or off-exchange. We have seen a fluctuation between 25 and 35 percent of the volume done off-exchange every month for the last 5 years, with no exceptions. There is no trend if you look at the long term of flow actually moving off the exchange. You have to get pretty creative in how you cut the data to come up with a trend that the flow actually is moving off. So, you know, I think that there has not been an increase in off-exchange trading. That is important to acknowledge.

Now, I concur with Mr. Gasser that we do not want to lose the benefits of competition, and we have seen many of them, as every panelist acknowledged in their testimony. At Credit Suisse, we are not in favor of setting any type of a speed limit or doing anything drastic. We would not be in favor of setting a 55-mile-per-hour speed limit across the board. We think the solution is to put proper safety mechanisms in place, to put seat belts and air bags in the cars, but not necessarily to say that people are not allowed to drive at the speed that they want to drive.

We believe that some of the things that the SEC has already done—the Limit Up/Limit Down rule, marketwide circuit breakers, market access rules, and the discussion of kill switches—are the right solutions and do put the right safety mechanisms in place to allow the markets to continue to enjoy the benefits of competition.

Chairman REED. Thank you.

Mr. Mecane, please, and then I will recognize Senator Crapo.

Mr. MECANE. Thank you. While I think we would all agree on this panel that markets for the most part have improved significantly, we are concerned about the direction of some of the evolution of our markets. And I think it is also important to acknowledge that while we have had a lot of practices evolve over the period that markets have improved, not all the practices that existed necessarily contributed positively to some of the changes that we have had in the marketplace.

And, while we are supportive of competition, some of the evolution that has happened has been a little bit unintended, and the two things that we have highlighted in a lot of our testimony and statements is around ensuring that from a public policy standpoint we have the right incentives in place for people to display orders publicly in the public markets, and ensuring that we have similar levels of rules and oversight for activities that occur on different venues.

You know, I would respectfully disagree with some of Mr. Mathisson's statements about the level of off-exchange trading, and it gets into a little bit of micro structure complexity around the ECNs that did publicly quote back in the early periods, and we are happy to address that offline. But, I think what it highlights is our markets have become extremely complex. I think the SEC and the industry have done a good job of responding to some of the crises that we have seen over the last few years, but clearly there is more that can be done.

One of the things that we would encourage is because the markets are so complex and because when you do try to address one issue in isolation, it raises a host of other questions and issues. We have suggested that a holistic review of market structure, as the SEC had intended back in 2010 with the Concept Release on Equity Market Structure, is probably the best way to try and address all the issues that are being raised on this panel because it is difficult to address any of these issues in isolation.

We would also suggest that perhaps one area that is discussed but not fully addressed yet is having testing standards in the industry. I think we need to be careful not to be too heavy-handed with that type of approach. But certainly having some best practices, some requirement for firms, trading firms, trading venues to have policies and procedures that address their testing standards, how they roll out new code, and setting that as a standard in the industry could certainly be very helpful. And as Mr. Noll highlighted, all of the Members of this Committee are involved in the industry discussions around potential kill switches that Senator Crapo mentioned before and working with the SEC about ways to potentially implement safeguards along those lines.

Chairman REED. Thank you very much.

Senator Crapo.

Senator CRAPO. Thank you, Mr. Chairman.

Let me follow up on the kill switch question. I guess I will start with you, Mr. Mecane. What progress is being made right now in implementing the idea of the kill switches since the SEC Roundtable?

Mr. MECANE. Sure. It is a good question, and there is a very active dialog around the kill switch concept. As you know, all the

SROs and a number of industry firms, including the firms on this panel, were involved in discussions leading up to the roundtable about a possible framework for a kill switch. And subsequent to the roundtable, we have all engaged in a much more detailed assessment of how a kill switch could work. We have been working with DTCC, and, you know, as they say, the devil is in the details. It gets very complex once you start designing it and outlining it, and I believe we are getting close to a possible framework as we iterate through the different possible ways to implement something like that in the industry, you know, what parts should be mandatory, what parts should be optional, whether it should be at the clearing level, whether it should be at the SRO level. All these types of issues are under discussion, but I think we are hopeful to have something to report in the first quarter next year.

Senator CRAPO. Thank you.

Let me turn to you, Mr. Gasser. You indicated that you felt it would be very helpful for a central clearinghouse to monitor market risk. Could you explain that a little better?

Mr. GASSER. Yes, Senator. You know, all of us have a substantial amount of capital committed to the business of clearing client trades, and they are held within the national clearinghouse, and there is a central clearing facility here in the U.S. which is actually very effective and much different in terms of global market structure. So it is very efficient, very effective. We have quite a bit of capital on deposit to support all of our trading activities there.

One issue, I think, that is a relatively scary one for the industry is that Knight gave us some interesting lessons in terms of a potential for a firm to blow through their capital and for an unprecedented call on other firms' capital at one stage or another to fill the gap. So that event I think had some interesting implications for not only the national market system, but for individual broker-dealers and their participation within the central clearinghouse.

So when I alluded to that—and I know that Joe and Eric and others, and Dan and our firms, have been involved in this dialog. One of the things I think folks keep coming back to is that notional limitation that we should all be held accountable to. When you blow through that, then you are now at a place where you may substantially affect other firms and their capital on deposit.

Senator CRAPO. Well, thank you.

Mr. Noll, I will ask you this question—well, actually, I think Mr. Mecane and Mr. Noll both in their testimony indicated that you support a pilot program for an increased tick for the smaller capitalized companies, so I suppose the question would be for Mr. Gasser or Mr. Mathisson. Do you agree with that approach as well?

Mr. MATHISSON. We would support a pilot program to test it out. We think it would be a significant change to the market structure, and as such, it should be done cautiously. But we would definitely support a pilot program if explicit metrics and goals were set out ahead of time to define success.

Senator CRAPO. Thank you.

Mr. Gasser.

Mr. GASSER. We would also support that, Senator, and think that from the perspective of capital formation it has potentially positive or could have positive effects.

Senator CRAPO. Thank you. And I guess this question is to everyone but Mr. Mathisson since I am going to ask about his recommendation that the immunity of SROs be addressed in this system. Do you all agree with Mr. Mathisson's recommendation? Mr. Mecane.

Mr. MECANE. Sure. The concept of being an SRO is founded on or historically based on the idea of having obligations to the market and getting certain benefits for meeting that obligation. Some of the obligations include the rule-filing process, the oversight that we have, the regulatory obligations that we have, and some of the benefits that we accrue are economic in nature. And we would encourage a review—which, again, I think falls into the SEC's holistic review of market structure—of the benefits and obligations of an SRO and what an SRO means.

I think it is important to note that SROs by their nature do not have blanket immunity. SROs have immunity when performing certain of their regulatory functions. And beyond that—and most of those regulatory functions are around our function as a listing market. And when you expand beyond our regulatory responsibilities, we have immunity that is set contractually with our members.

We would encourage, again, a holistic review of all the costs and benefits of being an SRO. Most of the items Mr. Mathisson raised are focused on reducing the economics for exchanges and transferring a lot of that benefit back to the investment banks. Again, I think that should be part of the holistic review that would potentially be done.

Senator CRAPO. Mr. Noll.

Mr. NOLL. Not unsurprisingly, I disagree with Mr. Mathisson on this. You know, I do think that there are several things about the exchange SRO model that are important to recognize as we talk about our immunities and our limitational liabilities, not the least of which is our obligation to provide fair access to all investors under all circumstances. So exchanges by their very definition exist to perform the price discovery function by gathering trading interest from all participants who want to participate and conduct that activity in a fair, transparent, accessible manner for all market participants.

Under current market models, no other market participant has those same obligations, and that also performs what I think is a very critical role in the marketplace of establishing price discovery, providing liquidity, and providing information to not only investors and traders but issuing companies about how capital should be formed, how it should be allocated, and the risks in the marketplace. And I think because of the value of that function in the marketplace, the immunities are well established and should be enforced.

Senator CRAPO. Mr. Gasser.

Mr. GASSER. Yes, I would agree with the examination as part of a holistic examination of U.S. market structure. We were actually, I think, very close to that—obviously, this issue was not on the table. It was pre-Facebook, back in 2010. But we were very close to what I thought was the end of a long comment process, industry engagement, exchange engagement, and that was obviously a pushback as a result of the Flash Crash. I think bringing that back

on board and engaging the same way with the Commission amongst all market participants I think would be a good thing.

In terms of immunity, I mean, I think we are all—as a broker, as an agency broker, I think we are all feeling the same thing. I do not want to speak for all brokers, but we are all feeling the same thing. There has got to be consequence for a system-wide failure of the type that we have experienced in the Facebook circumstance. Our clients suffered. Other broker-dealers suffered. Clearly, there were some decisions made that were, with all due respect, the wrong ones in terms of opening that stock. That is a very, very sharp contrast to the BATS failed IPO where actually they walked away when they realized that the software was not performing properly.

That does not mean that electronic markets cannot open IPOs. I mean, they have done so successfully. Archipelago, which Joe's firm acquired many years ago, did basically an electronic auction and was very successful.

So the devil is in the details in terms of the technology that we all operate today and its effect on the outcome, but if the outcome is significantly negative and folks are harmed, there has got to be some consequence felt. We certainly would feel that consequence if we had a failure within our system and it was attributed to our technology and acting as a fiduciary on behalf of a client.

Senator CRAPO. Thank you.

Chairman REED. Thank you, Senator Crapo.

Senator Hagan, please.

Senator HAGAN. Thank you, Mr. Chairman, and thank you for holding this hearing. I think it is very interesting and timely.

I just wanted to ask a couple of questions, one having to do with the dark pools. Mr. Mathisson, this question is, first of all, for this part directed to you. I have got definitions of dark pools, but I would like to have you give me your definition of a dark pool.

Mr. MATHISSON. Sure. A dark pool is a trading system that is organized under Regulation ATS that does not show bids or offers. So it is a computerized trading system where people enter a bid or an offer, say a buy of 100,000 shares of IBM, that would not be displayed publicly. It just sits within the computer. If somebody happens to come in with a sell order of 100,000 IBM, then the two cross. But the difference between a dark pool and a displayed ATS or a displayed order on an exchange is that the displayed order gets shown to the world, so everybody sees there is a 100,000-share bid for IBM. In the dark pool, it just sits in the hope that somebody might bump into it.

Senator HAGAN. How much of the trading is done on dark pools now, percent-wise?

Mr. MATHISSON. The best numbers out there are considered to be Rosenblatt survey numbers, and Rosenblatt puts it at about 14.5 percent of volume.

Senator HAGAN. And has that been growing since they have been introduced after 1998, or however long?

Mr. MATHISSON. That is right. It was probably——

Senator HAGAN. Has it been growing in the last——

Mr. MATHISSON. It has been growing, yes. It has picked up a lot of volume at the expense of the TRF, the Trade Reporting Facility.

Broker internalization is down from about 26 percent to 15 percent, and that 11 percent of the market moved to dark pools. So we have seen broker internalization go down. We have seen dark pool volume go up from approximately 4 percent 5 years ago to 14 percent today.

Senator HAGAN. And what is typically the average trade in a dark pool?

Mr. MATHISSON. The average trade sizes are small. I mean, they vary for different pools. Some pools are specifically aimed at crossing blocks. Mr. Gasser runs a pool that has a fairly high average crossing size. Some pools are as low as 200 shares, their average crossing size, which is comparable to exchange average size crosses.

Senator HAGAN. OK. Thank you.

Mr. Gasser, ITG has observed in the past that the traders in these dark pools will often experience adverse selection, and a trader will see a stock move in his or her favor immediately after he or she executes a block trade in a dark pool. The question is: Can you discuss why the adverse selection is occurring in dark pools? And how does the lack of transparency in these venues contribute to adverse selection?

Mr. GASSER. Yes, Senator. Actually, "dark" is probably an unfortunate, nefarious term.

Senator HAGAN. I agree with that.

Mr. GASSER. But I——

Senator HAGAN. Why do we call it "dark"?

Mr. GASSER. Because these are orders and executions that are not exposed to the lit market, so basically a quote that you can find on the screen. So I think that was basically the origin of "dark."

ITG has been operating a dark pool for 25 years, and that is POSIT. POSIT is the granddaddy of dark pools, if you will. It is a system that brings together institutional investors, allows them to interact with one another directly and anonymously, so they do not know size, they do not know who their counterparty is, and we improve price. So, in other words, we trade at the midpoint, and then we report—and this is very important. We report that trade immediately to the TRF. So there is complete transparency in terms of the trade having been done and now reported to the tape.

As Dan alluded to, our average execution size in our block trading system is 29,000 shares, so it is significantly in excess of the average size cross, and this is because it is an institutional constituency.

I think over time what has happened over that 25-year period that brings us to today is that internalization pools have become more multiconstituent, if you will; in other words, folks are not only crossing institutional flow, they are crossing retail flow. They are acting as market maker. There is high-frequency folks or, you know, strategies that are sitting within those pools and interacting, and they look much more like exchanges. So I think that has been a very steady evolution over time.

To get to your point about adverse selection, one of the things that we find is that, given the opportunity for institutions to interact with one another directly, that is the highest—and I think Dan would acknowledge that as well. That is the highest-quality execution that one can achieve.

Now, one order may be larger than the other. That is unavoidable in terms of negative selection. In other words, if you are a buyer and the seller is ten times your size, ultimately the price is going to go down if you extinguish that order. But that is what I would describe as organic to the environment we operate in.

What is much more difficult to control is that once you are forced into the lit market and you are forced into other trading venues, you now have less control over who you are interacting with. And so adverse selection can come from dark pools. It can come from lit pools. It can come from a variety of different places. And there are predatory strategies that we find every day, folks that are trying to, you know, basically probe liquidity pools and find the size of your order, the limit of your order, and are trying to trade against that order.

Senator HAGAN. Do you think that occurs in transparent pools versus the dark pools? Where is it most likely to occur?

Mr. GASSER. I think they are interchangeable. I think they come in and out of those markets, you know, looking for—you know, it is——

Senator HAGAN. Do the rest of you all agree with that?

Mr. NOLL. I have a slightly different view of that. I think, you know, Mr. Gasser said something I thought was illustrative, which he said dark pools look a lot like exchanges, except I would make some real distinctions around that. You know, one is they do not have to display prices that are accessible by outside investors. They are not required to take all investors on an equal and fair basis. The rules are not public. Their order types are not filed for a public notice and comment. So there are some significant differences, and I think that is where our concerns as exchange operators come in, which is to avoid the negative externalities of off-exchange or dark trading, which I will reiterate has real value for investors, and POSIT is one of the real benefits for institutional investors in the marketplace. It does what it is intended to do, which is allow buy-side investors to find liquidity in an efficient, information-less way.

But I do think that our concerns are really about asymmetrical information leakage, fair access, and nondiscriminatory activities.

Mr. GASSER. Just for clarity, when I said some dark pools look like exchanges, I was actually alluding to the average execution size, so other dark pools that are outside the POSIT system.

Senator HAGAN. Mr. Noll, let me ask you a question having to do with the minimum price variation. In the U.S., the MPV for all stocks of a dollar is one penny, and in Europe, their minimum price variations are less uniform. How do MPVs impact high-speed trading? And particularly I am looking at like a stock—at Google at $670 a share versus B of A at $9.50 a share.

Mr. NOLL. I think one of the things that we have noticed in the marketplace is that actively traded securities, not necessarily limited to stock price, so that certainly is a factor to consider here, but actively traded securities trade extraordinarily well in our national market system today. There is price discovery, there is liquidity, there is activity.

I think where we become very concerned is outside of those actively traded names, and European markets, as you alluded to, Senator, use what they call an "intelligent tick size regime" to de-

termine what the appropriate tick size is based on a variety of characteristics for the underlying security, a lot of which have to do with liquidity in addition to price amount, available float, size of the bid-offer spread. And so where we are interested in looking at this as a pilot—and I agree with the rest of the panel here that a pilot is a good thing for us to do here, particularly if set up well—is to uncover ways in which we can get better liquidity in less actively traded names and smaller cap securities. And I think minimum price variation will help us do that. I think a pilot will help us address that as we go forward.

Senator HAGAN. Thank you.

Thank you, Mr. Chairman.

Chairman REED. Well, thank you very much, Senator Hagan, for your excellent questions.

Let me just begin another round, and if Senator Crapo returns, obviously, I would invite him to join, too.

I think we all recognize that the interrelationships of these different issues are such that requires across-the-board, marketwide approach, holistic in Mr. Mecane's terms, but I think we also have to look at some sort of specific issues and, therefore, we have been talking about dark pools and ATSs, et cetera.

Just with respect to stepping back, the national market system, my sense, the motivating force was to make sure that orders sent to the trading platform were the best price, regardless of where the orders originate. And with these dark pools in particular, that does not seem to be the case. Is that a fair—since to be a member of a dark pool, that is not something that is—anyone can do or—let me use that as a prelude to ask Mr. Gasser to comment and others to comment.

Mr. GASSER. I keep coming back to the notion of a broker being a fiduciary on behalf of the client order. So we have very, very—the U.S. has very prescriptive regulations about how we report our execution quality, how we relate that back to customers. Obviously transaction cost analysis is core to what we do as a firm. So, you know, the highest priority is not to internalize order flow within POSIT for us. It is to find the best price. So that could exist in the lit market, other dark markets, or our system.

Now, fortunately for us, I think we can demonstrate a long history of very, very substantial cost savings, trading cost savings within our dark pool. But that is part of an ecosystem that we are forced to aggregate with technology every day, and we do not aggregate it based on being able to internalize it. We aggregate it based on the ability to find the best price, and we know that we are all—as brokers, we are going to be measured by the customer at the end of the day, and the customer votes typically with their feet in terms of quality of execution.

Chairman REED. Mr. Mecane, do you have a comment. Then Mr. Mathisson, because this is——

Mr. MECANE. Sure. Just to your question, Senator, I think it is a slightly different issue, at least from our perspective. As far as I know, most executions, dark pools, wherever, do happen at what the best price is in the public markets. From our standpoint, there is a slightly different issue that we think should get addressed, which is whether the person who is setting that best price in the

public markets is properly incentivized, meaning the person who is creating that best bid or offer price very frequently, roughly one-third of the time, will see trading happening at the price that he is displaying. And while the executions that are happening away from the public market are at that best price, the concern that we have from a broader public policy standpoint is whether there is diminished incentive for people to display their orders publicly if a significant amount of activity happens in front of their displayed price. And so when we have talked about incentives for people to display liquidity, whether the right balance is in place to ensure that the person who sets the best price, and Regulation NMS in its main mission set out properly incentivizing the public display of orders as its objective, we would just highlight that we should probably step back and review whether we think the balance that has evolved is the right one.

Chairman REED. Mr. Mathisson? And then I have another question. I will change the topic slightly.

Mr. MATHISSON. Yes, when traders decide whether to put out a bid order on an exchange or on a displayed ATS or put one into the dark, on a dark pool, they are making a tradeoff decision. If you show it publicly, then you get what is called NMS protection, meaning that nobody can trade through your price. So, in other words, if I show a bid at 27.50 into the national market and I choose to display it, then a trade cannot occur at 27.49 or lower anywhere. It cannot occur in a dark pool, it cannot occur anywhere. So I have what is called protection. Now, that is the plus side.

The negative side of doing it is that I show this bid which might scare the price up, and that is a tradeoff that traders decide to make, and they are constantly weighing whether it is better to display it and get protection and potentially attract a seller or whether it is better to put it in a dark pool, take on a lower fill rate, but have less chance of scaring the price. And that is essentially what trading is. It is a tradeoff between what we call signaling risk and fill rate. And that is what trading algorithms do. That is what people, traders, are deciding. And so the system allows traders to make that choice.

Now, Regulation NMS does ban the trade outside of the trade price. Once you put that price up, trading cannot occur in a dark pool at a different price, and the dark pool trades are reported to the tape immediately, so the whole world does know about them after the fact, and they do occur at or within the national best bid or offer.

Chairman REED. Thank you. This testimony and the questions have been very thought-provoking, so you can anticipate additional questions in writing, in fact, some detailed questions, and I know you will respond.

Let me change, again, quickly from my last set of questions, and then I will recognize Senator Crapo again.

We do understand this is a systemic approach—we should take a systemic approach, but issues crop up. One of them is the order type issue, which is getting a lot of attention. The proliferation of order types adds to the complexity, raises lots of questions, and it goes back to sort of the public perception of markets, too. Are these orders being written to induce people to come into your market to

give them tailored, bespoke approaches to the market which other particularly retail investors do not have? Are there too many of these? Should there be a standard set of order types that every market alternative as well as exchanges follow? And this general question of order types I think is important, at least to broach at this point. So let me start quickly—and, again, because I want to recognize as briefly as possible Mr. Mecane and then we will go down the panel.

Mr. MECANE. Sure. It is a good question, very topical. I think there are two main points that I would draw out. One is that it is important to recognize why a lot of these order types have evolved. Some of them are to comply with Regulation NMS; some of them are to guarantee economic results; some of them are to compete with some of the practices, customer segmentation, et cetera, that happens off-exchange. So I will go back to one of my earlier points, that the order type evolution is largely because the market structure that we have creates the need or the demand for different order types to replicate certain behaviors, some of which used to happen nonelectronically. But, again, my first point is if we want to review the order type issue or simplify the markets, we should simplify the market structure that they operate in, and there will be less need for these order types.

The second point I would just make is that it is important to recognize that all exchange order types are publicly filed, reviewed by the SEC, put out for public comment, disclosed, and can be utilized by any member of an exchange. Now, if there are any order types that are not adequately disclosed or not described accurately in the filings, that I think is a separate issue that needs to be addressed. But at least in terms of the intent of the process, all the rule filings should describe order types and order type behaviors, which, again, is something that is very distinct from how nonexchanges operate.

Dan's and Bob's firms have algorithms. There are probably more algorithms for institutional customers in the industry than there are order types for broker-dealers to use. So I think it is just the evolution of our complex market structure.

Chairman REED. Mr. Mathisson, just for clarification, is there a requirement for ATS to submit order types or algorithms for review?

Mr. MATHISSON. No. I mean, they do get filed in what is known as a Form ATS, but it is not reviewed and subject to approval. You just tell the SEC what you are doing. So that is correct.

Chairman REED. All right. The order type issue.

Mr. MATHISSON. I agree with Mr. Mecane that complex orders—that the line between algorithms that broker-dealers do and the line between complex order types that exchanges offer is blurry, and there are a lot of similarities between the two. But I think that the broker-dealer is the right place to have that complexity, and the reason is because the broker-dealer is a fiduciary to the client. The broker-dealer has an error account, and the broker-dealer has liability. And complex order types are more likely to fail than simple matches. I would be in support of a market system where ATSs and exchanges only offer very simple order types, just buy-and-sell matches, market on close, market on open, just the traditional, most simple order types, and put that complexity within a struc-

ture where there is an error account, there is a fiduciary responsibility, and there is liability if things go wrong. The more complicated an order type gets and the more complicated an algorithm gets, the more likely it is to fail, and so the question becomes who eats the error when that fails. With an exchange, the answer is—you know, the exchange does not eat the error. The error gets borne by the broker-dealer who used the order type.

Now, finally, the order types, while they are reviewed—all the exchange order types are reviewed by the SEC. The *Wall Street Journal* put out a piece that said every single order type that has ever been submitted by the exchange has been approved. There has never been one that has been rejected. You know, so I would question how thorough and meaningful a review that actually is.

Chairman REED. Thank you.

Mr. Noll? And then again, to allow Senator Crapo, your brief comments.

Mr. NOLL. Well, factually what Mr. Mathisson says about order types, from my own experience around the SEC review of order types and order type introduction, we have withdrawn many more order types at the suggestion of the SEC than we have had approved. So while the public notice and comment period does, in fact, exist and so I do think historically order types have been improved, many, many order types, many variations on order types have, in fact, been asked—we have been asked by the SEC to withdraw them for a variety of reasons, having to do with their view of what is the appropriate market structure. So they do not go unreviewed I guess is the point I would try to make.

I agree with Mr. Mecane on most of what he said. I think order types have evolved in various ways, some due to regulatory reasons, Regulation NMS being the primary one; but also because in an electronic market—and make no mistake about it, our markets are electronic today—order types fill the function and allow the function of what used to be done manually to be done electronically and with technology. And order types are a tool to do that. And I think it is important to recognize that they need to be applied fairly, they need to be made available to everyone, and they have to be used so that they are not favoring one type of party over another in an unfair way. And I think we have strived to achieve that, and I think for the most part we have been successful with that.

Chairman REED. Mr. Gasser, your comment, quickly.

Mr. GASSER. Senator, you heard in your first hearing, I think there is a significant cross-section of the institutional investor community that has become frustrated with the permutation of these order types. At the end of the day, I think our view is—as Dan alluded to, as a fiduciary, it is our job to make sure that their orders are properly represented and that we are taking advantage of all the technology available to use, and it is all in the public domain. So I think it is—from the perspective of preventing competition and further innovation, I would be hesitant to say that we need to prevent further innovation there on that front.

Chairman REED. Thank you very much.

Senator Crapo.

Senator CRAPO. Thank you, Mr. Chairman. I just had one final issue to get into.

Mr. Mathisson, in your written testimony, you indicate that so-called quote flickering has increased with decimalization. And, similarly, Mr. Gasser, you indicated in your testimony that you recommend that market participants who create excessive quote traffic without executing order flow should bear the costs of this activity.

How does quote flickering work? And what is its impact to the system? Mr. Mathisson first.

Mr. MATHISSON. Well, quote flickering is when somebody shows a bid or an offer for a very short amount of time and then keeps changing it repeatedly. Now, the cost of it on the system—I mean, the reason it is done is it would be typically done by high-frequency trading systems that are just making decisions very rapidly and they are deciding they want to buy something and the price of something else moves and they decide, you know, a thousandth of a second later to pull the bid or the offer. And so the result is that they can get quote flickering. It is empirical fact that quote flickering has increased. The number of quotes per day is up dramatically versus what it was about 5 years ago, and it is up, you know, something like 100 times from what it was 10 years ago.

Now, the cost of quote flickering is primarily in technology infrastructure. When you have a lot of quoting going on, people need to build networks and computer systems that are capable of digesting hundreds of millions of quotes a day. And so it is an expense, essentially, on everybody. All trading systems by broker-dealers and typically by mutual funds and pension funds and other investors read all these quotes and respond to them, and so they all have to spend a great deal more money on technology than they otherwise would.

Senator CRAPO. Thank you.

Mr. Gasser.

Mr. GASSER. Yes, in 2010, we gave a speech to an industry trade group and recommended, you know, some type of tax on what is—you know, there is no benefit to the broader national market system of having folks come in and basically flicker on the bid or the offer, as Dan alluded to. We spend a tremendous amount of money on infrastructure to support that, as I said, with no discernible benefit to investors or anyone else in the ecosystem.

While equity volumes have steadily declined, the duress or the stress that it places on our infrastructure has increased logarithmically, so we are getting less liquidity, less volume, and we are being forced to support this activity in terms of our own investments in our business.

Senator CRAPO. Thank you.

Mr. Noll and Mr. Mecane, do you want to comment.

Mr. NOLL. Sure. I agree that quote stability is an important goal for exchanges and for the marketplace. You know, we at Nasdaq have tried to take some steps on our own to bring more quote stability to the marketplace. So, you know, the first thing we have done is introduce an order type called the minimum life order type that creates economic incentives to have an extended quote as opposed to a short quote. We have also introduced and I believe we are the only exchange today that has an excessive messaging fee

for rapid quote changes without trades and without taking on discernible obligations in the marketplace.

And then, last, we introduced a new market model called PSX, which is a price six exchange, which was designed really to get away from being at the top of the book because you were there first in terms of your quote ability, but being there in size as the incentive for the market participants. I wish I could say that that has had more success in the marketplace in developing as a real alternative to some of the other market models. That has yet to do that. But I do think that there is room for innovation here. I do think achieving quote stability is an important goal in the marketplace. I think it makes the markets better for everyone.

Senator CRAPO. Thank you.

Mr. Mecane.

Mr. MECANE. I would just add two quick points. I think we would all agree that message traffic in general is a high cost for the industry and for all of us. The two points I would make, the first is just a recognition, again, that some of that message traffic or a lot of that message traffic arises not only because of Regulation NMS but because there are 50 venues out there for people to trade on. So in a lot of cases, traders will put their quotes in a subset of that many venues. They get executed on one venue, and then they pull their quotes from everyone else. And so some of the market complexity does contribute to the amount of message traffic. So, again, that points back to the holistic review of market structure.

The second is while the consolidated audit trail is still very much a development in process, one of the discussions is around whether there is a mechanism through the consolidated audit trail to potentially align some of the costs of surveillance and producing the consolidated audit trail records back to the person who has created the quotation. And so there is potentially another mechanism down the road to help address message traffic.

Senator CRAPO. Thank you very much. I really appreciate the testimony of these witnesses. It has been very helpful.

Chairman REED. It has been very, very helpful, and Senator Crapo's question has raised a question in my mind, a real question not a rhetorical one, and I will just see if anyone would like to respond to it. Is this flickering phenomenon related to entities that do not have market-making responsibilities so that they can come in and just ping the system without any responsibility to actually follow through? Is that related and we should be thinking about that?

Mr. GASSER. Yes, I would not say that I know for certain, but I think it stands to reason that it is probably—and I certainly do not want to tar the HFT community with a brush here, but it is probably a high-frequency strategy, as Joe alluded, that has been deployed into every market center liquidity pool. We have seen, you know, some pretty significant anomalies from time to time, and, you know, 10 o'clock in the morning, 10:30 in the morning, where you have got these just huge spikes. They tend to be focused on large cap liquid names, and to get back to the point of investor perception, if folks had, you know, more insight into this, I cannot see that it would be a positive from that perspective. In fact, it would probably be perceived as just another example of a participant that

had the ability to affect other participants in orders of magnitude larger than the capital they have deployed or their desire to actually execute trades.

Chairman REED. So I think that unless someone objects, this issue of—one of the categories we have to look at in market formulation is the responsibilities of market makers, who should be a market maker and what rights, what responsibilities they have, and that is an open question now given the new technology. I assume that that would be a point of agreement by the panel.

I want to thank you all again. Senator Crapo was absolutely correct. Your testimony has been both thoughtful and thought-provoking, so expect lots of written questions.

We appreciate the time that you have made. The preparation that you have undertaken has been obvious in this testimony.

I will ask my colleagues, all the colleagues on the Subcommittee, if they have additional questions or written statements, please get them to us by December 28th, and then we will get them to you as quickly as possible and ask for your prompt response.

The only thing, as we have been going back and forth about these dark pools, and I think you, Mr. Gasser, made the point that it is probably not the best term, I think there might be a rule of thumb that anything that could be used as a title for a Batman movie is probably not something that is good in the financial markets. But that is just a quip.

With no further questions, I will adjourn the hearing. Thank you, gentlemen.

[Whereupon, at 10:51 a.m., the hearing was adjourned.]

[Prepared statements and responses to written questions supplied for the record follow:]

PREPARED STATEMENT OF JOSEPH MECANE

EXECUTIVE VICE PRESIDENT AND HEAD OF U.S. EQUITIES, NYSE EURONEXT

DECEMBER 18, 2012

Introduction

Chairman Reed, Ranking Member Crapo, and Members of the Subcommittee, my name is Joe Mecane and I am EVP and Head of U.S. Equities at NYSE Euronext (NYX)—a leading global operator of financial markets and provider of trading technologies. NYX's exchanges in Europe and the U.S. trade equities, futures, options, fixed-income, and exchange-traded products. In the U.S., we operate three equities exchanges, two options exchanges, one futures exchange, and a technology business that provides comprehensive commercial technology, connectivity, and market data products and services.

While the U.S. continues to have the most liquid markets in the world and remains at the forefront of innovative technology used to conduct electronic trading, the infrastructure used to operate the markets each day has grown so sophisticated that few fully appreciate how well our markets actually operate in a highly competitive, fragmented, and complex environment. This has made it difficult for market participants, regulators, and Congress to determine the extent to which the growth in the number of trading venues, the speed at which trading platforms operate, and use of automated trading are beneficial.

However, in light of the market events that have occurred in recent years, I'd like to focus on how technology and our market structure have created unnecessary complexity and mistrust of markets; and, relatedly, what NYX believes the industry, regulators, and Congress should be doing to address it.

Market Structure Drivers Toward Computerized Trading

Decimalization. Electronic trading has added tremendous benefit to the capital markets, including lower costs of execution, faster speed of execution and, in some cases, greater transparency. However, the trend toward computerized trading was accelerated and fostered by several significant regulatory changes that drove the market to become more electronic. One important factor was decimalization of the markets in 2001, which had an effect of decreasing average spreads by roughly 38 percent in NYSE- and NASDAQ-listed securities, directly benefiting end investors.[1] At the same time institutional commissions, borne directly by end investors, were declining and decreased 33 percent[2] in the years leading up to Regulation NMS (Reg. NMS) implementation. In fact, almost all reductions in spreads and commissions occurred prior to the implementation of Reg. NMS and led to a huge expansion of electronic trading because human traders could no longer effectively make markets in this environment, and because institutions and brokers began relying more on algorithmic trading to access the market and reduce their costs of trading. This began a steady progression to have the most sophisticated algorithms and technology, since the smartest, the fastest, and the first prevailed—well before the implementation of Reg. NMS in 2007.

Regulation NMS. In 2007, just as the technology among the trading community was becoming more sophisticated, the Securities and Exchange Commission (SEC) adopted Reg. NMS. This regulation gave brokers the freedom to trade around markets such as the New York Stock Exchange (NYSE) when the NYSE was in "slow" mode,[3] and at the same time forced participants to access the national best bid or offer (NBBO) in the market. Because exchanges competed by establishing the NBBO, speed among markets became the competitive differentiator based on one exchange's ability to set the NBBO faster than a competing market. While Reg. NMS also established the Order Protection Rule to protect visible orders and encourage displaying quotes, today more than 3,000 securities have over 40 percent[4] of their volume occurring off-exchange in dark markets. In the NYSE MKT listed market, which represents 709 securities, off-exchange trading accounted for 42 percent of the volume in November. This level of off-exchange activity erodes the incentive for market makers to continue to trade the less active securities, has a negative effect

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[1] Data is calculated based on decrease in dollar value of spreads between 2001 and 2007, when the next major market structure changes were implemented through Reg. NMS. Consolidated Tape Association and NYX.

[2] Tabb Group: U.S. Long-Only Institutional Average Commission Rates, 2005–2012.

[3] Reg. NMS: *http://www.sec.gov/rules/final/34-51808.pdf.*

[4] Consolidated Tape Association.

on price discovery [5] and threatens to further decrease the incentives for companies to go public.

ATSs and internalization. Today, there are around 63 execution venues in the U.S. markets, including 13 exchanges and 50 dark pools. Exchanges find themselves competing more directly with Alternative Trading Systems (ATSs or dark pools) and broker internalization, which are able to employ different practices than exchanges with far less oversight and disclosure. Some of this competition is through cost, some through order handling practices, and much of it is through client segmentation whereby nonexchange venues are able to incentivize their own or third party liquidity provisions based on the nature of the person they are trading against. As a result of this advantage, large broker-dealers continue to move more order flow into their own private trading venues for a "first look" before routing on to the lit public markets. Since the implementation of Reg. NMS, we've seen two markets evolve—the lit public, regulated and accessible market versus the dark, selective and private nontransparent market.

As you can see, technology and the rules that govern the U.S. equity markets have resulted in the creation of a trading infrastructure primarily focused on speed and resulting complexity through which professional traders can identify and access liquidity—too often at the expense of retail investors and market integrity. To accomplish this, exchanges, brokers, and vendors have had to build expensive networks with the capacity to keep up with the growth of messages delivered each day to market participants seeking liquidity, as well as learn how to interact in a very complex ecosystem.

In response to this new flow of orders, exchanges have developed new order types. Order types have different purposes, such as giving cost certainty or competing with the client segmentation that exists off-exchange. Regardless of the reason for the specific order type, most are premised on the goal of attracting liquidity back to the public markets for the purpose of enhancing transparency and price discovery. Moreover, all order types must be pre-approved by the SEC and published for public comment, something that is unique to exchanges and which does not exist for ATSs or brokers who internalize.

Recommendations

The bottom line is that our market structure incentivized these various levels of increased complexity. Our main message is that if we want to reduce the complexity of technology and our markets, we should simplify the overall market structure. Doing so would certainly prove beneficial for the future of our national market system, for investors and issuers, and to the growth and well-being of our economy—including efficient access to capital to fund innovation, new business and job creation.

In this regard, key questions include determining who should lead the change process, and what should be done to correct course while ensuring that we continue to have the most transparent and liquid markets in the world.

NYX believes that the SEC is best suited to propose meaningful market structure changes—and, in fact, regulators in other global markets, including Canada, Australia, and Europe, are already taking action. With Congressional oversight, the SEC should continue with the holistic review it began in 2010 with the Concept Release on Equity Market Structure [6] by proposing changes that will promote additional transparency, fairness, and long-term capital formation. This unfinished initiative needs to be completed and made a 2013 priority.

We believe that changes to be considered should include a review of market maker obligations, the Sub-Penny Rule, the Order Protection Rule, tick sizes for illiquid securities, and addressing the conflicts and overlap between broker-dealers and exchanges, including the obligations and responsibilities of each when providing like services.

The Consolidated Audit Trail, proposed by the SEC, also is a vital component to ensuring effective surveillance in a highly fragmented marketplace. Such surveillance should include better identification and reporting on high frequency trading, similar to that being discussed by the Commodity Futures Trading Commission, to increase the transparency of this practice.

NYX also believes that, in light of the existing complexity of the markets and the technology and trading glitches that have occurred this year, all trading venues should ensure a robust set of policies and procedures around their systems develop-

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[5] CFA Institute: "Dark Pools, Internalization and Equity Market Quality", October 2012, Weaver: "Off Exchange Trading and Market Quality in a Fragmented Market" (May 2011), Tabb Group: "A Spotlight in the Dark: An Inevitable Debate", November 2012.

[6] *http://www.sec.gov/rules/concept/2010/34-61358.pdf*

ment life cycle. Although testing may not be the most exciting part of our markets, the hyper-competition that exists in this industry lends itself to excessive levels of change rates just to remain competitive and compliant with new regulatory requirements. The industry has been faced with implementing new back stops such as single-stock circuit breakers, market-wide circuit breakers, limit up-limit down, and possibly kill switches. These regulatory mechanisms have cost the industry tens of millions of dollars to implement over the past several years and have been developed in response to some of the negative effects of highly complex markets, in an effort to protect against those inevitable situations when the unforeseen occurs.

Conclusion

In closing, I want to reiterate our belief that although our capital markets are the best in the world, there remains room for improvement. Technology and innovation should not be the cause of crisis and fear in our markets. Under the right conditions and structure, they are assets and produce opportunity for all market participants. Our recommendations have a simple premise: implement market structure changes that enhance transparency, fairness and price discovery for investors and level the playing field for trading venues.

Thank you for inviting me to testify and I look forward to your questions.

PREPARED STATEMENT OF DANIEL MATHISSON

HEAD OF U.S. EQUITY TRADING, CREDIT SUISSE SECURITIES LLC

DECEMBER 18, 2012

Introduction

Good morning, and thank you for giving me the opportunity to share my views on the best structure for our Nation's stock markets. My name is Dan Mathisson, and I am the Head of U.S. Equity Trading for Credit Suisse. [1]

The U.S. broker-dealer subsidiary of Credit Suisse Group has been operating continuously in the United States since 1932, when the First Boston Corporation was founded. Today, Credit Suisse employs approximately 9,200 people in the United States, and 48,400 people globally. We are one of the largest U.S broker-dealers, executing 12.4 percent of all U.S. equity volume in 2012. Most of that volume derives from our 1,600 institutional clients, which include the largest mutual funds and pension funds in America, representing the savings of tens of millions of Americans.

I have been working in the U.S. equity markets for more than 20 years, the last 12 of which have been at Credit Suisse in New York. This is the second time I have been given the privilege of appearing before this Committee, and I appreciate the chance to appear here today.

Summary

Credit Suisse believes that equity market quality has improved markedly over the past two decades, and that the competition spurred by the adoption of Regulation ATS and Regulation NMS has benefited the average investor. However, there is still plenty of room for improvement in the market structure. Within the past decade, our Nation's exchanges have transitioned to a for-profit model, after more than 200 years as not-for-profit, member-owned organizations. Despite their new for-profit status, exchanges have retained quasi-governmental status as SROs (Self-Regulatory Organizations), and exchanges still receive significant public funding through the market data revenue plans. We believe that this new model for the markets has proven itself to be costly to investors, unfair to broker-dealers, and rife with conflicts for the exchanges themselves. We suggest that ending exchanges' status as SROs and transferring those regulatory responsibilities to FINRA or the SEC would put all market players on a level playing field and would benefit the average investor by creating markets that would be simpler, less vulnerable to disruptions, and less expensive to operate.

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[1] Credit Suisse provides its clients with private banking, investment banking, and asset management services worldwide. Credit Suisse offers advisory services, comprehensive solutions and innovative products to companies, institutional clients and high-net-worth private clients globally, as well as retail clients in Switzerland. Credit Suisse is active in over 50 countries and employs approximately 48,400 people. Credit Suisse is comprised of a number of legal entities around the world and is headquartered in Zurich. The registered shares (CSGN) of Credit Suisse's parent company, Credit Suisse Group AG, are listed in Switzerland and, in the form of American Depositary Shares (CS), in New York. Further information about Credit Suisse can be found at *www.credit-suisse.com.*

1. Are the U.S. markets working effectively?

Although the markets are not perfect, Credit Suisse believes that the market structure changes of the past 20 years have been successful in their goal of creating equity markets that are better than in the prior era. The empirical evidence shows that Regulation ATS and Regulation NMS have led to an increase in liquidity and a decrease in the total number of market disruptions. We have found this holds true for both large and small issuers.

Credit Suisse recently completed a broad survey of market quality in the U.S. equity market, and found that in every empirical measure, the U.S. markets are functioning better than ever.[2] The study found:

Positives:

- Overnight market volatility in 2012 is at a 15-year low.
- Intraday market volatility has been steadily decreasing since 2005.
- Bid-Ask spreads in the U.S. are the tightest in the developed world.
- Bid-Ask spreads have been clearly and steadily declining since Reg NMS was introduced, controlling for volatility.
- Average size of bids and offers has increased since 2004.
- The number of market disruptions, a.k.a. "mini flash crashes", has been decreasing since 2000.

Negatives:

- Quote flickering has increased, with the number of daily changes in the NBBO (National Best Bid Offer) per million shares traded at an all-time high in 2011.

Overall the study concluded there was no empirical evidence of negative market performance other than the increased cost of message traffic. Many other academic studies have found similarly positive results. A Rutgers University study released in September 2012 that examined data back to 1993 concluded that market quality breakdowns are 41 percent less frequent post-Reg NMS than prior to the rule.[3] A Feb. 2010 broad review of the equities markets by three well-respected professors concluded, "Virtually every dimension of U.S. equity market quality is now better than ever."[4]

2. Have liquidity and price discovery been impacted by the flow of stock trading volume to off-exchange venues?

Implicit in this question is a statement that volume has been moving to off-exchange venues, which is factually incorrect. Over the past 5 years, volume has not shifted to off-exchange venues. Figure 1 shows the percentage of U.S. volume executed on exchanges from January 2008 through November 2012. As can be seen, the percentage of volume executed off-exchange has been remarkably constant over the past 5 years.

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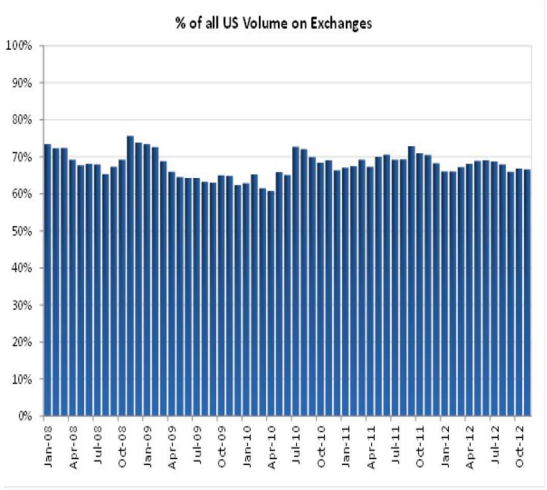
[2] Ana Avramovic, "Who Let the Bots Out?" Credit Suisse Trading Strategy, May 2012. Also see "June 2012 Chartbook", Credit Suisse Trading Strategy.

[3] *See,* Cheng Gao and Bruce Mizrach, Rutgers University, "Market Quality Breakdowns in Equities", Sept. 2012.

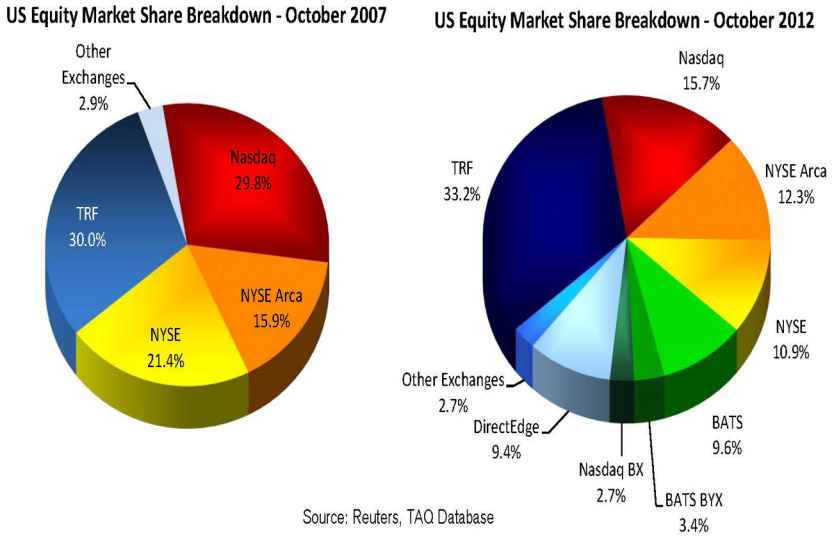
[4] James Angel, Lawrence Harris, Chester Spratt, "Equity Trading in the 21st Century", Feb. 23, 2010.

Figure 1: % of U.S. Equity Volume Executed On Exchanges, Jan 2008- Nov 2012



Source: Reuters, TAQ Database

Figure 2: Breakdown of Exchange Volume by venue, Oct. 2007 vs. Oct. 2012



Source: Reuters, TAQ Database

While the level of on-exchange vs. off-exchange volume has stayed remarkably constant, there has been a shift in volume from NYSE and Nasdaq to two new exchanges: BATS and DirectEdge. As seen in Figure 2, from October 2007 to October 2012, Nasdaq and the NYSE floor lost a combined 24.6 points of market share. New exchanges BATS and DirectEdge gained 22.4 points over that same period. Virtually all of the loss in the traditional exchanges' market share is explained by the rise of these two well-managed and efficient exchange competitors.

3. How does the current market structure impact market integrity or investor confidence?

Credit Suisse believes that the current market structure is not optimal for investor protection and market integrity. The aftermath of the Facebook IPO on May 18, 2012, revealed a significant flaw in the existing market structure. As has been widely reported, the Nasdaq exchange experienced extensive system failures during the initial public offering of Facebook Inc., causing others to suffer losses estimated to exceed $500 million.[5] Nonetheless, Nasdaq has only offered a $62 million settlement to those that suffered losses due to Nasdaq's failures, an offer it views as an "accommodation," given its view that it is legally immune from liability.[6]

Because the Exchange Act of 1934 vests the exchanges with self-regulatory authority, courts have traditionally afforded exchanges "absolute immunity" from civil liability for damages arising in connection with their regulatory operations.[7] The basis for this is the common law doctrine of sovereign immunity, under which a Government entity may not be held liable for acts taken in its official capacity. Because an exchange is empowered to perform a "quasi-governmental" regulatory function, courts have found that exchanges "stand in the shoes" of the SEC, and they receive the same immunity that the SEC would be granted.[8]

It is a dangerous situation when a for-profit enterprise can cause half a billion dollars of losses for others, and not have the risk of being held legally liable. Instead of bearing the cost of its own failures, Nasdaq believes that "the risks associated with system malfunctions should be allocated among all exchange members, rather than being borne solely by the exchange."[9] In other words, Nasdaq asserts that the costs should be borne by the shareholders of the for-profit broker-dealers that suffered the harm, rather than the shareholders of the for-profit exchange that caused the harm.

The contrast to recent events involving Knight Capital Group is striking. On August 1, 2012, a system error caused a Knight Capital Group broker-dealer subsidiary to send a slew of erroneous orders, resulting in $440 million in losses. Since Knight is not an exchange, and therefore does not benefit from sovereign immunity, rather than externalizing these costs on the market as a whole, Knight's shareholders suffered the losses.[10]

A fundamental principle of the law is that if a private enterprise wrongfully causes harm to others, it may be held liable to pay for the financial damages that ensue. In conducting its operations and implementing new systems, a broker-dealer must consider the risks and potential costs of potential liability and act accordingly. An exchange, on the other hand, may operate in a reckless manner.

Sovereign immunity may have made sense when exchanges were not-for-profit, member-owned regulatory organizations that existed for the good of their members. But today, the NYSE and all exchanges are for-profit enterprises that are not particularly different from broker-dealers. While they still have a few vestigial regulatory functions, they outsource the vast majority of their regulatory responsibilities to FINRA.

Exchanges now function as broker-dealers in many ways. For example, Nasdaq announced in May of 2012 they would compete with broker-dealers by selling execution algorithms, which involve significantly more complex technology than simply

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[5] Ashley Lau, "Nasdaq Defends Facebook Compensation Plan-Letter to SEC", Reuters, Sep. 19, 2012, available at *http://www.reuters.com/article/2012/09/19/us-nasdaq-facebook-letter-idUSBRE88I18V20120919.*

[6] *See,* Self-Regulatory Organizations; The NASDAQ Stock Market LLC; Notice of Filing of Proposed Rule Change to Amend Rule 4626—Limitation of Liability, Exchange Act Release No. 67507 at 4 (July 26, 2012).

[7] *See, e.g., Barbara v. NYSE,* 99 F.3d 49 (2d Cir. 1996); *DL Capital Group, LLC v. Nasdaq Stock Market, Inc.,* 409 F.3d 93 (2d Cir. 2005).

[8] *See, e.g., D'Alessio v. NYSE,* 258 F.3d 93 (2d Cir. 2001).

[9] *Id.* at 28.

[10] *See, e.g.,* Scott Patterson, "SEC Nixed Knight's Plea for a Do-Over", *Wall St. J.*, Aug. 6, 2012, available at *http://online.wsj.com/article/SB10000872396390444246904577571113923528168.html.*

crossing stock like the Facebook IPO.[11] Complex trading technology like algorithms should go through rigorous quality assurance testing, and maximum caution should be exercised when rolling out these types of programs. We believe that providers of trading technology will naturally exercise greater caution if they have material liability when their technology fails.

Repairing this problem in the current market structure is especially important since Regulation NMS does not allow broker-dealers to ignore an exchange's bids or offers, essentially compelling brokers to trade with every exchange, whether or not they find an exchange's technology to be reliable, and whether or not they find the exchange's liability policy to be fair and equitable.[12] Policy makers should examine whether it still makes sense for exchanges to be considered quasi-governmental entities, given that they are no longer member-owned, no longer not-for-profit, and no longer have much of a direct regulatory function.

4. Are exchanges and dark pools on a "level playing field"?

Regulation ATS was specifically passed to allow broker-dealers to create electronic crossing networks that automated their traditional job of crossing client orders. ATSs, a subset of which are known as "dark pools", operate under a very different regulatory structure than exchanges. Nasdaq and NYSE have claimed that regulators need to ensure that exchanges and dark pools are on a "level playing field" to protect the for-profit exchanges from losing further market share.[13] However, their "level the playing field" argument has the situation backwards, because there is a clear and massive economic advantage to being an exchange.

Within the past 5 years, two major ATSs, BATS, and DirectEdge, both voluntarily chose to become exchanges,[14] spending millions of dollars and devoting years of effort to make the switch. In describing its history, the parent company of BATS Exchange explained that it converted from an ATS to an exchange in order "to participate in and earn market data fees from the U.S. tape plans [and] reduce our clearing costs . . . ."[15] While many ATSs have applied to the SEC to convert to exchange status, and all were willing to accept exchange responsibilities,[16] we are not aware of a single exchange that has tried to convert to ATS status. While exchange status does come with some burdens, clearly market participants are happy to accept those costs in return for the five significant advantages of being an exchange.

The 5 big advantages exchanges have over ATSs:

1. Exchanges have absolute immunity on errors, having historically been considered quasi-governmental entities.[17] Courts have typically ruled that exchange immunity holds even in cases of gross negligence or willful misconduct. An ATS is a regular business that has liability for its actions.
2. Exchanges receive "tape revenue." The CTA (Consolidated Tape Association) has a legal monopoly on providing a consolidated stream of real-time data from our Nation's stock markets. The CTA makes a profit of approximately $400 million per year, which is then distributed to its participant exchanges based on a complex formula. ATSs do not receive tape revenue.
3. Exchanges pay no clearing fees. An ATS is a party to both sides of each transaction that passes through it, while an exchange merely facilitates the transaction. Therefore ATSs pay significant clearing fees, whereas exchanges pay no clearing fees.
4. Exchanges have no net capital requirements. An ATS operator must meet stringent net capital requirements. Exchanges face no such requirement.

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[11] "Nasdaq to Offer Algorithms, Competing with Brokers", by Nina Mehta, *Bloomberg News,* May 14, 2012. Article quotes Professor Bruce Weber saying, "Before electronic trading really took off, it was clear where the exchange function ended and the brokerage function began. That line is getting blurred."

[12] *See,* Regulation NMS Rule 611(a).

[13] *See,* "U.S. Market Structure Overview: Briefing for House Staff", Nasdaq/NYSE, June 12, 2012.

[14] *See,* In re the Applications of EDGX Exchange, Inc., and EDGA Exchange, Inc. for Registration as National Securities Exchanges, Exchange Act Release No. 61698 (Mar. 12, 2010); In the Application of BATS Exchange, Inc. for Registration as a National Securities Exchange, Exchange Act Release No. 58375 (Aug. 18, 2008) [hereinafter BATS Exchange Registration Order].

[15] *See,* Amendment No. 5 to Form S-1, BATS Global Markets, Inc. (Mar. 21, 2012) at 2, available at *http://sec.gov/Archives/edgar/data/1519917/000119312512125661/d179347ds1a.htm* [hereinafter BATS Form S-1].

[16] *See, e.g.,* "SEC Special Study: Electronic Communication Networks and After-Hours Trading", at n. 27 (referring to the applications of Island ECN, NextTrade, and Archipelago), available at *http://www.sec.gov/news/studies/ecnafter.htm*.

[17] "Nasdaq Exchange Immunity May Limit Losses From Facebook Claims", by Nina Mehta, *Bloomberg News,* June 13, 2012.

5. Exchanges can display bids and offers directly into the National Market System. An ATS cannot display a bid or offer directly into the National Market System. Instead, an ATS must pay an exchange to display bids and offers on their behalf. [18]

5. How has the operating model of exchanges been influenced by their change from not-for-profit organizations to for-profit companies?

Since becoming for-profit companies, exchanges have a fiduciary responsibility to their shareholders to maximize profits. A major source of revenue and profit for the exchanges comes from the sale of market data.

The exchanges, together with FINRA, have a Government-granted monopoly over the sale of market data to the public—including the fees from market data generated by off-exchange trading. The Consolidated Tape Association (the "CTA"), which administers the consolidated tape on behalf of the exchanges and FINRA, charges high fees to the investing public for real-time market data. While there is no systematic transparency into the CTA's finances, some information can be gleaned from the exchanges' parent companies' public financial disclosures:

- *NASDAQ:* The NASDAQ OMX Group, Inc. reported earning $115 million of net U.S. tape revenue from the CTA during 2011. [19] This amount is separate from, and in addition to, the $135 million NASDAQ earned from the sale of proprietary U.S. market data products.
- *NYSE:* NYSE Euronext earned $193 million from market data relating to U.S. equity trading in 2011, although it is not entirely clear from their disclosure whether this includes revenue unrelated to the U.S. consolidated tape plans. [20]
- *BATS:* BATS Global Markets, Inc. earned $55.4 million from its share of revenue from the U.S. tape plans in 2011. [21]

The estimated $400 million in market data revenues that the CTA distributes to the exchanges are after operational and administrative expenses have been paid. Given that real-time data is a Government-granted monopoly, and market data prices are not set by the market and are not subject to competition, the investing public is arguably being overcharged for market data by approximately $400 million a year.

Historically, the SEC has justified granting exchanges the exclusive right to sell market data as a form of user tax to fund the exchanges' regulatory expenses. In 1999, the SEC stated that exchanges are entitled to market data revenues to offset the cost of regulating their markets. [22] However, the amounts earned by the exchanges today far exceed their regulatory expenses and act as a major profit center for exchanges.

In Congressional testimony, the CEO of NYSE Euronext estimated that it would "spend nearly $85 million for U.S. equity market surveillance in 2012." [23] This is far outpaced by the market data revenue NYSE Euronext earns, which appears to have totaled $193 million in 2011 from market data relating to U.S. equities trading. [24] NASDAQ OMX Group earned $115 million of net U.S. tape revenue during 2011, but spent only $35 million on regulatory expenses across the entire holding company—apparently even including regulatory expenses relating to their non-U.S. exchanges. BATS Global Markets, Inc. earned $55.4 million from its share of the U.S. tape plans in 2011. But it spent only one tenth of this amount on regulatory expenses of $5.5 million in 2011, including costs under its outsourcing agreements for regulatory services to be provided by other SROs. [25]

The enormous revenues from market data are way out of proportion with the costs of exchanges' self-regulatory responsibilities. Market data revenue has simply become a Government-granted windfall at the expense of the investing public.

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[18] FINRA hosts an "Alternate Display Facility" to allow ATSs to display their bids and offers, but due to outdated technology, this service is not operational as of December 2012.

[19] NASDAQ OMX Group, Inc., 2011 Form 10-K at 57, available at *http://sec.gov/Archives/edgar/data/1120193/000119312512077518/d259668d10k.htm.*

[20] NYSE Euronext, 2011 Form 10-K at 60, available at *http://sec.gov/Archives/edgar/data/1368007/000119312512086538/d275617d10k.htm* [hereinafter NYSE 2011 Form 10-K].

[21] *See,* BATS Form S-1, supra note 15 at 18, 39.

[22] *See,* "Concept Release: Regulation of Market Information Fees and Revenue, Exchange Act Release No. 42208" (Dec. 9, 1999) [hereinafter SEC 1999 Market Data Concept Release].

[23] 2012 Market Structure Hearings, supra note Error! Bookmark not defined. (statement of Duncan Niederauer, CEO, NYSE Euronext), available at *http://financialservices.house.gov/uploadedfiles/hhrg-112-ba16-wstate-dniederauer-20120620.pdf.*

[24] NYSE Euronext, 2011 Form 10-K at 60, available at *http://sec.gov/Archives/edgar/data/1368007/000119312512086538/d275617d10k.htm* [hereinafter NYSE 2011 Form 10-K].

[25] *See,* BATS Form S-1, supra note 15 at 73–74.

Furthermore, the current tape revenue system potentially encourages odd distortions in the markets. Because the CTA allocates revenue to the exchanges based on a complex formula involving variables such as each exchange's number of quotations, for-profit exchanges try to set policies and services that will increase the level of quoting activity. We believe this is a major factor in why quote flickering has markedly increased, with the number of daily changes in the NBBO (National Best Bid Offer) per million shares traded recently climbing to an all-time high.[26] It is logical to assume that if the tape revenue system were reformed, quote flickering would be seen as a wasteful expense rather than a lucrative source of revenue.

6. What regulatory or legislative changes should be considered by regulators or Congress?

Credit Suisse suggests three policy changes, each of which is designed to make markets more reliable than they are today or reduce investor cost:

1. Remove the SRO status of the for-profit exchanges. For-profit entities should not be shielded from liability for damages that arise as a result of their own actions. For-profit entities should not be able to audit and regulate their competitors. Exchanges have already transferred most of their regulatory tasks to FINRA. It is time for Congress to revoke their special quasi-governmental status and Government privileges.
2. Perform a review of the pricing and rebate system operated by the consolidated tape plans. The CTA plans collect over $400 million a year from the investing public, most of which then gets rebated to the for-profit exchanges that collectively run the plans. Forty years after these plans were established,[27] we believe the tape revenue model is obsolete. In the current system, the investing public overpays for market data, and the exchanges receive a Government-granted windfall.
3. Lift the restrictions that limit broker-dealers to 20 percent ownership in exchanges. Although there is no rule or law limiting broker-dealer ownership in exchanges, there is a precedent set by the regulators to cap broker-dealer ownership of an exchange at 20 percent. Allowing broker-owned ATSs to follow in the footsteps of BATS and DirectEdge and become exchanges would level the playing field between exchanges and ATSs, ultimately resulting in lower costs for investors.

Thank you for the opportunity to appear today and I will be happy to answer any questions that you may have.

Witness Background Statement

Dan Mathisson is the Head of U.S. Equity Trading for Credit Suisse. He is responsible for block trading, program trading, and electronic trading at Credit Suisse.

Mr. Mathisson joined Credit Suisse in 2000 as a trader in the Index Arbitrage department, shortly after which he founded the Advanced Execution Services (AES) group, which executes trades on behalf of institutional clients using algorithmic techniques. Prior to joining Credit Suisse, he was the head equity trader at D.E. Shaw Securities, where he worked from 1992–2000.

Mr. Mathisson writes a column about trading and markets for Traders Magazine. In 2011 he was named one of the "Top Ten Innovators of the Decade" by Advanced Trading magazine, which cited him for creating the modern algorithmic trading desk. Mr. Mathisson received a B.A. in Economics from the University of Michigan, and he is a Chartered Financial Analyst.

PREPARED STATEMENT OF ERIC NOLL

EXECUTIVE VICE PRESIDENT AND HEAD, NASDAQ OMX TRANSACTION SERVICES

DECEMBER 18, 2012

Thank you Chairman Reed and Ranking Member Crapo for the opportunity to testify today on computer trading in U.S. securities markets.

Computer trading is a fact of life and has been the default method of trading for billions of trades over the past several years—Billions of trades that happen on our market and others without any concern or problem. While there are issues to review, computer trading has a proven track record of delivering benefits for investors and market participants that includes bringing new investors to the markets, equal-

[26] Ana Avramovic, "Who Let the Bots Out?" Credit Suisse Trading Strategy, May 2012.
[27] The SEC adopted Rule 17a-15 in November 1972, establishing the current tape plans.

izing the information advantage that used to be the staple of manual markets, lowering trading costs and giving the market expanded abilities to handle trade and message traffic growth that would freeze manual markets. As we saw during the financial crisis of 2008, the U.S. equities markets did not freeze-up and billions of trades that investors needed were handled by our computers. And of course, this was done without any contribution from the equity asset class to the list of problems that had to be managed. So, while we have experienced some trading anomalies like the Flash Crash of May 6, 2010, and a number of computer-trading events. I believe these are isolated technology incidents and not symptoms of deeper market structure concerns. At NASDAQ OMX we are laser-focused, every day, on how do we improve our market and make it more resilient and robust?

This question is critical because a well-functioning equity market is needed for efficient capital formation, innovative competition, and job creation. Companies like Microsoft, Cisco, and Intel, used capital raised from listing on NASDAQ to make cutting edge products that have transformed our lives. Along the way, these companies created millions of jobs and strengthened many communities. Innovative high-growth companies attract new talent and that talent pool then demands new goods and services. This virtuous cycle has played out in dozens of venture zones, from Silicon Valley to the Northern Virginia high tech corridor. And they have created enormous wealth opportunities, allowing millions of average investors to share in that wealth—enabling them to buy homes, put children through college, and retire with financial security.

In light of recent events, some may forget the unique and central role exchanges have played and continue to play in U.S. equities markets. All that your average constituent associates with "the market" starts with an exchange. The iconic public companies they recognize—Apple, Google, eBay, and Amazon—must satisfy exchanges listing standards, and they remain subject to exchange regulations against corporate fraud and abuse. The exchange listing process and regulatory program culminate in the IPO process that provides entrepreneurs with efficient platforms for capital formation and job creation. Only equities exchanges such as NASDAQ are entrusted with the important responsibility to be a catalyst for growth and wealth creation.

After the IPO, exchanges have a unique and continuing duty to foster price discovery and transparency. Exchanges like NASDAQ create and disseminate the ticker symbols and prices that your constituents see on television stations like CNBC, in newspapers like the *Wall Street Journal,* and at Internet portals like Yahoo Finance. Exchange quotes then create the reference price for all other trading, not only in equities but in other asset classes as well. Dark pools and other competitors use exchange quotes as a reference price for trading equities. Markets, such as the Chicago Mercantile Exchange and the Chicago Board Options Exchange, use equities exchange quotes to trade options, futures, and other derivatives. Vanguard, Fidelity, and Schwab use exchange prices for mutual funds, ETFs, and other instruments. Those ticker symbols are a byproduct of the rules and sophisticated regulatory systems that equities exchanges develop and enforce to protect investors and to provide orderly markets. They are the result of a system that is by law fully transparent, and that publicly discloses all rules and prices to all customers and treats all customers equally.

Only exchanges have the authority and responsibility to oversee broker-dealers as they interact with the market. That authority is the result of a rigorous public process of qualifying to be an exchange conducted by the SEC—in the case of NASDAQ it took 6 years. Exchanges alone adopt member and market regulation rules, develop automated surveillance systems to detect rule violations, and discipline broker-dealers that violate rules and harm investors. Congress recognized that enforcing rules in U.S. securities markets is so important that two regulators rather than one are needed to enforce them. Congress codified the authority of exchanges to act as self-regulatory organizations (SROs), to set and enforce trading rules and to halt trading during extraordinary national or international events. SROs supply the SEC and other regulators vital information about the trends and performance of U.S. capital markets. The SEC is our partner in protecting investors.

In fact, exchanges have heavy responsibilities to create a safe market for investors, characterized by fair access, transparency, and efficiency. No other market participant is charged with or even permitted to undertake this burden. Alternative trading systems (ATSs) are not entrusted to regulate and discipline their users in this manner. An ATS can choose to regulate its users, but it must then register as an exchange and accept SRO responsibilities. Today, virtually every ATS has the option to register as an exchange. One need only look at the list of SRO responsibilities and obligations that registration triggers to understand why so few ATSs voluntarily take that step.

While we often discuss the importance of capital formation, our regulatory responsibilities and the IPO process, let me add another important, but sometimes overlooked branch of our role in the markets—our role in the daily trading dynamics of the market. Trading and trading behaviors like price discovery, best bid and best offer and visible liquidity are very important to companies as they might seek secondary offering cash injections to their businesses and use their stock as currency in the market to achieve strategic goals like acquisitions. Price discovery and transparent liquidity are also very important to investors as they make informed decisions about which stocks to buy and at what price and when to sell. All the buying and selling and active trading in the equities market is not a grand game of speculators—it has real job creators and investors looking for the market's best information to make rational business and investing decisions. Exchanges maximize transparency, strive for fairness and support that price discovery engine and it is our unique market role to perform that function. We are not in business just to see trading for trading's sake. NASDAQ OMX is an exchange to produce transparent quoting and trading that helps price discovery, helps add liquidity, tightens spreads and benefits the continuous market is what we strive to support.

Cooperation

The role of exchanges is more important than ever in today's challenging environment. U.S. markets are complex, fragmented, and interconnected. Markets and traders leverage new technologies to trade near the speed of light. We at NASDAQ are working tirelessly to ensure that markets are strong and fair, and that as the pace of trading accelerates, so too does the pace of regulation and investor protection.

When computerized trading appears as a threat to investors, the SEC naturally turns first to exchanges for assistance. Regardless of where the problems began, regardless of where the damage was felt, the exchanges are always on the front lines partnering with the SEC and we work closely with the SEC to fix and improve the equities markets. In the aftermath of May 6th, the SEC and the exchanges worked quickly and cooperatively to devise new protections to keep computer trading errors from spreading too rapidly or inflicting unacceptable harm on the overall market. The exchanges reformed their rules for breaking trades, instituted single stock circuit breakers, updated market-wide circuit breakers, and we will implement the Limit Up/Limit Down mechanism in February. NASDAQ has also developed tools to help broker-dealers manage their obligations under the Market Access Rule.

In the wake of several highly publicized computer malfunctions, the exchanges are again leading the industry in a collaborative working group. A key and challenging initiative being discussed by this Industry Working Group, and one that NASDAQ fully supports and is helping to lead and define, is the implementation of "Peak Net Notional Exposure" levels, or "kill switches," that would automatically trigger a cessation of trading when an individual firm exceeds predetermined risk thresholds. The Industry Working Group is considering various approaches to both the SRO-level and broker-dealer level requirements, as well as a means for coordinating cross-market checks to create the market-wide check needed to combat the effects of market fragmentation and interconnectedness.

Testing

One important area of focus is testing and industry preparedness. NASDAQ is partnering with Carnegie Mellon University to form the Carnegie Mellon Software Engineering Institute dedicated to help bring the industry together to improve the resilience of financial services technology. We hope to form and lead a group of market participants, regulators, technology providers, and academic institutions with the goal of driving resilience in the large scale software engineering and technology arena and being recognized globally as a leader in helping the financial markets become more resilient and robust.

The industry has learned through experience that it must change the way we test. In the past, industry-wide system changes have utilized a testing methodology that tested for system design integrity. For example we might test a software update by having our members send us test orders to ensure the software does what we are asking it to do. Or, we might ask members to challenge our systems with high volumes. Instead, we should be testing each other's systems to try to break them. A more robust testing environment would assume breakdowns by all testing participants to visualize the impact on a system's integrity. Such "destructive" testing will spot troubles that the kinder-gentler testing of the past would not uncover.

High Frequency Traders (HFT) firms have attracted much media attention, but they are not the only "fast" players in the marketplace. Exchanges, dark pools and broker systems are all connected and all use sophisticated technology. These systems communicate in slices of time that approach the speed of light. This is a great

achievement, but it means that previously minor events now represent profound risks that can tangibly affect investor confidence. NASDAQ OMX is not immune to this issue, and we are committed to answering this challenge.

High Frequency Trading

NASDAQ believes that technological developments must be implemented in a manner that ensures all investors a "fair deal." Average investors must not be placed at a disadvantage to professional traders by rules that permit selective disclosure of information, preferential access to trading interest, or the appearance of a two-tiered market. All markets that trade the same securities should be equally transparent about their operations, including the rules governing their trading systems, the criteria for admission and the prices of comparable services. The Commission must regularly examine whether the application of new technologies contribute to regulatory arbitrage.

For example, exchanges and regulators around the world are analyzing the pros and cons and overall impact on markets of HFT. The International Foresight Project was commissioned by the British Government's Department for Business, Innovation, and Skills (BIS) to investigate the effects of HFT. This definitive and independent study, led by Sir John Beddington, Chief Science Officer for the British Government, found that HFT is likely positive for markets. Similarly, the Swedish Financial Services Agency released its own report finding that HFT in that country also had a positive impact on liquidity, and that regulators and exchanges continue to refine their tools for ensuring proper surveillance.

Many in the public arena vilify HFT as a business model issue. It is our view to always caution against such sweeping criticism. When, like the Beddington study, HFT is studied in depth, you find benefits to several metrics from the broad participation in our markets by firms that we consider to be high frequency traders. Like the British and other studies, we find that HFT trading tightens spreads and adds very valuable liquidity—certainly positive for our markets. We know that everyone in the markets has a profit motive and that generally incentivizes innovation and competition among participants. What we know from experience is that our industry, no matter the business model, will always attract individual players who cross the line and NASDAQ OMX, the other exchanges, FINRA (the Financial Industry Regulatory Authority) and the SEC work to expose those individual bad actors. It seems the tenor of the debate about HFT has become too broadly negative towards the business model. The academic evidence about HFT supports the fact that they generally add value to the market.

It is not enough simply to vilify fast trading. Regulators and exchanges are working to identify and address specific bad actors and specific bad outcomes such as false, misleading or deceptive practices. NASDAQ has worked diligently to ensure that the pace of its regulation matches the pace of trading. NASDAQ has partnered with FINRA to develop special HFT inspections. For example, in December of 2010, NASDAQ OMX retained outside experts to assist in assessing and improving our internal training program on HFT strategies. Through focus and effort, NASDAQ's Market Watch staff has developed 11 new alerts (algorithms specifically designed to spot certain trading behaviors) in addition to the 21 surveillances FINRA utilized for HFT related reviews.

To improve our own regulatory program and the regulatory programs of exchanges around the world, NASDAQ invested in state-of-the-art technology. In 2010, NASDAQ acquired The SMARTS Group, the world's leading provider of software for automated surveillance for exchanges, regulators, and brokers. With SMARTS, NASDAQ literally can deploy high speed surveillance to match high speed and any other kind of trading. We have held demonstrations for many Members and staff of this Committee to demonstrate the power of the SMARTS system. The feedback from those demonstrations has been positive.

These efforts have paid off. NASDAQ surveillance and referrals to FINRA and the SEC have improved compliance. While we cannot go into great detail, we have a full plate of pending Investigations on issues related to High Order/Low Execution Ratios, Wash Trading, Layering, Manipulation of the closing auction, Manipulation through master-sub relationship, Supervision, Order Entry controls. NASDAQ has detected violations by high frequency traders resulting in fines as high as $3.5 million and in the expulsion of firms and individuals from the securities industry. NASDAQ is protecting investors from people that use technology to prey on them. Our goal is always to constantly evaluate and improve our market to make it as robust and fair as possible using technology and the wisdom and experience of our industry-best employees.

Complexity

Any evaluation of the health of our markets and the ecosystem of computer trading must include a discussion of complexity. There are 13 registered exchanges active in the U.S. equities markets. The SEC also allows trading on 40+ venues in the U.S. where a broker can send one or more of their orders. Each of these venues has its own systems and procedures and each competes for orders from brokers and ultimately investors. Each venue has its own order types and each is continually talking to investors to develop new order types that satisfy their needs. The result is dozens or even hundreds of different order types for members to understand and program. Is the explosion of order types helpful or harmful for the market?

While some order types have come under intense media and regulatory scrutiny, let me be clear, NASDAQ OMX order types do not provide advantages to certain users allowing them to jump ahead in line at a given price level. NASDAQ believes that each order type it creates should be designed to make our markets better, and to improve transparency and price discovery. Fairness and equal access are key SRO responsibilities and we will always adhere to those principles. NASDAQ goes through a rigorous process to get order types approved by the SEC. As an exchange we have to expose innovative ideas to the market through the notice and comment process, often allowing our competitors time to mimic our idea and beat us to market. That is part of our SRO burden. For the sake of transparency and to help members understand our order types, we recently posted on our Web site a list and a plain-language description of NASDAQ's order types.

Computer trading and some of the concerns that have been outlined to Congress are in many respects the direct result of market structure decisions. Many problems with our markets stem from well-intentioned regulations like Regulation ATS and Regulation NMS, which sought to promote competition and to resolve tensions between electronic and floor-based trading. Regulation NMS has led to an increase in dark trading, which denies market participants a clear view of trading interest in a given stock. Dark trading is a concern in many countries; Canada recently modified its market structure to limit dark trading and to maximize price discovery. The Commission has similar market structure proposals pending since 2009.

Market-Based Approaches

In addition to regulatory enhancements, NASDAQ has also developed several market-based approaches to improve the trading experience, and help reestablish the prominence of the public company model. For example, NASDAQ launched the first "price/size" market to create incentives for quotes that offer deep liquidity rather for quotes that are fast. Also, NASDAQ voluntarily eliminated flash orders from its equity markets. NASDAQ also introduced the "MinLife" order to incentivize a longer quote life. Finally, NASDAQ is the only exchange to recently institute a charge for excessive messages to discourage a trading technique used primarily by high frequency traders.

NASDAQ OMX is also working to improve the market structure for small public companies that are job creation dynamos when given a supportive ecosystem. This past year, the JOBs Act recognized the importance of special rules for these emerging companies. However, Congress did not go far enough and consider how these companies were treated once they actually go public. Regulation NMS subjects these smaller stocks to a one-size-fits-all market structure. Apple, Microsoft, GE, and other large cap stocks trade relatively well, despite a highly fragmented marketplace. Small companies however are not best suited for a fragmented liquidity pool and dark trading. Smaller stocks do not perform well in the fragmented marketplace no matter their listing venue. This can compromise the momentum for smaller public companies and capital formation within this class of stocks. There are innovative ideas to empower small companies to help their stocks trade more often and more efficiently:

- *Tick Size Pilot Program:* Allows smaller companies to opt-in for a wider tick size for their stock to allow more spread for market-makers to be incentivized. Multiple tick size regimes are already used already in numerous other countries successfully.
- *Market-Maker Support Pilot Programs:* Allows the company to opt-in to a program to provide economic support for more aggressive quoting and trading in their stocks. These programs, common around the world, allow the exchange to stand between the broker and the listed company to improve the trading of a stock.

Conclusion

NASDAQ OMX is passionate about the critical role we play in capital formation, investor protection and job creation. While it presents challenges to everyone, ultimately we believe that technology is an important part of the solution for ensuring orderly and fair markets. We view efforts to slow-down our markets as counterproductive. Building robust and dependable markets requires legislators, regulators and market participants to continue to come together to drive positive evolution. NASDAQ OMX is committed to working with Congress, the SEC, our fellow exchanges and all market participants to make the U.S. equity market the best in the world. NASDAQ OMX appreciates the opportunity to testify. I look forward to your questions.

PREPARED STATEMENT OF ROBERT C. GASSER

CHIEF EXECUTIVE OFFICER AND PRESIDENT, ITG

DECEMBER 18, 2012

Introduction

Chairman Reed, Ranking Member Crapo, and other Members of the Subcommittee, thank you for the opportunity to testify this morning on the topic of "rules of the road" for computerized trading venues. On behalf of a leading agency broker, my goal is to offer an unbiased, fact-based view on the current state of U.S. equity market structure. ITG is a NYSE-listed company with 17 offices across 10 countries and nearly 1,100 employees. As an agency broker, ITG provides trading services, technology, analytics and research to a wide array of leading asset managers. Throughout our 25-year history, we have worked in partnership with major mutual funds, pension funds and other institutional investors, innovating to improve trading and investment performance. In my testimony today I would like to offer a brief overview of current market structure, discuss some recent events which have impacted investor confidence and look at some ways to restore this confidence. There has been much written of late about the quality of our equity markets. This morning we hope we can infuse some data and analysis into the debate.

Market Structure

Competition amongst market centers and broker dealers spawned by the passage of Regulation ATS in December 1998 has led to intense competition for liquidity and ultimately to fragmentation. This fragmentation has undoubtedly introduced complexity into our marketplace but has been a positive force in reducing execution costs. Technology has provided market participants, including retail investors and mutual funds, competition for order flow.

Global asset managers, as fiduciaries, have an obligation to achieve best execution. The global market standard requires all asset managers of size to measure the quality of their execution and its effect on the investment process. ITG is the world's largest provider of TCA, or Transaction Cost Analysis. We measure millions of trades executed on behalf of hundreds of global asset managers. Our TCA data clearly demonstrates that institutional investors have benefited greatly from the evolution of U.S. market structure. Over the past 12 years, there has been a 70 percent decrease in average total equity trading costs in the U.S. As the data indicates, U.S. market structure is not broken. The current ecosystem of displayed and dark markets has resulted in significantly reduced costs that in almost all cases have been distributed back to investors. There is no evidence to suggest that competition and fragmentation have damaged price discovery or harmed capital formation.

ITG is not a market maker, and we do not take on proprietary positions. In other words, we do not have "skin in the game" when it comes to the debates around broker internalization, as our system provides "meaningful price improvement" to buyside investors as described in Regulation NMS. Based on our data, we would conclude that Broker-Dealer internalizers, or broker-dealer dark pools as they are sometimes known, provide a useful permeable layer between the client and the displayed markets. Brokers have a fiduciary responsibility to their clients while exchanges do not, and these liquidity pools would not exist unless benefit was derived by the customer. Most recently, Australia and Canada have imposed regulations around internalization that will provide similar action here in the U.S. Early returns do not look promising in terms of the effects on liquidity and trading costs. Regressing to an oligopoly of U.S. exchanges is clearly not the answer.

Investor Confidence

Unfortunately, the evidence also suggests that the investing public has become disenchanted with equities. According to the Investment Company Institute, over half a trillion dollars has been pulled from U.S. equity mutual funds since the start of 2008. Much of this can be attributed to the reduced risk appetite of baby boomers and the relative safety of bonds supported by easy monetary policy.

The May 2010 Flash Crash, the Facebook IPO, and Knight Capital's trading debacle this past summer provide little comfort that U.S. equity markets are a safe place to trade or invest. Add in the suspicions that the investing public has about high frequency trading and its perceived impact on the quality of markets, and you have a recipe for anecdote and conjecture overcoming facts and reason.

Where speed is concerned, it is clear that the law of diminishing returns must be applied to further dramatic shifts in the foundations of our equity marketplace. Microseconds versus milliseconds do not matter to the wider, more important, audience. We need to restore investor confidence, but not at the cost of disturbing the progress that has been made.

Recommendations

- The SEC's Consolidated Audit Trail, if implemented properly and cost effectively, will give investors confidence that regulators can police bad actors and predatory strategies.
- The consistent application of the Market Wide Circuit Breakers and the Limit-Up Limit-Down Plan to all market centers would likely prevent a market disruption of "Flash Crash" proportions.
- Costs should be borne by market participants who create excessive quote traffic without executing order flow.
- Market data should be distributed to all market participants equally.
- Marketwide risk should be monitored at a central clearing house that would have the ability to terminate a broker-dealer's connectivity to the national market system in the event of a rogue program released to the market.

Conclusion

These five measures would give the investing public the protections they need to confidently invest in the world's strongest and most resilient market while still deriving all of the cost savings and liquidity benefits which have been achieved over the past decade. Lastly, as the regulations called for by the Dodd-Frank Act begin to take hold across other asset classes, the lessons we have learned in equities will be applied to those markets.

Price discovery, central clearing, transaction cost analysis, and pre- and post-trade transparency will become as deeply integrated into foreign exchange and fixed income markets as they are in equity markets. And innovation will come more quickly to those markets because of the lessons learned in equities. For this reason, our equity market structure is all the more important to our broader financial system.

Thank you again for the opportunity to share our views on these important questions. I would be happy to answer any questions at the appropriate time.

EXHIBIT A:

Responses to Written Questions Posed by the Subcommittee:

1. There are currently 13 equities exchanges in the U.S., more than 40 "dark pools," and 200 broker-dealers who can execute order flow internally. What are the strengths and weaknesses of this market structure?

The fragmentation of the U.S. equity markets over the past 10-15 years largely resulted from free market competition. The current market structure has yielded huge benefits in terms of cost savings for retail and institutional investors. ITG's own data indicates that total trading costs for U.S. equities have fallen more than 70% over the past decade. The increase in the number of execution venues has also led to a more robust national market system, with built-in redundancies and no single point of failure.

A potential weakness of this market structure is its innate complexity. Unlike the days when equity trading was essentially an oligopoly of the exchanges, today the proliferation of competing brokers, dark pools, and exchanges may be difficult for even many investment professionals to fully grasp. This complexity and the perceived lack of market structure transparency have grown to the point where it may be impacting investor confidence.

2. How has technological innovation and competition between an expanding set of trading venues impacted investor protection, market integrity and capital formation?

Increased competition between trading venues has benefited investors by significantly reducing trading costs while simultaneously protecting against predatory pricing and abuses such as the NYSE specialists front-running scandal a decade ago and the

NASDAQ dealer scandal of the mid-1990s. While there has been an expansion in the number of trading venues, the integrity of the market has not suffered as a result. During the post-Lehman financial meltdown in 2008, U.S. equity markets functioned efficiently and without any dislocations despite massive spikes in volatility and volume. In contrast, the over-the-counter markets for derivatives such as Collateralized Debt Obligations and even short term commercial paper seized up for days or even weeks at a time, with pricing that was aptly described as "marked to mayhem."

Regarding capital formation, we would argue that macro influences such as weak economic growth and political uncertainties may act as a deterrent to firms looking to raise equity capital. However, U.S. market structure is by no means a hindrance to capital formation. Through the end of November this year, firms have raised more than $57 billion through U.S. initial public offerings and another $182 billion in follow-on offerings. These figures indicate that the U.S. market raised more capital than all other global stock exchanges combined during the same period.

3. How have liquidity and price discovery been impacted by the flow of stock trading volume to off-exchange venues?

The prevailing view by academic experts in market microstructure is that the increase in off-exchange execution in the U.S. has, on balance, had a positive impact on both liquidity and price discovery.[1] We believe that the off-exchange crossing of blocks of

[1] *See*: Haoxiang Zhu, MIT, "Do Dark Pools Harm Price Discovery?" November 2012.
http://www.mit.edu/~zhuh/Zhu_darkpool.pdf
Also: Bhuti, Rindi, Werner: "Diving into Dark Pools" June 2010
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1630499

stock, which we effect through our POSIT alternative trading system ("ATS"), actually reinforces the price discovery mechanism of the exchanges. Specifically, we cross blocks on an agency basis and report the transactions in real-time. In addition, similar to other off-exchange venues, POSIT executes client orders at prices that are within the prevailing market quotes (the so-called "National Best Bid and/or Offer", or "NBBO"). As of October 2012, approximately one-third of U.S. stock trading volume was executed in off-exchange venues. In the absence of any compelling argument or hard data that suggests a negative impact on liquidity and/or price discovery by off-exchange venues, we reject the false notion that the U.S. equity markets have reached some sort of "tipping point" for this type of trading activity. It should also be noted that the exchanges employ trading models that are used by their member firms such as the acceptance and execution of un-displayed or "dark" orders. For years, the exchanges have offered their member firms the capability to provide and/or execute against dark liquidity and their interests in this type of flow is increasing as evidenced by the implementation of Retail Liquidity Pilot Programs by several exchanges.

4. It has been reported that a substantial amount of trading volume in the stock market is conducted by what are commonly referred to as high frequency traders. How has high frequency trading impacted liquidity, price discovery and equity market structure?

High-frequency trading has grown along with the technological advances in electronic trading and it expanded rapidly after the implementation of Regulation NMS (National Market System). While it is tough to estimate how much volume is generated by high frequency traders (HFTs) in the U.S. equity markets, it is generally thought to be

approximately 50% of total trading activity. During the past five years as HFT has become a more prominent feature of the U.S. equity markets, average stock spreads have narrowed and liquidity, as measured by the average depth of order books, has increased. While increased liquidity and narrower spreads are a benefit for investors, HFT strategies have also caused a substantial increase in message traffic, *i.e.* information concerning share prices and indications of interest, or IOIs. This sharp increase in message traffic is a negative result of HFT growth, acting as a *de facto* tax on all market participants. As we suggested in a speech to the Security Traders' Association in 2010, high-frequency traders who create massive amounts of tick data without resultant liquidity from executed orders should share the burden this creates for our industry. This could take the form of a message data fee for traders who have an extremely low ratio of order submissions to executions, similar to the excessive message fee programs that were proposed by NASDAQ and Direct Edge earlier this year.

It is worth noting that a universally recognized definition of HFT has proved elusive, although CFTC Commissioner Scott O'Malia's proposed 7-part definition offers a good roadmap.[2] HFT is more of a strategy or a trading style than a discrete set of investors. We would caution against an overly aggressive approach to policing behaviors which are perceived to be the domain of HFT, such as algorithmic trading. Algorithms have become a commonplace tool for virtually all institutional investors, including pension funds and mutual funds. Imposing heavy regulatory burdens on algorithmic trading

[2] See: http://www.cftc.gov/ucm/groups/public/@aboutcftc/documents/file/hftdefinitionletter111711.pdf

would have a negative impact on all market participants, not just those engaging in strategies similar to those employed by HFTs.

5. Exchanges have converted from mutually-owned not-for-profit organizations to publicly-owned for-profit companies. How has this influenced the operating model? Should exchanges still be self-regulatory organizations?

On balance, it is a positive development that U.S. exchanges are transparent, publicly-traded companies which are incentivized by the demands of the marketplace. This development has increased competition and lowered costs for the member firms of the exchanges, thereby benefiting the investing public. The question of whether for-profit exchanges should remain as self regulatory organizations ("SROs") is worth examining. As SEC Commissioner Dan Gallagher stated at the SIFMA Market Structure Conference in October 2012[3], the self-regulatory framework is premised on circumstances that no longer exist. He proposes an in-depth examination of this issue and we would agree that it is a matter worthy of regulators' attention.

6. The SEC recently held a technology roundtable on how to minimize trading errors and market malfunctions, as well as how to respond to any that occur in real-time. What changes need to be made to help fortify our markets, especially during times of market stress?

ITG participated on Panel One of the SEC's Market Technology Roundtable, which was held on October 2, 2012. The topics of discussion for Panel One addressed the prevention of errors through the design, deployment, and development of robust trading systems. ITG maintains that existing rules and regulations such as the Market Access

[3] See: http://www.sec.gov/news/speech/2012/spch100412dmg.htm

Rule,[4] Rule 201 of Regulation SHO,[5] and the Single Stock Circuit Breakers[6] have improved market conditions by requiring market participants to more closely monitor their respective trading activities for regulatory, financial, and operational risk. In addition, we believe that the Limit Up / Limit Down Plan[7] and Market Wide Circuit Breakers,[8] which will take effect on February 4, 2013, will result in the implementation of more robust policies, procedures, and automated controls concerning risk management and the prevention of trading errors. In light of the existing regulatory infrastructure along with the complex and dynamic nature of trading technology, careful focus is required when considering new regulations. Instead of implementing additional regulatory obligations, existing rules and regulations should be improved and updated, and industry guidelines and best practices should be promoted. Individual market participants could further contribute to the reduction of trading errors and liquidity failures by employing certain "best practices" including, but not limited to: (1) extensive design and functionality reviews of software code; (2) rigorous testing of software code prior to deployment; (3) robust testing environments using real time order flow and market data; and (4) incremental deployment of new code under close surveillance and monitoring by trading and technology professionals. Exchanges could assist broker-dealers in improving their risk management controls by providing enhanced drop copies

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[4] *See* 17 C.F.R. §240.15c3-5.

[5] *See* 17 C.F.R. §242.201.

[6] *See* Exchange Act Rel. No. 62251 (June 10, 2010), 75 FR 34183 (June 16, 2010) ("Approval Order of Single Stock Circuit Breakers").

[7] *See* Exchange Act Rel. No. 67091 (May 31, 2012), 77 FR 33498 (June 6, 2012) ("Order Approving Limit Up-Limit Down Plan on a Pilot Basis).

[8] *See* Exchange Act Rel. No. 67090 (May 31, 2012), 77 FR 33531 (June 6, 2012) ("Order Approving the Modification of the Market-wide Circuit Breakers").

of order handling and execution activities that are integrated with real-time execution and monitoring systems. Such information could help market participants track and determine when exchange monitored thresholds are breached.

Finally, market participants should seek to improve and/or enhance their respective redundancy systems and business continuity plans. Recent events such as Hurricane Sandy provided a harsh reminder that exchanges and member firms must be prepared to switch to secondary systems and alternative power sources from remote locations in order to provide trading services to their customers and maintain market integrity.

For more detailed information and analyses concerning the prevention of transaction errors and liquidity failures through the design, testing, and deployment of trading systems and technology, please see ITG's October 22, 2012 letter to the Securities and Exchange Commission in connection with the SEC's Market Technology Roundtable.[9]

7. What measures are being taken by market participants and regulators to secure data in today's markets?

Data security is a matter of paramount importance for all market participants, particularly when it comes to sensitive client information or trade data. We, along with the vast majority of other market participants, take this responsibility seriously and we safeguard our data using a combination of up-to-date technological measures, strictly enforced information barriers, and robust policies and procedures concerning information security and protection of client confidential information. We strongly believe that regulators

[9] *See*: http://www.itg.com/news_events/papers/SEC-Technology-Roundtable-2012.pdf

should be held to the same high standards as other market participants when it comes to data security, particularly as plans are laid for a Consolidated Audit Trail for the U.S. equity market.

8. What regulatory or legislative changes should be considered by regulators or Congress in order to protect investors; maintain fair, orderly and efficient markets; and facilitate capital formation?

Although the U.S. equity markets have faced challenges over the past decade, they could be fairly ranked as among the most transparent, competitive, resilient, and efficient markets in the world. As mentioned earlier, we believe that U.S. regulators should improve and update existing rules and regulations while also promoting industry guidelines and best practices. We believe that the markets would benefit from a modest, clearly defined set of modernized laws, regulations, and SRO rules, which are enforced consistently and fairly. Such action would cause market participants to implement more robust regulatory policies, procedures, and controls and reduce the inconsistent enforcement of regulatory obligations, thereby inspiring investor confidence and encouraging continued capital formation. To achieve this goal, the regulators require appropriate monitoring and surveillance tools at their disposal, most notably a staff which is knowledgeable in market structure and also a consolidated audit trail (CAT) in order to properly monitor market activity. Steps are being taken towards a CAT, but it is not happening quickly enough in order to improve investor confidence.

EXHIBIT B

Biography of Robert C. Gasser, CEO and President of ITG

Bob Gasser is Chief Executive Officer and President of ITG. Mr. Gasser was previously CEO at NYFIX, Inc., a global electronic trade execution firm.

Before NYFIX, Mr. Gasser was Head of U.S. Equity Trading at JP Morgan. Concurrently, Mr. Gasser served on the Board of Directors of Archipelago Exchange as well as on the NASDAQ Quality of Markets Committee and the NYSE Upstairs Traders Advisory Committee. Mr. Gasser holds a Bachelor of Science degree from the Georgetown University School of Foreign Service.

RESPONSES TO WRITTEN QUESTIONS OF CHAIRMAN REED FROM JOSEPH MECANE

Q.1. There was testimony that "dark trading" is a concern in many countries and that Canada recently modified its market structure to limit dark trading and to maximize price discovery. Canadian regulators have imposed a new framework governing how dark pools and undisplayed orders are allowed to operate including priority of lit over dark flow and a minimum price improvement requirement for dark orders. What is your view of these reform proposals? Would these measures make the U.S. markets more or less fair and transparent? Please explain. Would these measures be feasible in the U.S. markets? Why or why not?

A.1. To be clear, we are not adverse to the concepts of internalization or dark pools. We believe they are a valuable part of the market in terms of facilitating the execution of institutional block orders and providing significant amounts of liquidity to retail orders. However, there is a balance that must be struck between internalization and public price discovery in order to maintain a healthy public market. We believe the new Canadian rules—which are designed to encourage transparency, support the price discovery process, reward displayed orders with increased execution opportunities, and increase liquidity for all—can be incorporated into the U.S. markets to help achieve this difficult balance. Additionally, the Canadian rules recognize the value that dark trading can offer to minimize the market impact of trading blocks and provide meaningful price improvement—again, useful paradigms for preserving the value of internalization while creating mechanisms to facilitate publicly displayed liquidity.

A key objective of the Canadian rules was to encourage the posting of visible orders and expose liquidity to the widest variety of participants by ensuring that visible orders execute before dark orders at the same price across the entire market. [1] In stark contrast to Canada, in the U.S., market participants who take an added risk by displaying their orders are being traded ahead of, normally at the same price, on dark markets. This has the effect of reducing the execution experience on "lit" markets and further encourages liquidity providers to move into the dark markets. We believe this effect is borne out by the statistics we noted in our testimony that show that U.S. market structure has led to widespread and rapid growth in dark trading. [2]

We are concerned about the aggregate effect of dark or internalized activity on the overall U.S. marketplace, mainly the effect on spreads and volatility, as noted in recent research by the CFA In-

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[1] After significant analysis and industry commentary, the Investment Industry Regulatory Organization of Canada (IIROC) and the Canadian Securities Administrators (CSA) took the position that limiting the use of off-exchange trading was critical to maintaining the quality of the price discovery process and adopted new rules which went into effect on October 15, 2012. *http://www.bcsc.bc.ca/uploadedFiles/securitieslaw/policy2/23-405%20Dark%20Liquidity%20in%20the%20Canadian%20Market.pdf.* Rosenblatt Securities indicated the portion of Canadian equity trading done by dark pools was 2.06 percent in November 2012, down from 5.67 percent in September 2012. Rosenblatt Securities, "Let There Be Light", December 19, 2012.

[2] Off-exchange dark trading grew from 19.5 percent in October 2007 to a record level of 36.6 percent as of January 2013, including 38.5 percent in Nasdaq-listed securities. Off-exchange trading has increased 300 basis points in only two months since October 2012. Moreover, as of January 2013, approximately 3800 securities (49 percent of total securities) have over 40 percent of volume traded off-exchange (CTA).

stitute and Professor Daniel Weavers of Rutgers Business School [3]—especially in the thousands of less actively traded securities, as well as the selection bias in orders that do make it to public markets. Moreover, the Joint CFTC–SEC Advisory Committee urged the SEC to review the issue of internalization/dark trading in 2010. [4] Changes such as these are also in line with a key objective of Regulation NMS (Reg. NMS), namely displayed order protection. [5]

Q.2. What is an example of an order type that the NYSE has created to make our markets better, and improve transparency and price discovery? How does this order type provide equal access? Does the NYSE allow dark or undisplayed orders or provide dark execution? Why or why not?

A.2. The number and characteristics of order types offered by exchanges has been of recent discussion in the press and within the industry. It is important to note the overarching market structure context within which new order types are created, not the least of which is the competitive and complex dynamic among Exchanges and non-Exchange participants that is fostered by inequitable regulation. Among other things, we develop order types to allow clients to control how their orders interact with others in a complicated market environment. Many order types are developed to help participants comply with requirements of Reg. NMS, while others enable a participant to control their execution costs. More recently and significantly, Exchanges have developed order types to attempt to compete with practices that are allowed by non-Exchange venues, some of which are undisplayed. One of these order types, and perhaps the newest and most innovative in our suite of order types, is the RLP order.

The Retail Liquidity Program (RLP), which was approved in July 2012, gives retail investors the ability to receive price improvement at a sub-penny increment of at least $0.001 in an exchange environment. In comparison, off-exchange venues have been permitted to segment customer order flow, and trade in sub-penny increments, without limits since the inception of Reg. ATS. Approval of this relatively simple and beneficial order type took several months to develop and discuss with the SEC before the 240 day public process that took place once we publicly filed the proposal with the Commission. Prior to the existence of RLP, exchanges were not permitted to target specific customer segments, even where there could be significant benefits to the retail investing public. While arguments can be made about whether sub-penny executions and segmentation are the "right" market structure, in general we firmly

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[3] *http://www.cfapubs.org/doi/abs/10.2469/ccb.v2012.n5.1; http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1846470*

[4] In a summary report on Recommendations Regarding Regulatory Responses the Market Events of May 6, 2010, the Joint CFTC–SEC Advisory Committee noted that "the impact of the substantial growth of internalizing and preferencing activity on the incentives to submit priced order flow to public exchange limit order books deserves further examination" and recommended the SEC review whether to "adopt its rule proposal requiring that internalized or preferenced orders only be executed at a price materially superior (e.g., 50 mils for most securities) to the quoted best bid or offer. *http://www.sec.gov/spotlight/sec-cftcjointcommittee/021811-report.pdf*

[5] In the rule the Commission stated: "The Commission agrees that strengthened protection of displayed limit orders would help reward market participants for displaying their trading interest and thereby promote fairer and more vigorous competition among orders seeking to supply liquidity." *http://www.sec.gov/rules/final/34-51808.pdf*

believe that exchanges should be able to compete on equal footing with other venues when the investing public can benefit from price improvement in a competitive, liquid price discovery process.

The development, testing, and approval process for a new exchange order type is extensive and lengthy—sometimes taking a year or more to receive SEC approval. Exchange orders types are required to be available to members on a fair and reasonable basis and are detailed in SEC rule filings which are published for public comment and subject to the scrutiny of our direct competitors.[6] By contrast, ATSs and brokers offering "dark" or internalized trade execution services do not publicly disclose details about how their trading functionality works, including order ranking and execution rules, and the algorithms and order types offered to clients are not subject to prior public comment, SEC approval, or even SEC review. These participants use their regulatory advantage as a competitive edge to develop order functionality and this often drives client demands for Exchange order types.

Overall, to the extent an initiative develops to "streamline" the number of order types, the most effective way to accomplish this would be through a simplification across all market venues of the underlying market structure that gave rise to the proliferation of order types.

Q.3. Rule 612 of Regulation NMS prevents sub-penny quoting. However, under an exemption in Rule 612 the SEC actually allows broker-dealers to execute orders in sub-penny increments. Because there are no quoting obligations for broker-dealer internalization, broker-dealers can provide price improvement to their customers in the form of sub-penny executions. What are advantages or disadvantages of sub-penny quoting? Is special pricing good for retail investors? Why or why not?

A.3. Sub-penny quoting and trading raise two separate but interrelated issues. First is the ability for certain venues to trade in sub-penny increments. The second is whether quoting should similarly be allowed down to the sub-penny level.

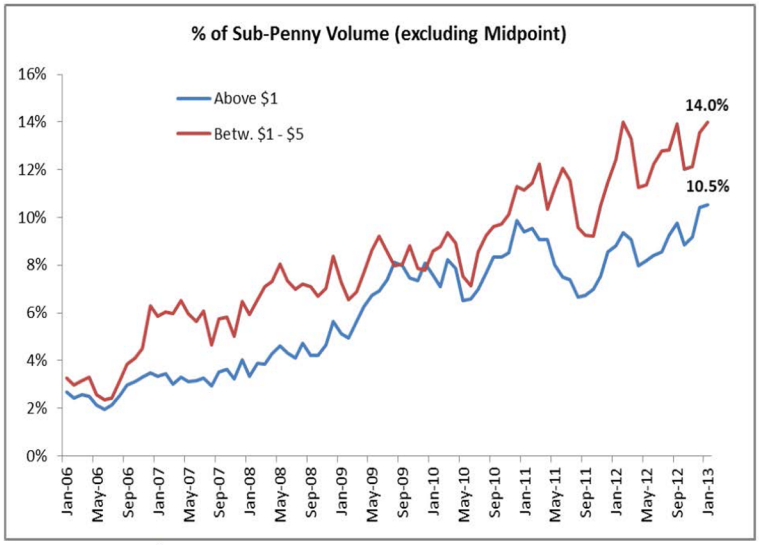
Our primary viewpoint is that the rules applying to sub-penny trading and quoting should be consistent across venues, regardless of the market participant utilizing it. From a public policy perspective, if sub-penny trading is allowed in non-Exchange venues, we believe similar conventions should be allowed in Exchange venues also. On a related note, as we've highlighted elsewhere, we worry about the rising level of activity that trades in front of visible, displayed liquidity and would suggest that a minimum amount of price improvement be required for this convention. Until the RLP program, Exchanges were only permitted to offer midpoint executions to its members. However, in August 2012, under the RLP program, for the first time an Exchange was allowed on a pilot basis to permit the execution of retail orders in sub-penny increments at a minimum of $.001 to mirror some of what occurs in internaliza-

[6] NYSE Euronext operates three equity exchanges in the U.S., NYSE, NYSE MKT (MKT), and NYSE Arca (Arca), each of which publicly discloses all order types in SEC-approved rule filings and on our publicly available Web site. *http://usequities.nyx.com/markets/nyse-equities/order-types; http://usequities.nyx.com/markets/nyse-arca-equities/order-types*

tion.[7] However, the RLP program remains far more restrictive than broker internalization, and is currently limited to a small segment of the marketplace. Despite the positive impact it may have on the retail investor, the RLP program only accounted for 0.14 percent of consolidated volume in December 2012.

The related question is whether sub-penny quoting should be allowed alongside sub-penny trading. This is also the topic of an upcoming SEC Roundtable, and should also be considered in the context of our previous point. However our basic view is that to the extent sub-penny trading continues to be allowed, then a more fair market structure would be to similarly provide for sub-penny quoting. While we agree with many of the negative implications of sub-penny quoting—such as investor confusion, a noneconomic denomination, quote traffic implications—we believe the current structure puts the public markets are at a significant competitive disadvantage that should be addressed.

The chart below shows sub-penny trading (excluding mid-point executions) in securities priced above $1 rose from 2.7 percent in January 2006 to 10.5 percent of volume in January 2013. In securities priced between $1 to $5, sub-penny trading (excluding mid-point executions) rose from 3.3 percent in January 2006 to 14.0 percent in January 2013. Nearly all sub-penny trading (excluding mid-point executions) occurs off-exchange.



Source: CTA/UTP

Q.4. Does the larger percentage spread in low-price stocks lead to greater internalization by OTC market makers or more trading volume in dark pools? If so, why? Should the Commission consider reducing the minimum pricing increment in Rule 612 for lower priced stocks?

[7] SEC Release No. 34-67347: *http://www.sec.gov/rules/sro/nyse/2012/34-67347.pdf.*

A.4. We believe the current penny quoting requirement has created artificially wide spreads in many liquid low-priced stocks where there is significant internalization.[8] There are two primary ways to potentially alter this dynamic—one by decreasing the minimum tick increment, and the other by incentivizing displayed public liquidity over that traded privately, as we have highlighted in our previous answers. Reducing the minimum pricing increment in liquid low-priced securities would lower investor trading costs and improve market transparency. In contrast to the "one size fits all" approach of the U.S., many countries have adopted tiered tick sizes based on the price level of a stock, with tick increments less than a penny.

The decision to internalize a trade is influenced by the trade-off of profit opportunity versus "risk" assumed. In general, the wider the spread in a lower-priced stock, the more profit opportunity and incentive to internalize. This incentive is further distorted to the extent there are differing increment rules on different types of venues, and also to the extent venues are allowed to trade in front of displayed liquidity in sub-penny increments.

The other contributing factor to greater internalization in low-price stocks is the uniform access-fee cap of $.0030 per share that applies across all stocks as defined in Regulation NMS. Some thought should be given to reducing the access-fee cap in these stocks commensurate with either price or spread.

Q.5. Some commentators have suggested that the Securities and Exchange Commission (SEC) should lift the ban on locked markets. Locked markets occur when a trader attempts to place a bid on one exchange at the same price as an offer on a different exchange. They argue that bids and offers at the same price but different venues should be forced to interact, and this could reduce fragmentation in the marketplace and perhaps reduce the prevalence of trading in dark pools and internalization venues. What is your view of this proposal?

A.5. Prior to Reg. NMS market centers were allowed to display quotes that locked or crossed other markets for NASDAQ-listed securities. Commenters at that time noted that locked/crossed markets could cause investor confusion and detract from market efficiency and were prohibited within Regulation NMS. Recently, some market participants have suggested that locked markets should potentially be allowed as a way to reduce fragmentation and internalization.

We agree that the current market structure has incentivized too much fragmentation and executions purely based on the public market quotes. There are several ways to potentially address this issue, some of which have been addressed in our previous responses. Locked markets are another way to potentially reduce the fragmentation incentive by decreasing the potential profit opportunity from internalizing, and/or reducing the need for a similar number of protected quotes.

As with any proposed changes, it is important to evaluate both the positives and negatives of any changes. On the positive side, locked markets would make transparent more trading interest—

[8] *http://www.sec.gov/spotlight/regnms/jointnmsexemptionrequest043010.pdf*

nondisplayed buy and sell orders on market centers that are executable but not currently eligible for display. Locked markets would also reduce trading costs by eliminating the spread and would potentially simplify some order types that were developed to comply with Reg. NMS rules.

However, on the negative side, we specifically worry that locked markets would become common in many active securities that continually quote at a penny spread today, potentially creating investor confusion.

The benefits and concerns resulting from locked markets need to be carefully considered as part of a holistic review of U.S. equity market structure. Other potential alternatives to allowing locked markets exist and should be considered. These include depth-of-book protection as well as other suggestions highlighted in other responses such as incentivizing displayed liquidity and/or introducing consistent trade and quote increments in the industry.

Q.6. Internalizing broker-dealers often pay retail brokers to direct customer orders to their trading venues. Does this practice advantage or disadvantage retail investors? Why or why not? Why is retail flow valuable to trade against?

A.6. Trading with retail flow is regarded as advantageous for two reasons—on average, the "informational" content tends to be lower than other types of order flow encountered in the market, and secondly, retail flow tends to be smaller and have less liquidity impact in a given stock. When a small order is sent by an institutional client, it is often a part of a larger order, and the counterpart interacting with the first order does not know that there will be significantly more stock behind it.

Payment for order flow is an issue that has been widely debated in the industry and also warrants further ongoing review due to the inherent conflicts that exist when the payment is not directly accruing to the end investor. It is also important that payment for flow not be viewed in isolation. Payment for order flow, price improvement, and access fees are interrelated topics that should be dealt with concurrently.

The traditional retail internalization model that exists today is primarily done through the interaction of retail market orders with a single wholesaler. Internalization is beneficial to the individual retail counterparty to the trade if the execution results in meaningful price improvement. However, internalization deprives both retail and institutional limit orders displayed on exchanges from interacting with those orders. The markets and price discovery optimally function through interactions with multiple, diverse market participants. When there is a proper mix of market participants, there is a greater incentive for market makers to quote more aggressively than a single participant. This incentive affords investors an opportunity to receive a superior fill on an exchange, one of the primary drivers behind the development of our RLP program. The Exchange environment brings competition from multiple liquidity providers, which offers retail investors greater price improvement potential, while also continuing to protect displayed quotes, which is fundamental to preserving market quality for all investors.

Q.7. Broker-dealers that operate their own dark pools can get a fee advantage when they route customer orders through their own dark pools rather than through a lit exchange. Does this create a conflict of interest between investors, who want to buy or sell stocks at the best prices, and brokers, who want to avoid exchange fees? Why or why not?

A.7. There are two related topics that this question raises. The first is one of best execution and whether the interests of the customer are being put first. The second is a broader question about the cumulative impact of these practices on overall market quality.

There are 13 equity exchanges offering a wide variety of fee choices for customers. Some exchanges offer high rebates to encourage liquidity providing and charge corresponding fees to remove liquidity. Under this model, investors who take additional risk by posting liquidity and showing their investment interest may be rewarded as price makers through a rebate. Investors who do not want to set prices but rather only act as takers of liquidity are charged a fee. This model was created by exchanges as a way to incentivize market participants to make public markets and assist in the price discovery process. This mechanism has become increasingly depended upon by exchanges as the more highly desired order flow from retail and institutional investors is executed in dark trading venues. Several exchanges also offer low take fees or even rebates to remove liquidity—minimizing the incentive for brokers to avoid exchanges simply because of fees.

As noted in the previous response, investors trading through a single private broker venue may not be optimizing their execution if the reason is to avoid exchange take fees or to maximize business in the broker-dealer owned dark pool. In an exchange environment, however, the order would be exposed to competitive participants within a transparent environment with a real chance for execution optimization.

As was expressed by Invesco's Chief Investment Officer during the June 2012 House Financial Services Committee's hearing, internalization whereby the broker-dealers garner information advantages creates a conflict of interest that they believe does not advantage the investor.[9] Similar conflict and disclosure issues were also recently raised by FINRA.[10]

More significantly, however, is the effect this aggregate activity has on overall market quality. As outlined in recent research by Tabb Group and the CFA Institute,[11] the incentive to segment markets and reduce transparency jeopardizes the price discovery process and can adversely impact costs for all investors. Contrary to the stated goals of Reg. NMS, today's market structure incentives result in increasingly higher levels of dark trading in broker owned venues, resulting in increased conflicts between investors and their executing brokers.

Q.8. The U.S. exchanges are required to submit data to a centralized network where it is aggregated before being disseminated to

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[9] *http://financialservices.house.gov/uploadedfiles/hhrg-112-ba16-wstate-kcronin-20120620.pdf*

[10] 2013 Regulatory and Examination Priorities Letter: *http://www.finra.org/web/groups/industry/@ip/@reg/@guide/documents/industry/p197649.pdf.*

[11] Tabb Group, "A Spotlight in the Dark: An Inevitable Debate", p. 8, Exhibit 4, November 2012; *http://www.cfapubs.org/doi/abs/10.2469/ccb.v2012.n5.1.*

the public. However, the Consolidated Tape Association/Securities Information Processor or SIP now lags behind direct proprietary market data feeds. As a result, high frequency trading firms and other market participants now usually colocate their computer servers at every exchange and subscribe to proprietary data feeds offered by the exchanges in order to capitalize on latency arbitrage opportunities. Why should anyone receive market data flow from other than the consolidated tape? Should market data be distributed to all market participants equally? How do you think this can best be accomplished?

A.8. The consolidated tape data feeds include the best-priced quotations of all exchanges and all reported trades, as well as the calculation of the NBBO, short sales restriction indications, single stock circuit breaker indicators, and other data. Proprietary data feeds of individual exchanges include those exchanges' own best-priced quotations and trades as well as other information not available through the consolidated tape, such as depth-of-book prices, which are required for trading larger or more sophisticated orders, particularly in a Regulation NMS environment. Because of these differences, market participants may choose to take market data from the consolidated tape and/or directly from exchanges or other vendors, depending on their individual needs. In any event, the SEC has to approve exchanges' proprietary data products before they are sold to the public, and one of the general requirements for approval is that the data is indeed fairly and equally accessible to those that want to subscribe to the data feeds. Moreover, speed differences from a user perspective are not unfair or unusual. Because the data that exchanges send to the securities information processors (SIPs) is consolidated by the SIPs and then redistributed, the information in the proprietary data feeds of exchanges is permitted to reach market participants faster than the information sent from the SIP to the same market participants. Indeed, this was expressly contemplated in Regulation NMS where the SEC noted:

> Commenters were concerned about the statement in the Proposing Release that the distribution standards would prohibit a market from distributing its data independently on a more timely basis than it makes available the "core data" that is required to be disseminated through a Network processor. Instinet, for example, requested that the Commission clarify that the proposal would not require a market center to artificially slow the independent delivery of its data in order to synchronize its delivery with the data disseminated by the Network. Adopted Rule 603(a) will not require a market center to synchronize the delivery of its data to end-users with delivery of data by a Network processor to end-users. Rather, independently distributed data could not be made available on a more timely basis than core data is made available to a Network processor. Stated another way, adopted Rule 603(a) prohibits an SRO or broker-dealer from transmitting data to a ven-

dor or user any sooner than it transmits the data to a Network processor. [12]

Further, in the SEC's 2010 Concept Release on Equity Market Structure, the Commission commented the average latency for the consolidated data feeds was generally less than 10 milliseconds at that time. This latency captures the difference in time between receipt of data by the SIP from the exchanges and distribution of the data by the SIP to the public. Since that time, continued improvements have been made to the SIP's processing and today the average quote latency is less than 1 millisecond for Tape A&B securities and less than 2 milliseconds for Tape C securities (such data is made publicly available on a quarterly basis). *[http://www.nyxdata.com/CTA]* We would note that the amount of data sent via proprietary feeds is far greater than on the consolidated feed, so the cost of telecommunications and the time to process this data when received is higher as well. Given these differences, we believe the provision of consolidated and proprietary data is largely about choice for customers.

Q.9. The October closure of the markets for 2 days due to Hurricane Sandy raised questions about the financial sector's preparedness for the next natural or man-made disaster. What challenges did the markets face in reopening after Hurricane Sandy? What should have been done differently after Hurricane Sandy to keep providing trading services to customers and maintain market integrity? What can the stock exchanges do to prepare the market for another disaster? What changes need to be made by market participants and regulators?

A.9. The effects of Hurricane Sandy on the northeast were devastating. Lives were lost and thousands of families were displaced. The markets faced several challenges leading up to and during Hurricane Sandy. Reports called for a severe storm with massive flooding, widespread power outages, the shutdown of major transportation methods and dangerous travel conditions. In retrospect, all of these reports came true. Further, many of the largest financial service companies, exchanges, the securities clearinghouse (DTCC), and countless related smaller firms are headquartered in areas that expected a severe impact. The storm was forecast to affect such a wide area that many firms had both their primary and backup facilities within the affected region.

NYSE senior management was in contact with the SEC, industry trade associations, member firms, and other exchanges throughout the weekend of October 27th and October 28th to consider the challenges posed by the forecasted hurricane. In the end, this group collectively decided that the risk/reward of opening the market while all industry participants with a local footprint would operate in contingency seemed inconsistent with providing a stable, liquid market.

Following the hurricane, the challenges faced by the markets were primarily borne by industry personnel. While the markets reopened on October 31st, industry personnel faced significant obstacles common to all residents of the surrounding area. Power and

[12] *See,* SEC Release No. 34-51808; File No. S7-10-04 at p. 271 (August 29, 2005).

communication outages hampered people's ability to work remotely. Access and transportation to certain areas like lower Manhattan were severely restricted. Basic necessities in these areas like lodging and food presented some challenges initially. There was significant damage to communications around lower Manhattan and surrounding areas. While there were many challenges to overcome, we note that the markets re-opened without incident on October 31st.

There are several lessons to be learned from this event. At a minimum, businesses learned the importance of a well-prepared and tested business continuity plan. At NYSE Euronext, we are actively considering changes to our current disaster recovery model for NYSE and NYSE MKT. The exchanges can take steps to both review BCPs and regularly test backup trading locations. Regular testing should both include a test of connectivity with exchange backup facilities and cause minimal disruption to the financial markets or its' participants. The industry should consider whether to make these tests mandatory for all participants. Industry conversations are underway to assess lessons learned and prepare for similar events.

Q.10. It has recently been reported that the SEC's Interim Inspector General found that some staff in the SEC's Trading and Markets Division did not encrypt computers containing confidential data from the exchanges and clearing agencies they were overseeing. What measures are being taken now or should be taken by market participants and regulators to better secure data in today's high tech markets?

NYSE Euronext is committed to providing our customers with a secure network delivering the highest levels of reliability in the industry. The reliability and availability of NYSE Euronext's Secure Financial Transaction Infrastructure (SFTI) is dependent upon many dynamics including the prevention of security breaches and cyber attacks. The security problems uncovered through the SEC's Inspector General Report were unfortunate and deeply concerning to NYSE Euronext, however we believe the important outcome is that the SEC appears to be taking steps to prevent a similar situation from occurring again the future. We also support a more targeted approach to regulator accumulation of entity data to ensure that any security issues have more limited impact.

As witnessed by several high profile cyber security breaches during the past several years, the Federal Government has developed a notification process that includes a number of agencies including the SEC, CIA, FBI, and DHS. NYSE Euronext is supportive of these coordinated efforts by Federal agencies and will continue to be partner with them in securing our financial markets.

As offered during the hearing, we would also like to take the opportunity to clarify the record on some of the representations and data provided by the Credit Suisse witness. We believe the below clarifications will provide a more accurate depiction of the facts.

Point 1—Levels of "Off-Exchange" Trading

Mr. Daniel Mathisson of Credit Suisse offered in his testimony that the "statement that volume has been moving to off-exchange

venues . . . is factually incorrect. Over the past 5 years, volume has not shifted to off-Exchange venues."[13] We strongly disagree.

Credit Suisse's conclusions rely on data that incorporates a misleading and narrowly focused definition of "off-exchange" and "on-exchange" trading: literally, whether a market was registered as an exchange or not during the relevant time frame. In particular, Mr. Mathisson includes BATS and Direct Edge, which were "Electronic Communication Networks" or ECNs in the "off-Exchange" category. These ECNs displayed public quotes and participated in price discovery in a way that was very similar to exchanges, and subsequently became registered exchanges.[14]

Under a more accurate and accepted measurement methodology for "off-Exchange" trading, such "off-Exchange" activity would not include ECNs such as BATS and Direct Edge. When measured correctly, "off-Exchange" trading, which would only include dark pools and internalization desks, rose from 19.5 percent in October 2007 to 35 percent in December 2012 and 37 percent in January 2013, as shown in Figures 1 and 2. Similar classifications were highlighted in recent reports by Tabb Group and Rosenblatt Securities.[15]

Mr. Mathisson also commented that dark pool activity has increased, but "other internalization"[16] has declined. This statement also is misleading. Dark pool activity has indeed tripled from 4 percent to 13 percent of total volume over the cited period. However, what Mr. Mathisson refers to as "other internalization" has risen from 12 percent to 21 percent of total U.S. trading activity from between January 2008 and December 2012, as shown in Figure 2.

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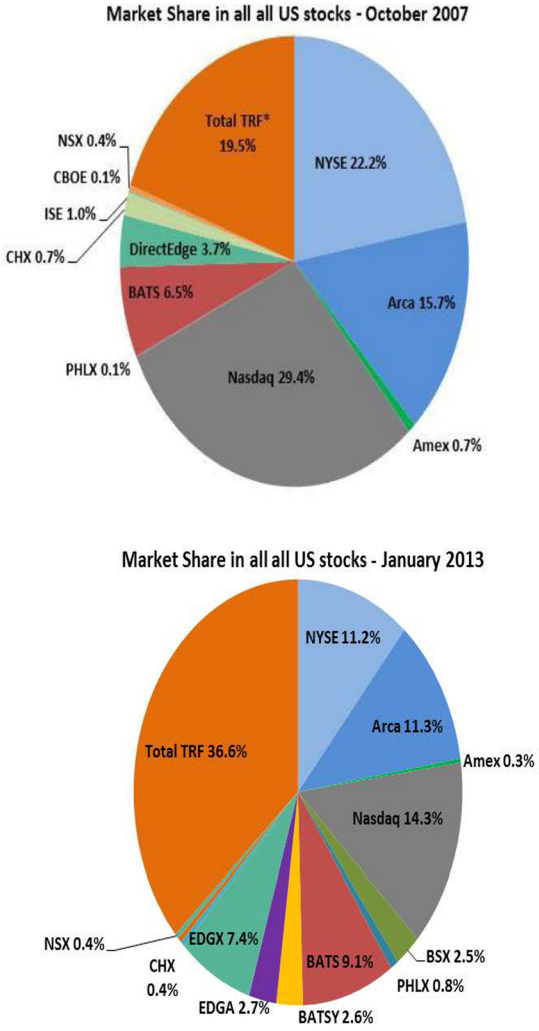
[13] Written Testimony of Daniel Mathisson of behalf of Credit Suisse, Before the Senate Banking Committee Subcommittee on Securities, Insurance, and Investment "Computerized Trading Venues: What Should the Rules of the Road Be?", December 18, 2012.

[14] BATS became a national securities exchange in October 2008 and Direct Edge spun off the EDGA/EDGX exchanges in July 2010.

[15] Tabb Group, "A Spotlight in the Dark: An Inevitable Debate", p. 8, Exhibit 4, November 2012; Rosenblatt Securities, U.S. Securities Volume: Year-In-Review, January 4, 2013.

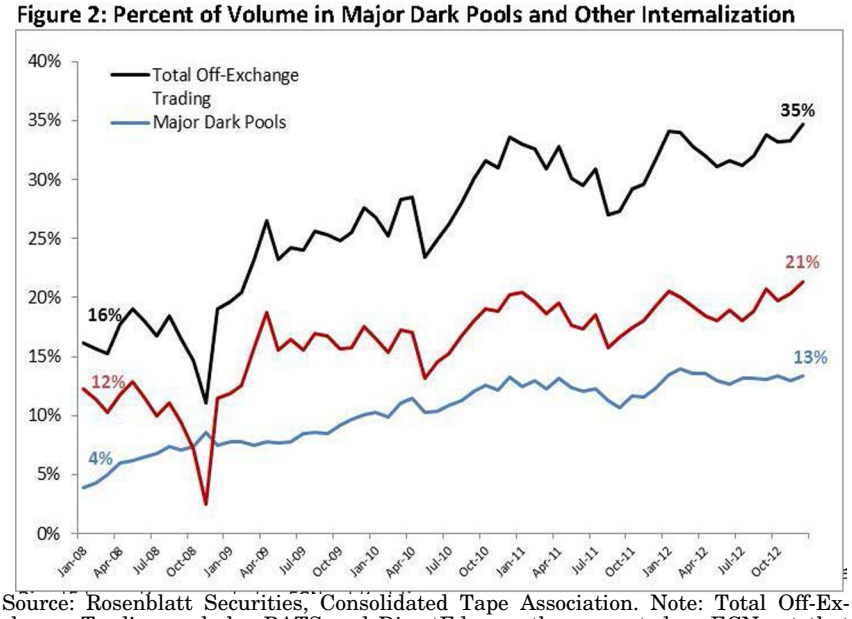
[16] Other internalization generally includes trades matched internally by broker-dealers based on the public quote. While these market-makers maintain various quoting and pricing obligations to their own client's orders, the desk may step in front of exchange-displayed orders by simply matching the displayed price. This can occur either on their client's behalf or for their own account (Tabb Group, "A Spotlight in the Dark: An Inevitable Debate", November 2012).

"Computerized Trading Venues: What Should the Rules of the Road Be?"
December 18, 2012



* Includes ADF and excludes BATS ECN and DirectEdge ECN, which are broken out separately.
Source: http://www.batstrading.com/market_volume.php,
http://www.thetradenews.com/news/Trading_Venues/Exchanges/Direct_Edge_CEO_plays_down_market_share_dip.aspx, Consolidated Tape Association.

Figure 2: Percent of Volume in Major Dark Pools and Other Internalization



Source: Rosenblatt Securities, Consolidated Tape Association. Note: Total Off-Exchange Trading excludes BATS and DirectEdge as they operated as ECNs at that time.

Point 2—SRO Immunity

In his written testimony, Mr. Mathisson stated that (1) "courts have traditionally afforded exchanges 'absolute immunity' from civil liability for damages arising in connection with their regulatory operations"; (2) "It is a dangerous situation when a for-profit enterprise can cause half a billion dollars of losses for others, and not have the risk of being held legally liable"; and (3) that *"Exchanges have absolute immunity on errors . . . "* [emphasis added].[17]

These statements are flatly inaccurate and warrant clarification.

Exchanges do have immunity from private lawsuits for damages when engaging in conduct consistent with the quasi-governmental powers delegated to them pursuant to the Exchange Act, and we believe that this well-developed doctrine is critical to ensuring that exchanges are protected when fulfilling those statutorily delegated powers. However, exchanges still answer to the SEC for their conduct, and can and have been fined by their primary regulator. This is true regardless of whether immunity applies in particular cases.

Separately, we have commercial limits of liability in place with our members, which are governed by rules and membership agreements approved by the SEC. These rules and agreements enable members to be reimbursed for certain types of errors made by the exchange. Moreover, these rules are submitted to the normal notice-and-comment process required by the Exchange Act, which

[17] Written Testimony of Daniel Mathisson of behalf of Credit Suisse, Before the Senate Banking Committee Subcommittee on Securities, Insurance, and Investment "Computerized Trading Venues: What Should the Rules of the Road Be?", December 18, 2012.

gives the public—including our members—the opportunity to voice concerns about the exchange's rules.

Point 3—Tape Revenue for Consolidated Market Data

In his written and oral testimony, Mr. Mathisson/Credit Suisse asserts that, "The CTA (Consolidated Tape Association) has a legal monopoly on providing a consolidated stream of real-time data from our Nation's stock markets. The CTA makes a profit of approximately $400m per year which is then distributed to its participant exchanges based on a complex formula. *ATSs do not receive tape revenue*" [emphasis added].[18] Mr. Mathisson later alleges that " . . . the exchanges are entitled to market data revenues to offset the costs of regulating their markets . . . [and] revenues from market data are way out of proportion with the costs of exchanges' self-regulatory responsibilities." The citation for this statement is the SEC's 1999 Concept Release: Regulation of Market Information Fees and Revenue, Exchange Act Release No. 42208 [hereinafter SEC 1999 Market Data Concept Release]. Finally Mr. Mathisson/Credit Suisse alleges that "[b]ecause the CTA allocated revenue to the exchanges is based on a complex formula involving variables such as each exchange's number of quotations, for-profit exchanges try to set policies and services that will increase the level of quoting activity."[19] Mr. Mathisson/Credit Suisse claims that a by-product of these alleged policies is quote flickering. These claims require clarification:

1. While the CTA plan does not directly pass tape revenue to non-Exchange participants, the two FINRA TRFs rebate an estimated $50 to $60 million in tape revenue annually back to brokers, including ATSs and broker-dealer internalizers.
2. The SEC 1999 Market Data Concept Release was not a rule-making or adjudication by the SEC—it was an invitation for comment on matters the SEC was considering, and it did not result in rulemaking. In addition, the SEC 1999 Market Data Concept Release repeatedly refers to the market data pool as being used to fund *"the market's operation and regulation"* [emphasis added]. As such, it is not accurate to represent that the SEC expressed a view, even in the context of the SEC 1999 Market Data Concept Release, that market data fees are exclusively meant to fund regulation.
3. The market data allocation formula is not based on an "exchange's number of quotations," but instead is partly based on dollar size and the amount of time at the NBBO (i.e., quoting share), which accounts for 50 percent of the allocation formula. The other 50 percent allocation is based on trading share. This allocation formula was established by the SEC in Reg NMS to incentivize both price discovery and market quality. Importantly, the formula requires that a quotation must be displayed for a minimum of one full second to earn quote

[18] Written Testimony of Daniel Mathisson of behalf of Credit Suisse, Before the Senate Banking Committee Subcommittee on Securities, Insurance, and Investment "Computerized Trading Venues: What Should the Rules of the Road Be?", December 18, 2012.

[19] Written Testimony of Daniel Mathisson of behalf of Credit Suisse, Before the Senate Banking Committee Subcommittee on Securities, Insurance, and Investment "Computerized Trading Venues: What Should the Rules of the Road Be?", December 18, 2012.

credits.[20] This minimum time period was put in place by the SEC specifically to prevent quote flickering. In this regard, the SEC stated in its explanation to commenters that opposed the need for a market data plan formula, " . . . the Commission's primary objective is to correct an existing flaw in the current formulas by allocating revenues to those SROs that, even now, benefit investors by contributing useful quotations to the consolidated data stream."[21] As such, we believe it is incorrect to assert that the SEC market data allocation formula incentivizes quote flickering.

More broadly, as noted in our oral testimony, registered exchanges operate under a regime of obligations and benefits. These obligations are significant, and include: rule filing obligations, restrictions on business operations, the inability to transact with public customers, member ownership limitations, fair access and self-regulatory obligations. Mr. Mathisson and Credit Suisse seem to argue that any economic incentives associated with the fulfillment of these important obligations should be allocated to the broker-dealers and investment banks and not to the exchanges that bear these significant regulatory obligations that benefit the industry and subsequently, the public.

As stated in our testimony, we would welcome a holistic review of our current U.S. market structure, including the benefits and obligations of registered exchanges and broker-dealers; however we would caution that the investment banks' and broker-dealers' economic self-interests should not be the linchpin upon which investor protection rests.

Thank you again for the opportunity to testify and provide our thoughts. We would be happy to answer any additional questions that you may have.

RESPONSES TO WRITTEN QUESTIONS OF CHAIRMAN REED FROM DANIEL MATHISSON

Q.1. There was testimony that "dark trading" is a concern in many countries and that Canada recently modified its market structure to limit dark trading and to maximize price discovery. Canadian regulators have imposed a new framework governing how dark pools and undisplayed orders are allowed to operate including priority of lit over dark flow and a minimum price improvement requirement for dark orders. What is your view of these reform proposals? Would these measures make the U.S. markets more or less fair and transparent? Please explain. Would these measures be feasible in the U.S. markets? Why or why not?

A.1. Canada rolled out new rules in October of 2012 that were intended to limit broker-dealer crossing platforms. The new rules forced several market participants to either exit Canadian markets (e.g., Goldman Sachs Sigma X) or drastically alter their business models (e.g., TSX Alpha Intraspread). According to the Rosenblatt Report released on December 19th 2012, combined dark volumes in Canada fell significantly to 2.06 percent in November, from 3.54

[20] *http://www.sec.gov/rules/final/34-51808.pdf*
[21] *http://www.sec.gov/rules/final/34-51808.pdf,* p. 264.

percent in October and an original 5.67 percent of equity trading volume in September before the new framework went into effect. While it appears the new rules have skewed the competitive environment, hurting Canadian ATS operators and helping exchanges, we have seen no empirical evidence that this change has been beneficial for investors.

We believe that the U.S. regulators should carefully review any future academic studies that demonstrate how the Canadian change has impacted liquidity, price stability, bid/ask spreads, and other empirical measures of market health. In the absence of evidence that the rule change has helped investors, it would not make sense for the U.S. to blindly follow Canada's lead. We believe that a rule change like this would have a major impact on the existing market structure, and this should only be considered as part of a comprehensive market reform that reviews the entire competitive landscape of the for-profit exchanges and broker-dealers.

Q.2. Rule 612 of Regulation NMS prevents sub-penny quoting. However, under an exemption in Rule 612 the SEC actually allows broker-dealers to execute orders in sub-penny increments. Because there are no quoting obligations for broker-dealer internalization, broker-dealers can provide price improvement to their customers in the form of sub-penny executions. What are advantages or disadvantages of sub-penny quoting? Is special pricing good for retail investors? Why or why not?

A.2. We believe that sub-penny trading is net beneficial for retail clients, as well as for institutional clients. In the current market structure, retail clients typically receive an immediate fill at a price slightly better than the bid or offer. For example, if Ford Motors is showing a 13.83 offer, a retail client buying 2,000 shares would often receive a fill of, say, 13.829, saving a small amount of money on the transaction vs. the offer price. Known as "price improvement," those small amounts can add up to significant sums over a lifetime of investing.

The SEC has recently relaxed Rule 612, by approving pilot programs by the NYSE and BATS Exchange which offer price improvement and allow sub-penny trading ("Retail Liquidity Program" approved in July 2012). Since exchanges are now permitted to accept and rank orders in sub-penny increments in the RLP program, we believe broker-dealer operated Alternative Trading Systems should be able to do so as well.

Q.3. Some commentators have suggested that the Securities and Exchange Commission (SEC) should lift the ban on locked markets. Locked markets occur when a trader attempts to place a bid on one exchange at the same price as an offer on a different exchange. They argue that bids and offers at the same price but different venues should be forced to interact, and this could reduce fragmentation in the marketplace and perhaps reduce the prevalence of trading in dark pools and internalization venues. What is your view of this proposal?

A.3. While the rationale for banning locked markets under Rule 611 of Regulation NMS Rule is to prevent trading at inferior prices, one of the unintended effects of Rule 611 has been the proliferation of exchange order types with the sole purpose of allowing sophisti-

cated users to unfairly gain queue priority over simple limit orders. These order types have contributed to an increase in pinging and cancellation rates. We believe that lifting the ban on locked markets would greatly simplify the U.S. equity markets and possibly lead to better execution results for investors. We recommend that the SEC implement a pilot program lifting the ban on locked markets in several NMS symbols to conduct analysis and gather empirical data to measure the effects and impact to the markets.

Q.4. Internalizing broker-dealers often pay retail brokers to direct customer orders to their trading venues. Does this practice advantage or disadvantage retail investors? Why or why not? Why is retail flow valuable to trade against?

A.4. Retail investors are advantaged by the current system, where brokers are allowed to engage in market-making. Market-makers typically pay rebates to retail brokers for order flow, which allows the retail brokers to charge very low commissions to the end customer. Market-makers typically provide better quality of execution than exchanges, as execution quality statistics are made public under SEC Rule 605, resulting in savings for the investor.

Retail flow is considered valuable to market-makers because it typically consists of a steady stream of small market orders. A market-maker will try to buy near the bid from client A and sell near the offer to client B, capturing a spread in the process. Market-makers prize small orders because they are less risky than large institutional orders.

Q.5. Broker-dealers that operate their own dark pools can get a fee advantage when they route customer orders through their own dark pools rather than through a lit exchange. Does this create a conflict of interest between investors, who want to buy or sell stocks at the best prices, and brokers, who want to avoid exchange fees? Why or why not?

A.5. This practice does not create a conflict of interest. Under Regulation NMS, orders in the U.S. may not "trade through" the National Best Bid Offer (NBBO), meaning that if a stock is offered at 18.50 on an exchange, a broker-dealer may not route a buy order to a venue where the order would be filled at 18.51 or higher. The client is guaranteed to do no worse than the best current price on the national market system. Within that significant constraint, as part of their best execution obligations, broker-dealers take into account multiple factors when deciding where to route client orders. These factors include the potential for price improvement, the speed of execution, and the likelihood that an order will be filled.

Q.6. The U.S. exchanges are required to submit data to a centralized network where it is aggregated before being disseminated to the public. However, the Consolidated Tape Association/Securities Information Processor or SIP now lags behind direct proprietary market data feeds. As a result, high frequency trading firms and other market participants now usually colocate their computer servers at every exchange and subscribe to proprietary data feeds offered by the exchanges in order to capitalize on latency arbitrage opportunities. Why should anyone receive market data flow from other than the consolidated tape? Should market data be distrib-

uted to all market participants equally? How do you think this can best be accomplished?

A.6. In an ideal system, we believe that all intraday market data would be supplied by the SIP. However, we recognize that this would create a significant disruption to the existing business models of the for-profit exchanges as well as many trading firms, and therefore regulators should carefully analyze and review the costs and benefits prior to changing the current data distribution model.

Q.7. The October closure of the markets for 2 days due to Hurricane Sandy raised questions about the financial sector's preparedness for the next natural or man-made disaster. What challenges did the markets face in reopening after Hurricane Sandy? What should have been done differently after Hurricane Sandy to keep providing trading services to customers and maintain market integrity? What can the stock exchanges do to prepare the market for another disaster? What changes need to be made by market participants and regulators?

A.7. The decision to close the U.S. equities markets on October 29th and October 30th was made after serious consideration and with industry-wide consensus on Sunday, October 28th, as Hurricane Sandy was bearing down on East Coast. Several contingency plans were discussed, but the primary concern was the safety of employees. All contingency plans involved a number of key employees having to commute and work in areas in immediate danger of being flooded or destroyed.

Most U.S. financial institutions, including Credit Suisse, have backup power generators and disaster recovery sites to maintain uninterrupted trading and customer service during fire, flooding, or any other event impacting the firms' primary location. However, given the rarity of events as severe as Hurricane Sandy, it would be impractical and tremendously costly for the entire industry to maintain fully operational, fully staffed alternative sites and facilities in various locations throughout the country. According to our research, during the past 100 years, the U.S. markets have been closed due to inclement weather only five times, including the two days of Hurricane Sandy. We agree that a continued focus on disaster recovery is prudent and necessary, but believe it is acceptable for the markets to close during extreme region-wide weather events, since these occur so rarely.

RESPONSES TO WRITTEN QUESTIONS OF CHAIRMAN REED FROM ERIC NOLL

Q.1. There was testimony that "dark trading" is a concern in many countries and that Canada recently modified its market structure to limit dark trading and to maximize price discovery. Canadian regulators have imposed a new framework governing how dark pools and undisplayed orders are allowed to operate including priority of lit over dark flow and a minimum price improvement requirement for dark orders. What is your view of these reform proposals? Would these measures make the U.S. markets more or less fair and transparent? Please explain. Would these measures be feasible in the U.S. markets? Why or why not?

A.1. NASDAQ OMX does not oppose all dark trading, but rather focuses on the need to make our markets as efficiently transparent as possible to ensure that the price discovery process is robust and that capital formation is maximized.

NASDAQ OMX recognizes that large institutional trades between natural buyers and sellers should be able to occur at prevailing market prices outside the confines of an exchange or ECN in order to minimize disruption to the market. In executing all other types of transactions the emphasis should be on open, efficient, and transparent order interaction in order to ensure that the price discovery process is robust, broker-client conflicts of interest are minimized, and investor confidence and capital formation are maximized. These nonblock transactions can occur on exchanges or on ECNs. The Canadian policy decision to limit the use of closed alternative systems shows that regulators increasingly view it as important that open order interaction be strongly encouraged. We support innovative solutions like the Canadian Reforms and would like to see the SEC fully explore like-minded reforms here in the United States. Although the U.S. and Canadian markets are very different in scale there are common economic issues underlying the trading process in both markets. We view the SEC as appropriately positioned to weigh and balance the ramifications of investor protection, competition, liquidity, and regulatory complexity and look forward to working with them to understand the U.S. capital market's needs in this area.

Q.2. What is an example of an order type that the NYSE has created to make our markets better, and improve transparency and price discovery? How does this order type provide equal access? Does the NYSE allow dark or undisplayed orders or provide dark execution? Why or why not?

A.2. In comparison with some markets, NASDAQ adheres to a principle of maintaining relative simplicity in its roster of order types, and ensuring that the operation of all of its order types is well understood by market participants. To that end, NASDAQ recently posted a webinar describing its order types, freely available to market participants and other members of the public at *http://www.brainshark.com/nasdaqomx/vu?pi=zF7zJ6aUZzoG0z0.* Further descriptions of order type operation are available at *http://www.nasdaqomxtrader.com/content/ProductsServices/Trading/Workstation/rash—strategy.pdf.* Notably, NASDAQ does not offer any order types that allow an order to jump ahead of previously posted orders in execution priority. All order types are available to members on equal terms.

NASDAQ believes that it is necessary to offer market participants the option of posting nondisplayed orders to enable NASDAQ to compete with the multiplicity of exchanges and alternative trading venues that offer this option, and because market participants representing large orders may have a legitimate need to use nondisplayed orders as a means to guard against adverse price movements. Moreover, nondisplayed orders that are designed to price at the midpoint between the national best bid and offer provide a means for market participants to offer price improvement to their counterparties.

Of course NASDAQ believes that its exchange should be the preferred venue for price discovery of the securities that it lists and trades. To that end, our schedule of fees and rebates for order execution offers a rebate for liquidity provided through displayed orders that is higher, and in many instances significantly higher, than the rebate for liquidity provided through nondisplayed orders. The effect of these financial incentives is borne out through actual patterns of trading, with approximately 90 percent of executions on NASDAQ based on the use of displayed orders. In addition, order types that NASDAQ offers that are designed to reprice aggressively to increase the order's chances for execution are generally required, by their terms, to be displayed orders.

Q.3. Rule 612 of Regulation NMS prevents sub-penny quoting. However, under an exemption in Rule 612 the SEC actually allows broker-dealers to execute orders in sub-penny increments. Because there are no quoting obligations for broker-dealer internalization, broker-dealers can provide price improvement to their customers in the form of sub-penny executions. What are advantages or disadvantages of sub-penny quoting? Is special pricing good for retail investors? Why or why not?

A.3. NASDAQ believes that quoting increments must be uniform across all trading venues and market participants, including over-the-counter trading and broker-dealer internalization. Additionally, a one-size-fits-all increment regime is inefficient and ineffective; increments must be flexible and tailored to the characteristics of varying classes of securities. In fact, NASDAQ has several times urged the Commission to add tick increments both larger and smaller than those set forth in SEC Rule 612, most recently in its April 2010 joint letter with the NYSE and other exchanges seeking an SEC exemption from Rule 612 for certain actively traded securities. No action has been taken on that request for exemptive relief.

These two principles dictate a reversal of the above-referenced exemption from Rule 612. That exemption has contributed significantly to the migration of trading away from lit markets and into the dark markets. While broker-dealers claim to provide price improvement to retail orders executed in the dark, that price improvement may be financially immaterial and outweighed by the negative impact of dark trading on price formation and market fairness.

Q.4. Some commentators have suggested that the Securities and Exchange Commission (SEC) should lift the ban on locked markets. Locked markets occur when a trader attempts to place a bid on one exchange at the same price as an offer on a different exchange. They argue that bids and offers at the same price but different venues should be forced to interact, and this could reduce fragmentation in the marketplace and perhaps reduce the prevalence of trading in dark pools and internalization venues. What is your view of this proposal?

A.4. This is an interesting theoretical concept that we think should be considered along with other approaches as the SEC evaluates U.S. market structure. The spread between bid and offer historically existed to compensate providers of liquidity, typically trading professionals, for the risk and expense associated with posting or-

ders to buy and sell. In a series of well-conceived reforms, the SEC has opened the process of posting orders to buy and sell to all investors. As investors are motivated to trade for reasons other than short term trading profits motivating the professional there is no ex ante reason that a positive bid and offer spread should exist in situations where investors are separated by their preferred locus of trading. Should such locked markets occur, as they do frequently under Regulation NMS today, we expect that these locked markets would quickly clear as brokers and traders act to buy or sell at a price more favorable than would otherwise exist. We recognize that the SEC's position on locked markets was driven in part by the market access fees charged by certain trading platforms during the time Regulation NMS was under consideration and that a review of the SEC's ban on locked markets might reasonably also include a review of the market access fee caps created by Regulation NMS.

Q.5. Internalizing broker-dealers often pay retail brokers to direct customer orders to their trading venues. Does this practice advantage or disadvantage retail investors? Why or why not? Why is retail flow valuable to trade against?

A.5. NASDAQ believes that the public would view negatively the practice of retail brokers "shopping" their orders to the highest bidder, particularly where it results almost exclusively in their orders being routed to and executed in dark markets. Notably, the overwhelming majority of retail investors' orders, whether entered by individuals, mutual funds, or pensions, are handled by sophisticated trading firms that are obligated to deliver best execution to such orders and to disclose payment arrangements. The question becomes whether those duties place sufficient constraints on potential conflicts of interest to overcome the negative perception of payment for order flow practices.

Q.6. Broker-dealers that operate their own dark pools can get a fee advantage when they route customer orders through their own dark pools rather than through a lit exchange. Does this create a conflict of interest between investors, who want to buy or sell stocks at the best prices, and brokers, who want to avoid exchange fees? Why or why not?

A.6. Fragmentation and darkness are eroding the quality and perceived fairness of U.S. markets. NASDAQ supported the Commission's November 2009 proposal to modify the regulation of non-public trading interest. That proposal would have attempted to address the problem of so-called "dark" pools that use indications of interest to, effectively, display quotes to only a small subset of the national market system. It also would have begun to address the proliferation of dark pools that has fostered the two-tiered market which is anathema to the public interest.

Q.7. The U.S. exchanges are required to submit data to a centralized network where it is aggregated before being disseminated to the public. However, the Consolidated Tape Association/Securities Information Processor or SIP now lags behind direct proprietary market data feeds. As a result, high frequency trading firms and other market participants now usually colocate their computer servers at every exchange and subscribe to proprietary data feeds

offered by the exchanges in order to capitalize on latency arbitrage opportunities. Why should anyone receive market data flow from other than the consolidated tape? Should market data be distributed to all market participants equally? How do you think this can best be accomplished?

A.7. The U.S. national market system creates the fastest, deepest, most transparent and most reliable market data of any jurisdiction. No other market system creates aggregate data capturing a dollar or share volume of trading from as large a number of trading venues as the United States. In addition to aggregate data from the network processors, the flexibility granted by the Commission in Regulation NMS has sparked innovation and competition by exchanges, ATSs, and broker-dealers to create a previously unimagined variety of optional data products. This broad range of options supports an equally broad range of competing business models that require different amounts, types, and speeds of data. The coexistence of multiple competing business models, supported by a variety of data products, contributes positively to price formation and liquidity. In NASDAQ's view, eliminating proprietary data products that support competing business models would harm the U.S. market and investors with little or no off-setting benefit. Additionally, it is worth noting that market participants that collocate in exchange facilities serve a wide variety of business models, including many highly sophisticated firms that serve retail investors.

Q.8. The October closure of the markets for 2 days due to Hurricane Sandy raised questions about the financial sector's preparedness for the next natural or man-made disaster. What challenges did the markets face in reopening after Hurricane Sandy? What should have been done differently after Hurricane Sandy to keep providing trading services to customers and maintain market integrity? What can the stock exchanges do to prepare the market for another disaster? What changes need to be made by market participants and regulators?

A.8. Hurricane Sandy was a devastating storm that hit at both the physical assets and human resource center of our industry. It was the first time since 1885 that two trading days were lost to weather-related issues. We prepare for emergencies such as Sandy and other unexpected market events in several ways. With respect to physical infrastructure, NASDAQ OMX and most of our partners in the trading community maintain geographic and systems diversity that would have allowed contingency trading and regulation of our markets in the aftermath of Hurricane Sandy.

NASDAQ OMX implemented our own emergency plans before, during and after Sandy made landfall. Our key employees and systems were in place and ready to operate. From a legal perspective, the SEC granted our board of directors and persons designated by the board the authority, memorialized in our by-laws, to take "any action" regarding the operation of our market or the trading of any and all securities in the event of an emergency or extraordinary market conditions. This gives us the ability to adapt to unexpected events to protect the integrity of the market, to protect investors and the public interest, and otherwise to ensure that we are fulfilling our mandates under the Securities Exchange Act of 1934.

Market integrity was clearly threatened by the moral dilemma presented by the prospect of operating the markets during Hurricane Sandy. Operating the market would have demanded that professionals from across our industry venture out into dangerous conditions, potentially imposing additional burdens on already stressed public safety personnel. Owing to the risks to human life in New York and New Jersey and for employees of the markets, our customers and regulators, the markets made the best decision under the circumstances. NASDAQ supported this collective decision, and exercised its emergency authority to close its market.

The industry learned valuable lessons from the experience. We have already looked at how our contingency plans worked in a real-life situation. We are pleased that, without hesitation, we can say that NASDAQ's testing and readiness plans, thanks to our dedicated employees, had our market ready to operate and trade all of our listed stocks in a normal and uninterrupted manner.

Q.9. It has recently been reported that the SEC's Interim Inspector General found that some staff in the SEC's Trading and Markets Division did not encrypt computers containing confidential data from the exchanges and clearing agencies they were overseeing. What measures are being taken now or should be taken by market participants and regulators to better secure data in today's high tech markets?

A.9. NASDAQ is fully cognizant that attaining perfection in the operation and implementation of technology is impossible, even when it is developed and monitored by the most diligent personnel and rigorous systems. At the SEC's own October 2, 2012, Technology and Trading Roundtable the SEC's academic expert stated as much. Dr. Nancy Leveson, Professor of Aeronautics and Astronautics and Engineering Systems, at the Massachusetts Institute of Technology, describing her 47 years in computer science, at IBM, MIT, and in her own business stated:

Let me tell you a little bit of what I've learned in the last 47 years. The first lesson is that all software contains errors. I have not in all of that time ever come across any software that was non-trivial in which no errors were found during operations. The errors may not surface for a long time but they are lurking there and waiting for just the right conditions to occur. There are also some myths about certain industries being able to create perfect software but unfortunately this is patently untrue. No industry creates perfect software.

NASDAQ fully agrees with this statement and, as such, understands the difficulty that all organizations, including the SEC, experience in implementing technology in a secure, effective manner.

Moreover, the SEC Inspector General findings with respect to computer security at the SEC are another reminder that security is a shared responsibility between the markets, participants, and Government. The SEC seems fully committed to resolving the issues highlighted in the IG report, which raised concerns about one isolated area of the SEC that can be addressed appropriately through training and understanding about security protocols and best practices for the treatment of all sensitive information. NASDAQ OMX would welcome the opportunity to work with the

SEC to ensure that the data we share with them is communicated in a secure manner and protected from unauthorized disclosure in the future. NASDAQ OMX is investing heavily to mitigate risks in the computer security area—we have hired nationally respected experts, upgraded our own systems, are in the process of enhancing our systems integrity testing and are demanding similar actions by those with whom we interact. NASDAQ OMX supports Congressional action to foster information sharing between national infrastructure operators and Government agencies that have access to information about cyber security threats, technology best practices and other resources that can help us protect vital infrastructures like our security markets.

RESPONSES TO WRITTEN QUESTIONS OF CHAIRMAN REED FROM ROBERT C. GASSER

Q.1. There was testimony that "dark trading" is a concern in many countries and that Canada recently modified its market structure to limit dark trading and to maximize price discovery. Canadian regulators have imposed a new framework governing how dark pools and undisplayed orders are allowed to operate including priority of lit over dark flow and a minimum price improvement requirement for dark orders. What is your view of these reform proposals? Would these measures make the U.S. markets more or less fair and transparent? Please explain. Would these measures be feasible in the U.S. markets? Why or why not?

A.1. The Canadian regulators have clearly stated they made these changes despite a total lack of evidence that dark trading was negatively impacting Canadian market quality. Most academic evidence suggests that not only does dark not harm price discovery, it generally improves it. [1] ITG's own analysis of the Canadian markets has shown a continued decline in institutional trading costs as dark pools have gained acceptance and grown in that market. While it is too early to fully discern the impact of the October 2012 rule change, there is certainly no glaring evidence these rules have improved the marketplace or added to the availability of displayed liquidity. Early indications in the Canadian equity markets are that there has been a decline in order flow at the dark venues and an increase in trading flow posted as dark order types on the displayed markets.

The U.S. equity market is much larger and more complex than the Canadian market. With 13 exchanges and over 40 dark pools, there is healthy competition for order flow, which has resulted in a dramatic decrease in both implicit and explicit trading costs over the past decade. It is a generally accepted principle in the U.S. that regulators should not make changes that simply favor one set of competitors over another without a resultant improvement in overall market structure. In our assessment, imposing rules similar to the Canadian measures in the U.S. would neither be feasible nor advisable, as they would not result in improved liquidity or better outcomes for institutional or retail investors.

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[1] *See,* Ian Domowitz, ITG, "Are We Missing the Evidence in the Global Dark Pool Debate?", December 2010 *http://is.gd/qpumXJ*. *See also*: Haoxiang Zhu, MIT, "Do Dark Pools Harm Price Discovery?", November 2012. *http://www.mit.edu/zhuh/Zhu__darkpool.pdf*

Q.2. Rule 612 of Regulation NMS prevents sub-penny quoting. However, under an exemption in Rule 612 the SEC actually allows broker-dealers to execute orders in sub-penny increments. Because there are no quoting obligations for broker-dealer internalization, broker-dealers can provide price improvement to their customers in the form of sub-penny executions. What are advantages or disadvantages of sub-penny quoting? Is special pricing good for retail investors? Why or why not?

A.2. There is clear value in price improvement through sub-penny executions, but sub-penny quoting is unnecessarily complex and of dubious benefit to investors. Sub-penny executions, in the aggregate, have lowered execution costs for retail investors by millions of dollars. It is appropriate for retail investors to receive this type of special pricing because retail order flow carries little risk of adverse selection; specifically, interaction with retail order flow does not involve many of the concerns that arise when interacting with orders from certain high frequency trading strategies, such as information leakage and price deterioration. In contrast, sub-penny quoting does not offer a clear benefit. It would add to the already onerous burden of rapidly growing message traffic and would impede market making, as market makers would not be able to offer meaningful price improvement. Sub-penny price quotes would make stock auctions difficult, if not impossible, eroding overall liquidity in the marketplace.

Q.3. Some commentators have suggested that the Securities and Exchange Commission (SEC) should lift the ban on locked markets. Locked markets occur when a trader attempts to place a bid on one exchange at the same price as an offer on a different exchange. They argue that bids and offers at the same price but different venues should be forced to interact, and this could reduce fragmentation in the marketplace and perhaps reduce the prevalence of trading in dark pools and internalization venues. What is your view of this proposal?

A.3. We believe the ban on locked markets causes more problems than it solves, and as such it should be lifted. There is much unnecessary complexity in current equity market structure stemming from efforts to prevent locking and crossing of markets. Locked markets are not that difficult to address from a market structure perspective. Market participants are capable of providing best execution in locked market situations when handling customer orders on an agency or riskless principal basis. Accordingly, we would support efforts to lift the ban.

Q.4. Internalizing broker-dealers often pay retail brokers to direct customer orders to their trading venues. Does this practice advantage or disadvantage retail investors? Why or why not? Why is retail flow valuable to trade against?

A.4. As discussed earlier, retail order flow is valuable because it is not informationally "heavy" and interacting with it does not involve significant information leakage. As a result, broker dealers are often willing to pay for this order flow, which yields clear benefits to retail investors in the form of lower trading commissions. We would argue that the practice of online brokers offering trading to retail customers for less than $10 per execution would not be pos-

sible without trading rebates or payment for order flows. In general, we do not believe that this practice disadvantages retail investors because broker-dealers have fiduciary responsibilities to their clients to achieve best execution. It should also be noted that broker-dealers that receive payment for order flow are required to disclose such arrangements to the public pursuant to Rule 611 of Regulation NMS, and to their customers in confirmations required under Rule 10b-10 of the Securities and Exchange Act of 1934.

Q.5. Broker-dealers that operate their own dark pools can get a fee advantage when they route customer orders through their own dark pools rather than through a lit exchange. Does this create a conflict of interest between investors, who want to buy or sell stocks at the best prices, and brokers, who want to avoid exchange fees? Why or why not?

A.5. While the routing of customer orders through internal dark pools creates the potential for a conflict of interest, we believe it is a manageable conflict. Broker-dealers have a fiduciary duty to provide best execution when handling client orders. This duty should be the controlling factor when making order routing decisions Fulfillment of this duty can, and in most cases is, accomplished through the use of detailed transaction cost analysis and extensive evaluations of execution quality, (e.g., opportunities for price improvement, speed of execution, number of venues checked, character and volatility of the market, etc.). Such reviews and analyses can demonstrate whether internal crossing provides equivalent or better execution costs and superior transaction prices compared with routing orders to an external market center. In most cases, using an internal dark pool yields three clear advantages over exchanges: a lack of information leakage, lower latency and potential opportunities for price improvement.

We would also note that there is much less of a conflict of interest with an agency dark pool as opposed to a pool which contains broker-dealer principal or proprietary order flow. In the case of an agency pool such as ITG's POSIT, the broker-dealer is generally unconflicted as it does not have a vested interest in terms of profiting from one side of the trade. In addition, internal crossing also protects clients from incurring costs for lost opportunities. For example, a dark pool operator could forego an internal crossing opportunity by routing a client order to an exchange for the purpose of avoiding a potential conflict of interest. However, by the time the order arrives at the exchange, the targeted liquidity may no longer be accessible. In such a situation, the client would have been deprived of an opportunity to execute at the same displayed price (or even better) in the dark pool.

Q.6. The U.S. exchanges are required to submit data to a centralized network where it is aggregated before being disseminated to the public. However, the Consolidated Tape Association/Securities Information Processor or SIP now lags behind direct proprietary market data feeds. As a result, high frequency trading firms and other market participants now usually colocate their computer servers at every exchange and subscribe to proprietary data feeds offered by the exchanges in order to capitalize on latency arbitrage opportunities. Why should anyone receive market data flow from

other than the consolidated tape? Should market data be distributed to all market participants equally? How do you think this can best be accomplished?

A.6. We strongly believe that there should be equal opportunities for accessing market data. All market participants should have the same access to market data feeds, either through the SIP or direct proprietary feeds. As a matter of practice not all participants will elect to invest in the technology, subscription fees, and/or colocation costs to be able to take advantage of all proprietary data feeds. While we believe it is important to ensure equality of market data access, it would not be appropriate to attempt to ensure equality of outcomes through regulatory means.

Q.7. The October closure of the markets for 2 days due to Hurricane Sandy raised questions about the financial sector's preparedness for the next natural or man-made disaster. What challenges did the markets face in reopening after Hurricane Sandy? What should have been done differently after Hurricane Sandy to keep providing trading services to customers and maintain market integrity? What can the stock exchanges do to prepare the market for another disaster? What changes need to be made by market participants and regulators?

A.7. We believe the decision to shut the market for 2 days in the wake of Hurricane Sandy was the correct one. The damage to lower Manhattan and the loss of life in affected areas supports this contention. The 2-day hiatus ensured the safety of broker dealer and exchange staff and enabled market participants to test and fully activate their business continuity programs. When markets reopened they did so in an orderly and efficient manner. In hindsight, better coordination between exchanges and market participants would have resulted in a smoother re-opening process. Of note, the decision to shut the equity markets on the Monday after Sandy hit did not come down until late Sunday night. There was some concern among broker-dealers that the exchanges' disaster recovery plans had not been sufficiently vetted. The lessons for preparation for future disasters are to increase communication among all market participants and to increase awareness regarding the specifics of exchange disaster recovery plans.