

THE BROOKINGS INSTITUTION  
ARE THERE STRUCTURAL ISSUES IN  
U.S. BOND MARKETS?

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**Opening Remarks:**

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**Panel on Corporate Bond Markets:**

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**Keynote Addresses on U.S. Treasury Markets:**

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## P R O C E E D I N G S

MR. ELLIOTT: Good morning, everyone. Let's consider this a two-minute warning, if we can. Though you're all so well behaved. Maybe it'll only take a minute. But we'll start shortly.

Okay. As I said, you all have been very good about showing up here on time and not milling around back with the food and all, so we might as well start roughly on time.

So again, good morning, everyone. Welcome to our event on the Structure of the U.S. Bond Market. For those of you who might not know me, I'm Doug Elliott from the Economic Studies Program here at Brookings.

There are two parts to today's event. First, we'll have a panel on the corporate bond markets, which is moderated by my colleague, Martin Baily. He is a senior fellow here and a former chair of the President's Council of Economic Advisors. And I'll leave it to him to describe the panel and its participants in a minute.

Following that panel, we have two senior officials giving keynote addresses on the Treasury bond market. And I've asked the first panel try not to mention the word "treasuries." So if there are some odd pauses, it's basically so they don't steal any thunder from our two keynotes.

The first speaker will be Antonio Weiss, who is counselor to Treasury Secretary Lew. And the second will be Federal Reserve Board Governor Jay Powell. And I'll introduce them more fully when we get to that point in the event.

So without further ado, let me turn the podium over to Martin. Thank you.

MR. BAILY: Thank you, Doug. It's a pleasure to be here. It's a pleasure to welcome all of you here. And I think we're in for a good session this morning.

And I'm just going to quickly introduce the participants and then turn it

over to them, and then we'll do a panel.

So it seems to be -- I'm just simply following my script here, but first is Steve Zamsky. Steve is managing director and head of Global Credit Training in Morgan Stanley's Fixed Income Division.

Second, Annette Nazareth, she's a Davis Polk partner practicing in the firm's Regulatory Finance -- excuse me, in the firm's Financial Institutions Group in Washington, D.C., and she's a former commissioner at the SEC.

Dennis Kelleher is the president and chief executive officer of Better Markets, a Washington, D.C.-based independent, nonpartisan, nonprofit organization that promotes the public interest in the U.S. and global financial markets. That's quite an assignment.

And fourth, Kashif Riaz. He's managing director at Blackrock, where he focuses on investment grade credit.

Well, that doesn't give our guests justice, but their bios are available to you. So I think we'll move right ahead from there.

So now I've lost my tick-tock, so let me get to the first speaker, who is Steve Zamsky.

Steve? Thank you.

MR. ZAMSKY: Good morning, everybody. Martin, thank you for the kind intro. And I guess I've got the warmup slot here, so I'll try and get things going on a Monday morning.

So the question we have been posed is whether there is a structural problem in the corporate bond market. And I guess my reaction to that, now being immune to the constant press drum beat on this topic of late, my reaction to that is somewhat more moderate, I suppose, than maybe some might anticipate. I would argue that there has basically been an evolution in place that is creating structural challenges, but to go so far as to say there's some sort of big problem I would view as somewhat

extreme. Not to say that these issues aren't serious and worthy of discussion and potentially even some change on the regulatory front that otherwise could help conditions improve to a certain extent.

So what is that evolution all about? From my perspective, it's a combination of affairs. There's no one specific cause here that's of particular -- maybe a particular cause of the challenges that folk are concerned about. Probably the biggest one would be the combination of regulatory impacts. Again, any one item not being particularly significant, but the combination in their totality certainly having an impact. I also think there's a growth of the market component here, so there's a bit of a numerator/denominator kind of question in terms of the size of the bond market today, as well as the number of participants in the markets today. That's largely an outcome of monetary policy, I suppose, in a certain degree as well.

And finally, there's been a change in the composition of the market makers and the asset management industry over time, all of which have changed the market structure that we operate in today. I also think it's important to think of those changes in the context of what the market looks like and how it has always been -- how it has always worked from a broad framework perspective in the sense that it's a very heterogeneous marketplace, very large, a critical place for capital formation, a critical source of capital for corporate America, but it's always had this somewhat illiquid nature to it. So unlike the stock market where you look at one company and see one ticker and one instrument and understand one instrument that encapsulates the entirety of that part of the company's balance sheet, it's just not that easy in the corporate bond market and never has been. It wouldn't be uncommon for a specific company to have tens or dozens or even more bonds. That heterogeneity is kind of just the way it is and it creates some challenges, but it's also a sign of the incredible flexibility and depth of the market that has a great value to the issuers.

Speaking to the size portion of the problem, if you will, the corporate

bond market is about three times larger today than it was in the year 2000. That is a very significant rate of growth. It's more than 10 percent per annum kind of growth, which is an interesting contrast to what the economy has been doing of late I suppose. But again, I think it's also a sign of success on the monetary policy front on one level and a sign of success for the issuers who are taking advantage of this robust marketplace.

That does present challenges though, so to the extent that we have a market that is so much bigger than it was before with a smaller number of market makers, to me it has to be the case that whatever we're describing, if that were the case, whatever we were describing, that thing would have to be less liquid than it was before, and certainly, I think that is how it feels to participants. Whether the data can support that a robust manner is kind of another question, but certainly market participants would tell you that liquidity is very challenged. Maybe not today, in more of a forward looking kind of a way.

I mentioned some of the regulatory constraints of the impact of the cumulative regulatory constraints. Some of the issues there that have been raised, I think, again, maybe over emphasized in terms of -- well, we're talking about the Wall Street Journal version of the story. I would say it's more of the cumulative effect of both the size of the market, as well as the regulatory impacts. But it has to be the case though that the way we measure capital, the stress testing that's done to banks' balance sheets, the focus on leverage-based capital going forward, as well as the Volcker Rule, the combination of all these actions certainly has impacted the dealer community. It's raised the cost to a certain level. It's probably pushed some dealers out of the marketplace, and I think that it certainly leaves a bit of a question mark in terms of the dealer appetite to engage in market-making activities going forward, at least on a level that will be consistent with the market growth that we've seen.

So what does that mean from a current state of play perspective? We have a very large, very heterogeneous marketplace. It has concentrated ownership in

terms of the participants as owners of those assets. It has a small number of market makers relative to the historic construct, and as a result, when we look at things like market turnover, market turnover appears to be lower. I say appears to be lower because volumes are actually -- trading volumes are actually growing in our marketplace every day, but they aren't growing at the same pace that the market itself is growing. So if one were to define turnover as the amount of trading relative to the size of the market, on that basis, turnover has actually declined.

It does appear that we should expect there to be more volatility in this marketplace, as I mentioned, just given the structural evolution, but I'm not sure it's necessarily a bad thing, per se. Historically, there may have been an opportunity or a process by which the dealer community would be a buffer to a certain degree of down trades in the marketplace. Given the limitations I've discussed before, that buffer may no longer exist. I'm not sure that's necessarily a bad thing; it just means that we may have market disruptions from time to time that are maybe a little bit frightening to a certain degree, but it just means the markets get to the ultimate price in a little quicker fashion than they did in the past. Maybe a little bit more economic destruction at the same time.

Clearly, the biggest question this all raises is what is the outlook for the marketplace in an environment over which rates normalize? Because I would argue that for day-to-day, moment-to-moment business today, that the marketplace works just fine and that the liquidity, while a challenge for certain players, is nonetheless okay. But the big question is, as rates normalize, if we were to see significant losses in the bond market as a result of that rate normalization, would you see fund outflows that would be very difficult to intermediate? That's kind of the big question. And would that result in a scenario where while the Fed is trying to tighten monetary policy in a relatively controlled fashion, does the market squeeze it in some sort of way that makes it a noncontrolled kind of fashion? So to the extent that the Fed is trying to dial in a certain tightening of financial conditions, one could argue that this is a risk that they kind of lose control over

that process. Again, I think that that's certainly a risk. It's probably not a base case, but it's certainly a risk.

How does this work out over time? My base case would be that we'll have a situation where transaction costs are higher. We have these bouts of volatility from time to time. That will impact the performance of the largest managers. That will likely lead to some growth of managers who are somewhat more moderate in size and maybe aren't as impacted as significantly by these transaction costs. Those transaction costs should also take the form of a bid offer spread for the dealer community, so that should be something that pulls dealers back into the marketplace. So I think that if you look out over a five- to seven-year kind of timeframe, my guess would be that the buy side looks a little bit more balanced in terms of asset ownership; that the dealer community actually grows a bit over time as the bid offer adjusts to reflect the regulatory costs that the dealer community faces these days. That, I think, is a reasonable estimation on how we get back to something that looks a little bit more like normal. And that, by the way, would look a little bit more like how the industry has looked over long periods of time.

The question is whether that is a Pollyanna case and whether there is a more significant risk of a stress kind of outcome that I kind of laid out here. That gets back to the rate normalization question. That's why market participants are so focused on the pace of rate hikes. If the pace of rate hikes is slow and steady and predictable, these outflows will be manageable and not a significant problem for the marketplace. If, on the other hand, rates rise more quickly than the market anticipants, that's when we'll be forced to consider and play out day to day how these stresses actually go through the system, and again, that gets into the question of the cost and availability of capital.

I do think there are some tweaks that are possible to pursue that could help the liquidity conditions of the marketplace today. I think that better hedging tools would be something that if adopted by both the buy side and the sell side could help us

manage our risks more effectively day to day. That should help liquidity on the margin. You know, there's lots of moves affront on that topic in the industry today, and I think that will be a source of some improvement in market efficiency going forward. I do think there are opportunities to tweak the trade reporting process in the corporate bond market that could allow market makers to be better intermediators of large-scale risk transfer. That's something you've seen a bit about in the press, and I think is, in my view, really not that controversial and something that could help market liquidity day to day.

And finally, there's the topic of the homogenization of issuance. As I mentioned before, the corporate bond market suffers to some extent from a massive amount of heterogeneity. I don't think that's really going to change for the most part. The issuers value significantly their ability to be flexible about issuance and access to incredible breadth and depth that's in our marketplace today. But that's not to say that there's not a few opportunities around homogenization, so can we see more openings of bond issues? Can we pursue other vehicles that could be hedges for market participants on a single company kind of basis? There are some efforts underway in the industry today that I think could make some progress on that.

So I do think that while none of these things that I mentioned is going to massively change the marketplace and its environment, I would argue that each could have a positive impact and maybe the sum total of those small impacts would be something that would be measurable in terms of liquidity.

So in the interest of time, I'll wrap it up as my intro and pass it on to our next speaker.

MR. BAILY: Thank you, Steve.

(Applause)

MR. BAILY: Annette?

MS. NAZARETH: Thanks so much. It's a pleasure to be here this morning, and I want to thank in particular Brookings and Martin Baily and Doug Elliott for



inviting me to speak today on this very interesting and timely topic.

As Martin said, I'm a former SEC commissioner. I was also the director of the Division of Trading and Markets. And so my views today very much reflect my perspective as a former regulator and a person who has had a keen interest in following market structure issues.

Given the size and importance of the fixed income markets, it's really somewhat surprising how immune this asset class has been to the forces that brought about such significant market structure changes in other asset classes over the past several years. It appears that really a disproportionate amount of regulatory attention and public focus has been devoted to the equity markets and the swaps markets, while comparatively little was devoted to the fixed income markets.

In the equity markets, we've seen very significant evolution in the last 10 to 15 years, as you know, from a very small number of floor-based markets to multiple competing electronic platforms that provide investors with a large array of trading execution alternatives. The equity markets provide pre- and post-trade pricing data to the marketplace that provides investors with the information they need to trade on an informed basis.

Competition among market centers is very robust and has resulted in significant reductions in execution costs. There has also been a notable evolution in the types of entities that participate in these automated trading venues and who provide liquidity to the markets. Regulators have focused, as you know, on the emergence of high frequency trading firms and the reduction in the traditional dealer-market maker activity and its possible effects on liquidity in times of stress and whether any regulatory responses in that area are warranted.

We have also certainly seen tectonic shifts in the swap market post Dodd-Frank, as that legislation mandated that the swaps market move from a largely unregulated, multi-trillion dollar market, to a pervasively regulated market with many

products subject to, or soon to be subject to, mandatory clearing requirements and requirements to trade on exchanges or electronic platforms known as swap execution facilities that are open to nondealers.

There also has been meaningful progress in price transparency in the swaps market, and thus, the market structure for both equities and swaps has become more competitive and less concentrated among a small group of market players. And technology has played a very important factor in driving change in both those markets. But the fixed income market has been much slower to evolve, even as that market continues to grow in size and importance in the U.S. economy. Indeed, U.S. corporate bond issuances in 2014 alone exceeded one trillion dollars.

So our topic today is whether there are structural issues in the U.S. bond markets. So I think to begin to answer that question you really need to understand the current fixed income market structure, particularly in comparison to that of other markets. Compared to the equity in swaps markets and on an absolute basis, the corporate bond market is relatively illiquid. There are more than 40,000 corporate bond issues totaling approximately \$11.3 trillion in principal amount outstanding. And there is, as we've heard from our previous speaker, very little standardization in bond terms.

Studies of Trade data for corporate bonds have indicated that very generally, only about 20 percent of those bonds trade every day, and nearly 18 percent barely trade at all. One study showed that the median number of trades for a sample 30-day period was approximately 14, which means that bonds in the middle of the pack might trade once every two days. While generally about two-thirds of all trades are retail and one-third are institutional, institutional trades represent almost 95 percent of the volume in terms of the principal amount of bonds traded. This would suggest that large players may have a need for greater liquidity and overall size for their transactions, and a handful of dealers account for about a third of all trading in corporate bonds. This market remains overwhelmingly decentralized. Over-the-counter, bilateral, and a dealer-based

principal as opposed to agency market.

There is some bond trading on exchanges. Specifically, there are some bonds that trade on the New York Stock Exchange, but volumes are not material, and 95 percent of the trades on that market are retail and trade in smaller size. The municipal bond market has a similar market structure with bond dealers affecting virtually all transactions over the counter on a riskless principal basis, and the number, which is 3.7 trillion in principal amount outstanding, and the individualized terms of these municipal issuances, are also comparable to the corporate bond market.

We really have to look back as far as 2002 to see the most important change in the fixed income markets in the last 15 years, and that was the implementation of the trade system, which was an SEC set of approved FINRA rules that mandated post-trade price reporting for corporate bonds. This change, not surprisingly, was rather hard fought. As you undoubtedly know, intermediaries, such as dealers, benefitted from the opacity, and thus, the dealers strongly opposed the SEC and FINRA price transparency reforms.

There were certainly some legitimate issues raised concerning the liquidity impact of trade reporting, but economic analysis conducted by the SEC showed that liquidity did not suffer materially under the FINRA proposal during the rule's rollout period. What studies did show after the implementation, however, was that spreads narrowed as a result of this mandated price transparency, and thus, investors benefitted from more competitive pricing.

Notwithstanding the transparency that we see post-trade that was achieved by FINRA's trade system for corporate bonds and later the MSRB's EMMA system for municipal bonds, the markups that are charged in these principal transactions with dealers remain largely opaque. Both FINRA and the MSRB have recently been encouraged by the SEC to mandate disclosure of pricing information for same-day retail-size principal transactions for corporate and agency debt securities, as well as municipal

securities, so that investors have a frame of reference for assessing the markup.

So the takeaway message on the structure of the bond markets is that notwithstanding the profound impact that technology has had on competition and intermediation in markets such as the equity and swaps markets, the fixed income markets, and particularly the corporate and municipal bond markets, remain largely manual and dealer centric, with a large number of separate CUSIPs, each with bespoke attributes.

There is very little movement towards more electronic platforms that permit nondealers, such as high-frequency traders or buy-side firms to participate, and the number and complexity of the bond issues also make continuous auction-based electronic markets less attractive.

There has been much concern expressed of late about liquidity issues in the fixed income markets. Dealers have traditionally held sizeable inventories in the corporate and municipal bonds in which they make markets. It is widely believed that these dealer inventories are materially lower than they've been in the past. Investors, particularly large institutional investors such as mutual funds and pension funds, are concerned about the impact this change will have on their ability to trade in and out of their positions. The anticipated rise in interest rates by the Fed and the likelihood of the need for liquidity in the face for selling pressure has exacerbated these concerns.

Many have speculated on the causes for the reduction in dealer inventories. While some point to reductions in inventories that began prior to the Dodd-Frank Act, recent regulatory changes have likely contributed to this occurrence, including the Volcker Rule's prohibition on proprietary trading by banks. Higher capital requirements likely also make holding fixed income positions more costly, and some believe that banks have reduced their inventories as they have moved to significantly increase the liquidity of their balance sheets as part of the resolution planning process.

To be sure, ensuring that large financial institutions are resilient is an

important regulatory goal, and there may well be reasons other than these regulatory initiatives that are contributing to these changes. But regardless of the causes, the vulnerabilities of the fixed income market structure and the apparent reduction in dealer inventories is a growing concern.

As you know, there has also been a great deal of concern about the structural issues in liquidity in the U.S. Treasury market after the events of October 15, 2014, when the market for U.S. Treasury securities and other closely related markets experienced unusually significant volatility. Unlike the corporate and municipal markets, the Treasury market has seen more structural change, including changes in intermediation, automated trading, regulation, and participation by nondealers, including high-frequency trading firms on electronic platforms.

The growth of electronic trading of Treasury securities changed the composition of participants in the market over time. HFTs gained access to the platforms by the mid-2000s and now represent more than half of the trading activity in those products. The participation of high-frequency traders in the Treasury market may have changed the way trading occurs and the way liquidity is provided on these markets that is not yet fully understood. The expansion of electronic trading and new participants on the platforms increased competitive pressures just as occurred in the equity markets more than a decade ago. As spreads narrow, dealers may be less inclined to engage in this activity versus other more profitable activities. And as with the corporate and municipal activities, regulatory changes may have increased trading and inventory costs and provided disincentives to make markets and Treasury securities.

There will undoubtedly be further regulatory action and study following on the heels of the Joint Staff Treasury Market Report. I note that one action item seems remarkably overdue for this market, particularly one of this size and importance, and that's that the staffs will conduct an assessment of the sufficiency of publicly available information on Treasury securities pricing and pre- and post-trading activity. This is a

critical first step, and one that I predict will be implemented very promptly with additional analysis to follow on whether further reforms in the Treasury markets are needed.

(Applause)

MR. KELLEHER: Good morning, everyone. Thank you to Brookings, and Doug and Martin for inviting me and having me here. You all get extra credit. It's a Monday, in August, morning, and you're here to talk about liquidity.

As is often the case, I'm invited to be slightly more provocative than most people on these subjects. So we're going to get right to it.

There's a lot of things to say and there's a lot of facts that don't often get mentioned, so I thought I'd do something radical and start with a few facts.

First, and Steve alluded to this a little bit, there really is a liquidity hysteria going on at the moment, so the first factor to begin with is there is zero actual evidence that financial regulation is causing any liquidity problems. And in fact, the evidence shows the opposite. History shows that volatility increases when the Fed normalizes policies -- i.e., changes rates -- especially when they increase. If you look at history when they increase, volatility really goes up. Everyone knows the Fed is preparing to normalize rates, so after you have a historic crash, an economic crisis, all of this comes on top of years of unprecedented rate actions plus bond buying, both of which add to uncertainty. Also, the Fed policy has dominated investment and trading decisions, thereby exaggerating the historical patterns. As we've seen, there's a tremendous amount of herding going on.

And the Fed isn't the only reason for changes in the liquidity as Steve alluded to. There are massive shifts to gigantic asset managers. There's historical high bond issuances. There's electronic HFT activities, and a lot more going on in these markets that might have something to do with liquidity.

The decrease in Wall Street dealer bond inventory has been grossly exaggerated. Wall Street dealer banks never had much inventory to begin with, and

much of what they did have pre-crisis was illusory or phantom-toxic products. There was also, interestingly, no golden age of liquidity when everyone could trade at all times at the price and size they wanted, as so many of today's claims seem to suggest. Wall Street's dealers' banks are not beneficent market makers standing ready at all times to buy and sell, to maintain an orderly market regardless of volatility. Wall Street's dealers aren't shock absorbers. They are opportunistic, and at times, predatory buyers, but are mostly shock creators and amplifiers. Thus, Wall Street dealer banks and their allies have created a false crisis and then created a false culprit, financial regulations, but the facts show otherwise.

Now, let's start with just one of the facts. And as Doug requested, to not be too inflammatory, I thought I'd start with "Jamie Diamond is wrong." Wall Street dealer inventories of corporate bonds are not down 75 percent as he said in his April 8, 2015 letter to shareholders, which I quote here. This is a report from Goldman Sachs. Unfortunately, our colleague from Goldman Sachs couldn't make it today, so I thought I would vicariously bring Goldman Sachs to the briefing. This is a quote from a Goldman Sachs report from October of 2014.

"We also think the decline in dealer corporate bond inventories has been exaggerated. Why? Because the primary dealer net positions in corporate securities that is used for that includes the definition -- in the definition of corporate securities, they include private label mortgage-backed securities, in addition to the plain vanilla corporate bonds, which overstates the magnitude of the decline." This isn't me; this is Goldman Sachs.

As you can see from this Goldman Sachs chart, if you look at the top chart, that's what a lot of people refer to, but that is not corporate bonds. That includes the private label mortgage-backed securities. If you strip those out, what you have is the line on the bottom. And what does that show? That shows a little decline, but not much decline in so-called dealer inventories of corporate bonds. So sure, it's down, but it's not

a 75 percent drop.

Also, importantly though, note that the data shows that the current inventories of corporate bonds are not far off from the range of inventories from 2002 to 2005. Thus, if dealer inventories look much like they did in the period before the financial crisis, then the claim that post-crisis regulations have impacted, never mind dried up those inventories, has to be false. This, too, is from the Goldman report, and I know you would love me to take you through this in detail, but I'm not going to.

So there's another issue, which is Wall Street's dealers never had that much inventory to begin with. They only had a tiny fraction of the outstanding corporate bond market, and therefore, it's kind of hard to argue they are shock absorbers. This shows the dealer inventory of corporate bonds as a percentage of total outstanding in 2006. 0.7 percent of one percent was their inventory of all outstanding bonds. It's kind of hard to be a shock absorber when you don't have anything to absorb.

Add that to the fact that much of the pre-crisis dealer inventories were illusory. Inventories were bloated with toxic, often worthless securities that had to be written off or marked down to reflect their market prices. Thus, it's not bad to have less liquidity of and for bad toxic or illusory trading and investments which fueled the last crash and crisis.

And IOSCO did an interesting study that's pretty comprehensive that showed the drop in Wall Street dealer inventories merely getting rid of illusory or phantom liquidity. I won't go into that but you should read it. IOSCO did a great report.

Now, there's another way to look at this. I know you know this guy, the former Citigroup CEO. "When the music stops, in terms of liquidity" -- people always drop that phrase when they quote him -- "things will be complicated. But as long as the music is playing, you've got to get up and dance, and we're still dancing in 2007."

Well, of course, we know in 2008, Citigroup was one of the biggest, most reckless failures of the financial crash, received the biggest bailout of any single



institution -- \$476.2 billion from a series of rescue programs. And not for nothing, the only Wall Street Bank that didn't repay the money it received from the TARP program. Or as Sandy Helvane would say, "The result is a periodic tidal wave of credit -- i.e., liquidity during the boom followed by protracted credit during the crunch. Chuck Prince's "Disco Inferno causes murder on the dance floor." Leave it to Andy.

The myths of Wall Street dealer banks as market makers don't withstand scrutiny either. There never was a golden age of liquidity when you all get to trade at the price and the size and the time you'd like. That's because Wall Street dealers aren't beneficent market makers, and that's also why they aren't shock absorbers. And it is why they are shock amplifiers and magnifiers. And Wall Street dealers' trading shows that it's not regulation that's inhibiting trading.

So, again, Goldman Sachs, you'll make an appearance in my presentation. This is a Goldman Sachs trader who actually participated in a terrific committee hearing at the CFTC. Commissioner Sharon Bowen held a committee hearing on June 2<sup>nd</sup>, and I would encourage all of you who care about this issue to go back and watch it or read the transcript. It's fascinating with many market participants talking and discussing these issues over about two hours.

But this is what the Goldman Sachs trader had to say. "Liquidity does not sit along life, liberty, and the pursuit of happiness in the Declaration of Independence. Liquidity provision is, at the end of the day, a service which needs to earn an economic rate of return." No shock.

Well, why are these myths about liquidity increasingly prevalent and strident? Well, as Ken Griffin said in the Wall Street Journal, "Historically, Wall Street Banks have enjoyed a privileged position as intermediaries between buyers and sellers in the fixed income market. Unsurprisingly, these banks argue that their position must be maintained to facilitate liquidity during volatile periods. This is a myth intended to preserve the competitive moat around what has been a very lucrative business."

And I should say a lot of the rest of the op-ed was pretty dubious, and Themis Trading at Themistrading.com has a blog that goes through the rest of it. But this point he's right on, and this gets a little bit to what Annette had to say when they tried to bring in Trace and the sky was going to fall and all sorts of bad things were going to happen. But lo and behold, it didn't happen. Actually, margins were crushed, which means their business was crushed. It diversified the market. There was more transparency, a level playing field, and it improved the markets overall.

Again, the Goldman Sachs trader. I feel like sometimes I hear some of the comments, and it feels like liquidity is this magical thing that's going to keep everybody from losing money. I've never traded in a market where that's the case. That's why trading dried up during high volatility -- that's why trading drying up during high volatility is the norm, as was observed in 1994, 1998, and 2008, when there were none of the so-called restrictions on Wall Street dealer banks like today.

So here's another one that's pretty interesting. No liquidity provider who is economically rational is going to stand there and provide continuous liquidity in the face of new information which changes the fair value of an asset, and I think that needs to be recognized. "I would have gotten fired," says the Goldman Sachs trader correctly, "so fast if the market was selling off and all I did was sit there and buy from customers."

In the face of new information -- i.e., the Fed moving on interest rates -- markets reprice. You can't avoid that. That's trading. Losing money in that situation is not no liquidity. You have a bad trade on. The role of a market maker is not to stand in the way of a one-way freight train where you know where it's going.

Another way to put it is any problem we have in the bond markets won't be solved by higher dealer inventories or lower capital requirements, and that's the point that the Goldman Sachs trader and all the other traders and market participants made at the CFTC Committee meeting. Even without regulation, it's unclear where the dealer banks would want to step in during heavy one-way selling because despite what many

people think of the big banks, these people generally aren't idiots.

And finally, during a sell-off, perhaps triggered by a change in settlement of bad news, dealers did not simply buy bonds to buffer the markets. They would buy attractive bonds opportunistically, but also quite likely would contribute to the sell-off by trying to lighten their inventory. Hence, the buffer claim implies that dealers were fulfilling some form of public service. Dealers may not always do smart things or have the right view about the market, but they tend not to mix business with charity. And, of course, no surprise, that's exactly what was observed during the trading of Wall Street's dealer banks during the so-called temper tantrum, but per Doug's edict, I'm not going to get into treasuries. I will just say that that was demonstrated in the Federal Reserve Study and then in FSOC's study, but I won't refer to treasuries because I was told I'll get tasered if I do.

All right. So where does that leave us?

First, make no mistake about it. When the Fed raises rates, volatility is going to go way up and people are going to lose money. Some people are going to lose lots of money. I don't know if you remember, but 1994, the year of the bond market debacle, there were blowups across the country from Askin Capital Management, to SWIB, to Orange County, to Gibson Greetings, to P&G, to Bankers Trust. But investors losing money or even blowing themselves up is not a liquidity problem. It is no basis to change financial regulation targeted at illusory liquidity while making the financial system stronger and more resistant. The real issues are risk and risk management, not regulation.

The other issue is who pays for liquidity in the associated risk? It's investors or taxpayers. Financial reform has shifted those risks and costs back to investors, and indeed, many prominent market participants -- Peter Fisher included, among others -- have noted that this may actually get investors back into investing rather than trading. But it's shifted the risk and cost back to investors and away from taxpayers

who ended up on the hook for Wall Street's dealer banks' reckless actions last time. The new rules are designed to ensure that liquidity will be priced at its true cost, not underpriced to reflect government and taxpayer subsidies in the form of under regulation, Fed emergency liquidity facilities, and at the end of the day, taxpayer bailouts.

So Greg Ford from Finance Watch based out of Brussels had this to say. "The financial industry lobbyists are using concerns about market liquidity to try to scare policymakers away from necessary reforms to bank structure and capital. If policymakers react in the wrong way to the liquidity lobbying, they'll risk leaving us with more short-term investing and a financial system that is more fragile and pro-cyclical than it needs to be. And that means that it needs to be for all of us."

As Mark Carney said, "More expensive liquidity is a price well worth paying for making the core of the system more robust. Removing public subsidies is absolutely necessary for real markets to exist." Or, the Goldman Sachs trader, "Put simply, you could argue, I think, correctly, that the liquidity that was observed pre-crisis was subsidized by the taxpayer. In our view, it would be a mistake to roll back those reforms for the sake of recreating the same set of issues."

So what's at stake in trying to roll back reform? Well, another financial crash and economic calamity. 2008 was the worst financial crash since the Great Depression of 1929. It caused the worst economy since -- I'm sorry, since the Great Crash of 1929. It caused the worst economy since the Great Depression of the 1930s. As detailed in a report by Better Markets, all of that is going to cost this country about \$20 trillion. The American people have suffered too much. No one, especially Wall Street CEOs, should be advocating for a return to the 2007 peaks of anything.

So I will leave you with this thought. We actually at Better Markets did a report on the cost of the crisis that we just put out on the fifth anniversary of Dodd-Frank to remind people that the anniversary is actually a recognition of what happened years before in 2008, 2009, and 2010. And in order to talk about regulation or the risk of rolling

back regulation, we should focus on the cost of nonregulation, under-regulation, and taxpayer bailouts, and too often, that's what underlies the discussion about what we call the current liquidity hysteria.

Thank you.

(Applause)

MR. BAILY: Thank you, Dennis.

Kashif?

MR. RIAZ: Thank you. And before I start, I want to just set your expectations that I might be a bit drier than the previous speakers.

So on behalf of Blackrock, thank you very much to the Brookings Institution for the invitation today and for the opportunity to have this discussion.

This is obviously -- market structure and liquidity in the credit markets is a very important topic, and we've spent a great deal of time at Blackrock over the past few years examining these issues across the various parts of our firm, and have also engaged in a broad dialogue with peers, counterparties, regulators, and other stakeholders.

Before getting into the details of a few suggestions and recommendations we've developed, I wanted to spend a little bit of time recapping, in our view, what are some of the factors that have driven the changed liquidity environment. So, many of the points I make will be similar to the previous speakers, so I think it's encouraging to see that on the major themes there is a remarkably broad consensus that has developed, and it's separate from what I think accurately has been described by some of the others as probably an overheated debate in the media on the topic.

So first of all, I do think it's very important to point out that the growth in the fixed income markets, and specifically in the credit markets over the last several years is a very important factor. We've seen growth driven by both really the supply and demand supplies of the market. On the supply side of the market there is a tremendous

amount of capital formation taking place where corporate borrowers really from across the world are coming to the U.S. credit markets to fund investments and operations. That's driven by the low rate environment. That's prompting them to refinance their capital structures and to make new investments. On the demand side of the market, global investors are flush with savings and have increased the assets dedicated to credit markets, so both those factors, and obviously, monetary policy and the economic cycle plays a part in that growth that we've seen over the past -- in the post-crisis period.

Secondly, the changes in the over-the-counter market makers' risk appetites that have occurred since the crisis are an important factor in the new environment. Traditionally, as we all know, the credit -- market-making credit has been an over-the-counter principal function with the growth in the market happening at the same time as many of these companies changing their business models post-financial crisis. That has had an impact. And those changes in business model are not simply a result or a reaction to new regulations, whether Basel III or Dodd-Frank. I do think that the large financial firms learned a lot about their business models during the crisis, about appropriate levels of leveraging various businesses, about the actual returns on capital in different lines of business, and as multi-line businesses which you've seen is that credit market making and fixed income market making more broadly is generally a lower return business than many of the other activities that global banks engage in. So as a result, the dealer balance sheets are certainly not growing. Regulatory changes aimed at enhancing capital and liquidity at the banks and ensuring a safer and more sound, broader financial system have had an impact in our view as well.

And finally, I will agree with some of the previous speakers that the pre-crisis liquidity conditions, which were fueled by leverage, were neither healthy nor sustainable.

So looking ahead, we do think that it's important for the market to look at the current state of play and think about the modernization of the market structure to

cope with the new size of the fixed income market and the new reality, both in terms of regulation and in terms of the -- essentially, the business models of the various constituents in the market.

Finally, while liquidity has gotten a lot of attention over the last year or so, I do think it's important to highlight that liquidity risk is not something new. It's been an inherent part of portfolio management since the inception and professionalization of the industry. It's something that portfolio managers and risk managers have looked at for a long time, and liquidity risk is both a risk and an opportunity. There are certain assets that will always be illiquid. They're designed to be such, and for investors with the appropriately long time horizons and risk tolerances, they're actually -- illiquidity can create interesting investment opportunities. The mismatch between -- the mismatch is what causes the problem between expectations and realities.

Before going further, I do want to just delve upon the term "liquidity" for a moment. It gets used in a lot of different contexts, but the context we're referring to today is that of where liquidity can be defined as essentially market depth or capacity and the ability to buy or sell a certain quantum of securities without materially causing changes to the market price of the asset. Obviously, there are other discussions of liquidity, whether it's talking about Central Bank liquidity or fund level liquidity, which has also been a topic that's been getting some attention as of late.

So, when we look at the broad question of market structure in fixed income, we -- and this has been something we recently published in a couple of publicly available viewpoints -- we're advocates of what we call now a three-pronged approach. The first one of those prongs is broadly under the category of market structure modernization. And our overarching observation here is that given the size of the global credit markets, that the traditional OTC principal intermediated market structure is increasingly out of date and needs to adapt. In addition, we do think that the adoption of technology by the credit markets has been much slower than in many adjacent securities

markets, whether it's equities, futures, swaps, or others, and that we are, I think, seeing real time a fair bit of ferment and a fair bit of activity where technology is coming to the credit markets, not just as what has been so far a productivity improvement but actual process innovations, and we think that will have a material impact in years to come.

Other elements of our three prongs, in addition to market structure modernization, are enhancing fund and product level disclosure so that there is a very clear understanding by end investors of what are the liquidity management practices and risks of specific fund products, whether they're mutual funds, ETFs, or others.

And thirdly, we do think that as markets evolve, investments evolve, too, and that there are products and innovations that can occur to allow end investors to access the credit markets in a way that's suited for purpose.

So I'll go a little deeper into each of those in the next few minutes.

As I've already talked about, the current environment has been driven by the mix of very rapid growth in the credit markets, the fuel of monetary policy, which we all understand is poised to change. And I do think an important point has been made earlier and we would echo it, which is that there is a difference between investment risk and systemic risk. Just because the prices of bonds go down as rates go up, doesn't mean that there's a systemic risk. That's a regular part of market cycles. I think the question that we should look at in the context of market structure and its impact on systemic risk is are there issues in market structure that can cause such a severe backup in the plumbing of the market so as to in and of itself cause feedback effects that then become unpredictable. So I think that's the narrow question to look at. Obviously, bond prices will go up and down as market conditions change.

I'll spend a couple minutes on our specific recommendations on market structure modernization. I talked a little bit generally about greater use of technology. Specifically, we do think that given the limitations on growth of dealer balance sheets and the limitations of the traditional OTC market making function, in light of the size of the



fixed income market, we do advocate exploring and using more all-to-all trading venues. And what we mean by that is simply that where buyers, sellers, and other market participants can, whether it's an exchange or an electronic platform, have the opportunity for there to be more connections rather than the bilateral dealer-client connection, the opportunity for more connections we are hopeful can uncover some heretofore latent liquidity. And technology has a very important role in that.

We do think that the heterogeneity of the credit markets is an important constraining factor. I think it's important to level set expectations and understand that corporate bonds are never going to be as liquid as single equities or single effects pairs or defined futures contracts, but there are a number of incremental steps that can improve the status quo. Greater use of large liquid benchmark issues is one of those steps.

When issuers are given clear price signals, where liquid assets are priced better to them than illiquid assets, then we do think issuer behavior can shift over time, but right now the market is not giving those signals.

Another point I would make is that we do think it's important for market participants to adapt their historical behavior and expectations. One simple example of that is buy side participants, such as ourselves, need to become more comfortable being price makers. Not market makers, but price makers, meaning that we can show a price at which we're willing to transact, which in a way increases the information -- the pricing information available to the market and for dealers to react to.

Another topic, Trace, was covered by some of the other participants. We do think that Trace, in general, has worked well in improving price transparency. We do think that in an existing illiquid market -- for example market for large block trades -- the Trace reporting thresholds have the ability to actually inhibit liquidity rather than create it. So we do think it is worthwhile to revisit some of the reporting thresholds, et cetera, so that the large block trading doesn't have a dampening effect in the way that Trace

currently works.

So the common themes that I'm making in these topics about market structure, modernization, are essentially for the market to use emerging technologies better that have already been well applied in other securities markets, and taking steps that collectively reduce the capital intensity of fixed income market making and make it a bit more of an information-intensive business rather than a capital-intensive business.

And in closing, I do think that this is a very important topic. I think that market structure and liquidity have -- their impact has been masked for some time because of very strong credit market conditions. And like any market which is subject to cycles, as those market conditions are on the threshold of change, it's worthwhile to have this discussion about how the market structure can react in coming years as well.

Thank you.

MR. BAILY: Thank you.

(Applause)

MR. BAILY: In no particular order.

Well, thank you to our participants for really interesting presentations. I would normally be sitting with them down there but under Brookings' rules, we are only allowed four people on the stage. This gives you a glimpse of the Brookings rules at work. But we will -- so I'm here at the podium, so that gives me a certain height here -- height advantage.

Okay. I'm stalling because everybody is getting mic'd up. Are we all mic'd up?

Okay. So let me start with a sort of general question, and that is, I think it's been raised by many of the speakers, which is that new technologies have revolutionized other parts of financial markets, particularly equities and swaps and so on. But these changes do not seem to have had the same impact on the fixed income markets.

So I'll pick on you first, Annette. Why do you think that's the case? What is it that's holding it up?

MS. NAZARETH: Well, I think, you know, partly it's not in the dealers' interest to have these sort of open platforms.

MR. BAILY: So you think there's backward pressure coming?

MS. NAZARETH: I think there's a little bit of backward pressure. I'd be interested in what others think, but I assume that that's certainly part of it. Even in those circumstances, interestingly, where we see some use of automation, it's tended to be just replicating electronically what is the current dealer model where on the system itself you have principal transactions. It's just making it more efficient to communicate. So it does seem in my case to be really quite incremental and it seems to me that it may have something to do with the incentives.

MR. BAILY: Okay. So, Steve, do you want to respond to that? Are you guys pushing back?

MR. ZAMSKY: Well, we seem to do it in every other market, so I don't know why we would push back in corporate credit.

I think that there is a little bit of a cause and effect thing. So people observe the liquidity -- well, they observe the equity market, they observe the FX market, they observe the treasury market, and they say, "Hey, these markets have a lot of liquidity and a lot of transparency and trade electronically, and that stuff must all be interrelated." And it is all interrelated, but I think there's a question of cause and effect.

So, to me, if you look at the equity market, FX, and rates, you know, these are markets that have a high degree of homogeneity, have a lot of breadth, and have a lot of depth. So just by their very characteristics, you would expect them to trade electronically and very easily. In Credit, we don't have that. We have exactly the opposite. So we have a very heterogeneous market. We have depth, I guess, in terms of size, but not size at a price. And one good question that Brad's particularly given how

the market has become more concentrated over time.

The one contrasting credit is, of course, the credit index markets. The CDX markets, which even before the implementation of SEF, had already gone fully electronic because they do have characteristics that make them easy to trade electronically. So I'll battle back again, start pushing back against dealer conspiracy and argue for just the nature of the instruments themselves, how easy they are to adapt to the market.

I'm not sure if people need to trade every single one of those 40,000 CUSIPs 20 times a day, 100 times a day, 1,000 a day. That's not what those instruments were for. These are largely instruments held by liability hedgers and people saving for their retirement. I'm not sure we need these to trade in a highly frequent manner, nor is the nature of the instruments themselves likely to be conducive to trading electronically. That's not to say that we don't care about those initiatives. We're very engaged in electronic trading. There are opportunities on the margin for sure, particularly around efficiency of some of the most liquid instruments. We want to engage and do engage with our client base that way all day, every day, but in terms of the real opportunity to change the market and its liquidity and depth overall, I think that that's going to be a real, real challenge over time, and I don't -- I think that, again, there is an efficiency opportunity but who is to say that's to create liquidity? You don't create liquidity out of thin air. So I think we're kind of, you know, from my own perspective, if we think there's a liquidity problem, and as several have said, it's kind of a question whether there really is a liquidity problem, but if we think there is a liquidity problem, I kind of think our energies are probably spent better elsewhere than trying to think about some of the real causes.

MR. BAILY: Okay. Kashif, do you have a sense of why these markets are behind, which you also described?

MR. RIAZ: Absolutely. I think one of the reasons the markets -- the credit markets are behind in process changes driven by technology is because to date

the status quo has largely worked to meet the needs of market participants. So as Steve said, the demand for liquidity isn't as high as it is in equities, for example, which is a much more retail-heavy market. In addition, the size of the dealer balance sheets and the OTC intermediating function, until recently, worked pretty well. And one of the reasons why this topic has gained increasing attention over the last couple of years is maybe it's not working so well anymore as the market has grown. Those are some of the reasons.

In addition, the heterogeneity is a very important reason that undoubtedly the structure of cash credit products is more complex and heterogeneous than most other securities markets, so it's a much harder problem to solve. So in terms of the type of technology systems and algorithms that can effectively cause real fundamental process changes, they are probably just now coming into full bloom and becoming fit for the kind of large scale, reliable, robust system that's needed for an institutional market of this size.

MR. BAILY: Dennis, let me address a question to you. Now, under the regulatory rules -- okay, let me back off a minute. So if you are a relatively small company, so you're not an IBM or a Microsoft or something like that, under the old world, the dealer would hold an inventory of your bonds and then gradually sell them off over time. So this was the way they would make the market for something that wasn't a household name, that wasn't something that was going to be snapped up immediately, was issued.

Now, a lot of people think that Volcker and other aspects -- the capital requirements, the liquidity requirements, have made that more costly or even made it difficult for the dealers to do that -- the broker dealers to do that. And so they've reduced their inventory. And I think you quoted Goldman Sachs, but I could also quote Goldman Sachs as saying that's reduced the amount of liquidity and it's hitting small companies and raising their cost of capital. So you dismissed this whole problem. Again, I'm not -- I don't have a horse here in this race exactly, but what's your response to that? I mean, wouldn't we have expected this regulation?

MR. KELLEHER: I don't think I dismissed the problem, but I first want to go back to something that Steve said. You don't have to believe that the current state of the market, the fixed income markets and the way they trade, as Annette alluded to them, is due to a dealer conspiracy. The dealers are reacting to incentives. They have a massive amount of this business, which means a massive amount of revenue and profits, and they are, as Ken Griffin said earlier, attempting to protect their market position, and that does not mean transparency, a level playing field, and making it easier for other entrants into the markets. So there's an incumbent protection action going on that you would expect in any market in any area where you have an oligopoly or a small group of people that control the market in many respects. It has nothing to do with conspiracy or perfidious conduct. It's like I say, well, somebody is talking their book and they say that's bad; I say, no, you should expect people to talk their book. Right? You just should recognize it as talking their book. And I'm not talking about you. I'm just talking about the broader question. So it's not a conspiracy-non conspiracy. You have to look at the facts, how people act in the market, how they are reacting to the incentives, and then you have to look at the overlay of the laws and regulation as to what is permitted. And if you're permitted to do that, and essentially extract rents and that's your book, you would do it. And so that's the context that Annette alludes to.

It's the same thing when you get back to Trace and the fight against putting Trace in a place. We've got the same problem. We've tried to have electronic markets and changes to the fixed income markets so that you make it a level playing field, more transparency, easier for entrants to come and greater competition for the incumbents.

As to your question, I don't dismiss regulation across the board. And in fact, I would argue, and I think people have, that much of the regulation has driven out what is, I think admitted to be, as everything I think would admit, was some illusory inventory based on --

MR. BAILY: But I'm talking about corporate bonds. Corporate bonds.

MR. KELLEHER: I understand. I understand. But you said --

MR. BAILY: I'm talking about --

MR. KELLEHER: Wait a minute.

MR. BAILY: -- the CEOs and all the stuff that got into trouble.

MR. KELLEHER: I heard you. I heard you. But you said I dismissed everything and that's not accurate. Okay? So that's point number one.

Point number two is if you look at the breakdown, if you disaggregate the inventories over time, the so-called problem in liquidity for the inventories in terms of a significant issue has never been in the small corporate issuances. So you have the underwriting going on, but when you look at the inventories, and actually the normalized actual corporate bond inventories, those inventories are not comprised of small issuers. They're just not. They're a tiny fraction of a tiny fraction of the inventories.

So I've heard that, but it reminds me when I say, oh, we need to change the Volcker rule because it's hurting community banks. But it's not hurting community banks, and we know that. It's hurting the big banks. And so people say, oh, look, it's hurting liquidity and these small issuers because they can't hold the inventory. But the facts show they didn't have the inventory before so it can't be hurting them now. So it's kind of whack-a-mole where you want to change the rules, which disproportionately benefit the dealer banks, by claiming you're worried about small issuers, but the facts don't bear that out on inventory, either currently or over time.

MR. BAILY: Okay. Let me go back to you, Annette. I don't know if you want to respond to that, but also looking back in your former role at the SEC, would you recommend changes that the SEC or regulators might be able to make in these markets, in these fixed income markets, to improve the way they operate? But if you want to respond to the other members on your panel, feel free to do that.

MS. NAZARETH: Well, one thing I want to be clear, I'm certainly not

talking about a conspiracy but I do think there was also very little incentive in the past given how well the markets were functioning as Steve said. We really didn't have the need to innovate as we may now. And I do think that the heterogeneity of the products really made automated trading less viable. I mean, there were attempts at it, and you can have all these messages in a system, but if there's not enough activity in the system because, you know, as you said, these products trade so infrequently, it's not really viable. I think what we see now is potentially an opportunity to revisit some of these things, both greater standardization, perhaps encouraging greater standardization of products, encouraging greater use of automation. Exactly what role regulation can play in that, I'm not sure. I don't think you'd want to necessarily -- I'm not sure we're at the point where we would mandate it, but I do think that there are, you know, there may be sort of industry initiatives that could make progress in some of these areas.

MR. BAILY: Anybody want to add onto that? I'll move on.

You have some recommendations. Do they involve regulatory changes or is this more an industry initiative?

MR. RIAZ: Largely, they are industry initiatives. Obviously, you know, we do think what's warranted is a broad discussion amongst all stakeholders, that includes regulators, and there may be some important steps for them, but some of the most impactful steps are, you know, clearly either buy side or dealer driven, as well as technology infrastructure providers, exchange providers, et cetera.

And I would underline one of the points I made earlier which is in isolation, this is a very complex issue. In isolation, any single step can quite easily be dismissed as being of very modest consequence, and so you kind of need a half dozen or so separate reforms and developments over the course of time to gradually evolve the market.

MR. BAILY: Steve, let me ask you to take a little bit more of a global perspective. I think it was you, maybe it was someone else, mentioned that issuers from



all around the world are coming to the United States to issue. Now, that reflects the fact that we have, you know, we're large, we have a lot of depth. Is your sense that that's increasing? Is the United States or the sort of New York markets becoming more important globally, or has regulation, in fact, made us less competitive and eventually we're going to see some of that business go overseas?

MR. ZAMSKY: This time I'm not going to use the word "conspiracy." Somebody is going to take it out of context. I was kidding, folks.

The U.S. markets have long been an important source of capital for foreign companies. You can see that in issuance trends and that's been the case for a long, long period of time. I think it would be inaccurate to say that these regulatory changes have had any negative impact there. You do see, for example, going the other way a little bit, there has been an enormous amount of issuance by U.S. companies in Europe this year, and that's largely been a response to price as opposed to anything else. You know, QE in Europe has had a significant impact on corporate credit spreads there. We're sort of seeing U.S. issuers flock to take advantage of that. So someone could look at the data and maybe try and argue something, given kind of this relative geographic preference that issuers seem to be demonstrating, but I don't think that's a factor.

I think if you were looking for those kinds of impacts in terms of is regulatory change having an impact on the cost of capital, I do think you could look at corporate credit spreads and scratch your head a little bit in the sense that spreads have been widening pretty steadily for a little over a year now during an environment that one would normally associate with credit spread tightening. So the economy is getting better, et cetera. So I do think if there is a liquidity impact, we know that a large portion of credit spread is considered a liquidity compensation anyway. The true default risk in corporate bonds is quite low; therefore, the compensation for that risk should be quite low. So it does beg the question, well, then why the spread is widening and I had asked whether

that's not an indicator that maybe those liquidity pressures are having an actual impact.

MR. BAILY: Dennis, how concerned are you about the international competitiveness of U.S. markets? Do you think it's overrated as an issue?

MR. KELLEHER: Well, I mean, we spend a fair amount of time -- we've got people in Brussels and London and, you know, nowhere near as much as the reaches of others on the panel, and frankly, you see either two things happening. Issuers and others coming to the U.S. markets, frankly, and other places on the globe trying to replicate the depth and breadth of the U.S. markets. You have the Capital Markets Union Initiative going on in Europe, which is a bank-centered financing -- largely bank-centered financing across the continent, and they look at the U.S. markets and see depth and breadth, and they're trying to replicate that. So not only are people not fleeing from the U.S., (a) they're coming to the U.S., and to the extent they're thinking about it elsewhere, including in Asia actually we even see it, but more -- I think Europe is in the front of it with the Capital Markets Union Initiative. You see them trying to replicate our markets so that they can actually become competitive for some of these markets-based activities which they don't have. So it's not only that there's no real competition elsewhere, but it's also just the depth, and breadth, and history of our markets as Steve says.

MR. BAILY: Let me turn to the audience and ask them to ask some questions. And could I ask you to state who you are, and please make it fairly brief and let's make it in the form of a question, hopefully not a speech. Let me start with you. There are mikes. Yes, thank you.

MR. DECKER: Michael Decker with SIFMA.

There have been a number of experiments over the year with limit order type trading platforms for fixed income products and they never really caught on. And focusing on a point that Mr. Riaz made about the buy side acting as price makers potentially. It seems like a lot of investors don't really want to use a system where they've got to post a position, an offering, and just let it hang out there for the market to

see. They like the idea of being able to solicit executable quotes from dealers in a short period of time, knowing that they can trade at those prices immediately if they want to. Isn't that a factor in why these limit order type systems have never really caught on? It's really an issue of what investors need or want.

MR. BAILY: Anybody want to respond to that?

MR. ZAMSKY: Sure. I think that's exactly right. I mean, there's been, you know, over the 20-something years I've been involved in the corporate bond market, I've lost track of how many initiatives there have been, electronic platforms designed, somewhere along the lines that you lay out. And the reality is the market has not needed that. Does not seem to need that.

There's kind of two reasons. One, there's always this problem we have in the corporate bond market of too many CUSIPs and not enough opinions. There's lots and lots of securities and not enough people to care about the same ones at the same time. That's just kind of the nature of the market. I don't think it's a problem. It just is. So I think that's a little bit of it. It's a question of just that structural aspect.

Secondly, it gets back to what is the purpose of ownership of these instruments. You know, who is to say if someone really cares, you know, a penny or two pennies away from the price, that they have tax considerations, long-term objectives, a role in securities, et cetera, liquidity premiums, I'm not so sure those bonds are supposed to trade. So I'm personally skeptical of the real opportunity for those types of platforms, and I think history has borne that out.

MR. BAILY: Well, I think, Annette and Kashif, you better say something because you are sort of telling us that these markets are out of date and they're not doing what they're supposed to do. So --

MR. RIAZ: I'd be happy to.

MR. BAILY: -- one or both of you can respond to this question.

MR. RIAZ: So one of the many topics we've highlighted under the

heading of market structure modernization specifically delves into the question of protocol. So traditionally, bond markets always request for protocol. Equity markets use the limit order. And in a way, those two protocols are appropriate for like two polls of liquidity. Request for quote is most appropriate for the most illiquid assets, and limit order books work well for quite liquid assets with good two-way flow. And there is a very finite set in the universe of corporate bonds that meet the criteria for really functional central limit order book trading.

So there are a number of the newer, more recent attempts to jumpstart electronic trading that involve different protocols, whether it's session-based trading where people are invited to trade in certain bonds at a certain time in order to concentrate the limited liquidity, and there's others like that. There's applications, for example, of dark pool-like technology in order to address one of the questions you asked about that people don't want their order hanging out there. So I do think that there is a group of hybrid protocols that are suitable for different assets with different liquidity profiles even within the broader corporate bond space.

MR. BAILY: Annette, did you want to add?

MS. NAZARETH: No. I agree very much with that. I agree that it's not a "one size fits all" approach; that the fixed income markets are very different from the equity markets, but that there are other opportunities to make use of technology and perhaps bring more participation into systems than we've heretofore achieved.

MR. KELLEHER: There's also, I mean, I think it recognizes the barriers to entry to successful changes within the market are quite high and quite difficult, and I think you're going to see some real technology disruption over time and those barriers to entry coming down. And so when you look at kind of the incumbent system with the existing relationships and the existing practices where there's tremendous inertia, in addition to kind of incumbent protection going on, that it's a little bit misleading to look at those things that may not have worked in the past to say they're not going to work in the

current and the future because we also have a dramatic change with the growth of the asset managers and the buy side interest and how these things are being done. And I think some of those interests are going to trump some of the other interests which have killed some of these ideas in the beginning. And I think you're going to see massive technology changes that make those, what appear to be preferences today, to be channeled requirements rather than actual preferences.

MR. BAILY: Okay. Questions?

Yes.

SPEAKER: (Inaudible), Brookings trustee.

I'm struck that no one has said anything about credit default swaps, and it's always perplexed me. When credit default swaps were first introduced, the hope was that they would provide a sort of form of benchmark security and credit markets and do what futures and swaps did to the treasury market and transform the liquidity of the market. So why did that not happen? Was it something about the design of the instrument? Was it something about the regulatory environment?

MR. BAILY: Who wants to pick up on that? We haven't talked about credit default swaps.

MR. KELLEHER: We're fighting over not to answer.

MR. ZAMSKY: Yeah, exactly.

It was a good question. I mean, it absolutely was --

MR. BAILY: They have a bit of a mixed history, credit default swaps, although the ones on corporate bonds have not -- did not get into trouble, right?

MR. ZAMSKY: Yeah, exactly, but the corporate bond and CDS didn't get many people in trouble at all yet it's borne the brunt of the regulatory impacts as it relates to derivatives, at least from a corporate bond market guy's perspective, I guess. I always find that somewhat interesting.

But you're right. That certainly was one of the premises. I guess what I

would say is simply looking at today's snapshot, why doesn't it work that way to be back into causes. You know, from our perspective, the reality is there just aren't enough participants that care. So there's a lack of broad market participation and I guess I attribute that back as some of it certainly relates to the history, some relates to counterparty pressures, even though we are slowly but surely, hopefully the SEC will get us all the way there eventually. You know, going to use central clearing houses to clear all these trades, which should relieve counterparty concerns. I think there's still that, you know, that twitch is still in people's cerebral cortex. They don't want to think about that issue as compounding the risk in their books. You know, there's end users who simply don't want their investors to use those instruments and there may be hesitancy on the part of asset managers to go through that education process with their end users. I'm not sure which effect is more dominant, but certainly those are factors. So, in fact, you know, some of the hedging instruments that, you know, like Kashif's firm, and mine, and others, have talked about to try and develop better instruments to manage risk, end up looking kind of like CDS but in a cash market format.

And I guess that does bring up one other reality is that CDS is CDS and cash bonds are cash bonds, and at the end of the day they're never exactly the same thing. And the best hedge is always to get rid of the exact thing you're trying to get rid of, not something that's closely akin to it.

But, look, I think there have been efforts underway to try and improve the liquidity of the CDS market. Again, some of that is an industry thing. I think the really structural about is the nature of the contracts, and there's been a notion of reducing the number of coupon payments from four to two to try and bring a little bit even more homogeneity to that market, to tweak the composition of the indices a little bit to make them look more like the cash market. We view these things as positives, but I really do think that for me, getting all single names to clear would be a big positive, and we're still on a slow path there.

MR. BAILY: Did you want to?

MR. RIAZ: Yeah, I do. I feel duty bound since I punted.

So I think a couple of the reasons why -- one of them is just very important historical that CDS grew in the run up to the crisis and I think got caught up with all of their cousins and became a bad word.

I do think another important point is, and Steve alluded to this, is that when you look at who are the holders of credit and corporate bonds, insurance assets, pension funds, retirement funds are a huge component. Most of those end-investor types are not comfortable with derivatives positions, so they participate only in the cash market. The growth of CDS was helped in large part in the mid-2000s with a lot of investor types that have almost disappeared in the aftermath of the crisis -- leveraged credit, hedge funds, arbitrage funds, and bank-owned proprietary trading groups. So those were the liquidity providers and most active participants in the single-name CDS market. As that kind of industry group largely didn't make it to the present day and you have a market that's more dominated by kind of long-only "real money assets" in the insurance pension and other space that tend not to be derivatives users, you've essentially had the single-name CDS market really dry up because of the lack of participants. In contrast, the index CDS market is the single-most liquid credit product as Steve pointed out earlier as well. So if a critical mass of single-name CDS, you know, were able to evolve and be cleared and come back, they would provide another kind of additional data point and pricing benchmark and help the price discovery process. So that's a hope but I think that's some of the reason why they haven't been so active over the past several years.

MR. ZAMSKY: One minor addendum I should note is that if there is an impact of leverage-based capital measurement on a credit business, certainly CDS is the product most impacted by that. So it's something to keep in mind. Again, that may be something the system is fine with given the history. I would argue maybe it's misguided history, given what the specific instruments were that got folks in trouble, but that is a

reality of our business -- leveraged-based capital matters a lot, and CDS is not necessarily a friendly instrument under that regime.

MR. KELLEHER: But it would be interesting to see how the market would have developed if it would have developed as intended, if it wasn't, to put it in a slightly different way, hijacked by the gamblers. And the problem is the market was hijacked by the gamblers. And so you had a product with an intention that had an expected kind of evolution that never happened, or didn't happen in any size as expected. And so the question is whether or not that market, in an appropriate way, can be rehabilitated and reestablished, notwithstanding being hijacked by the gamblers and the blowups and all the other things that happened.

MR. BAILY: Well, would another possibility be that if that CDS market is not developed, or particularly is not developed for the certain classes of bonds, does that show there isn't that much of a liquidity problem? Because if they were, we would see a more active CDS market. Does it show that there isn't as much of a problem as some people are concerned about?

No? Maybe not.

Okay. Let me turn back to the audience.

Paul?

MR. SALTZMAN: Paul Saltzman, vice chairman at Deutsche Bank.

I was wondering if the panelists can talk about the connection between equity market volatility or equity market liquidity and liquidity issues in the corporate bond market. You know, is there a direct or indirect correlation there?

MR. ZAMSKY: Interesting question. I think that there is definitely a correlation, but I guess I would point out, particularly for those who would argue that this will be viewed as in support of the current construct which I'm hesitant to be labeled with. But I would note that during periods like the flash crash that we've seen in equities, the mini flash crash that we saw in the government bond market, the breaking of the Swiss



peg and the FX market, which literally resulted in 100 percent losses for some hedge funds, you know, whilst all that was going on, the corporate bond market continued doing its thing. You know, get a little quiet for 10 minutes or 20 minutes to kind of determine if this is a real thing that we should be concerned about, or is this just nonsense? It turned out in most cases it was kind of nonsense; that while people incurred significant losses with their machines that were turned on during those events, corporate bond market participants suffered no losses. So there's something to having the human touch, I guess, still involved. But there is the risk of a few back loop, you know, both ways, and that's why, again, not my base case, but in more of a stress scenario, the run for liquidity, if that manifests itself in the corporate bond market weakness, it'll make its way back to the equity market for sure. It always has and always will.

MR. BAILY: Any other comments on that?

MS. NAZARETH: I agree with much of what you said. And I think, again, it would be a mistake to think that all that occurs in the equity market is equally translatable into the fixed income markets. Obviously, there's been a lot of concern in the equity markets about the short termism of certain traders in the equity markets which, as I said in my remarks, we actually don't have participating in the corporate bond markets. So the concerns about liquidity are, again, that there may be fewer participants as dealers and maybe there should be greater participation across the board, including more participation by the buy side. But the fact is that I think a lot of what we're seeing in the equity markets relates to a different structure that currently exists.

MR. BAILY: More questions. Yes?

MR. LINTNER: Thank you. Peter Lintner, IMF.

I have a question. It's a little bit related to the last one. Namely, what is the brave new world we are looking for? Namely, what is liquidity? There was a definition brought up earlier that you can do trades without impacting the market, and often people use a slight variation of that definition, namely you can do large trades in a

short period of time without impacting the market.

Now, by that definition, the U.S., the public U.S. equity market is pretty illiquid. It's a great market to trade 500 or 1,000 shares of IBM, but if you want to trade a million, you go to one of these dark pools. You get out of the limelight. That goes back to the issue that people don't want to post their big trades on a limit order book.

So where do we want to go to? And how desirable is it? Is it sensible to have a market where, you know, Joe Six Pack trades some bond on Grease or maybe on Hilton Hotels or something and in six months it goes under and his bond gets taken away for zero because of some arcane provision in the prospectus? I don't know.

But another site issue may be -- and that refers to some of the data that were brought out earlier -- there's also -- isn't there a trend observable for, one, towards more index investing which means less trading? And secondly, more, I believe some people say the share of smaller issues in the current, maybe EU-induced issuance wave has increased relatively to larger issues. Traditionally, smaller issues have always traded less. So you would expect, you know, I think some people say 20 to 30 percent of "the reduction in trading over outstanding" --

MR. BAILY: Okay. You're running on a little bit long here. Can we get to the end of the question?

MR. LINTNER: So these are my questions.

MR. BAILY: Okay.

SPEAKER: In one minute or less.

MR. BAILY: Does somebody want to respond to that?

MR. RIAZ: I'll start with the first one.

So the question was really what is the desired level of liquidity, and I was the one in my remarks that made the point that said for this purpose we can define liquidity as the ability to trade X amount without material price moves.

So I think it goes without saying almost that when one is selling or buying

a very large block of a security, that in the most well-functioning markets causes significant price moves. So I think the problem that's being referred to in the corporate bond market is that much smaller quantums, say a low to mid-single digit percent of an outstanding bond, trading that amount has become over time increasingly difficult without material price moves. And we've seen kind of evolution in trading behavior and tactics as a result where investors might say fragment an order or a desired trade into smaller slices and pieces in order to have less of a market impact. So it's more about day-to-day, kind of regular course of operations, buying and selling activity rather than very significant moves. So I would say that's the desired level of activity.

And I know I'm not putting a hard quantum on it that it should be five percent of a bond or three percent of a bond, and I'm deliberately not doing so because one size doesn't fit all. There's very specific security level characteristics that matter. But anecdotally, it means being able to trade modest amounts of an outstanding security without moving the price is the desired goal.

MR. ZAMSKY: I think there's a notion, also, I think you bring up a good point that the equity market looks really liquid on the surface of it, and anybody who has traded institutional equities knows that that's maybe not quite the case. So another alternative definition of liquidity might be -- so one is can I move my position relatively close to the price? Another definition of liquidity might be can I move a really large position as a slight discount to the price? And I think that kind of speaks to this current environment. I think it wraps back to the Trace thing. I'm a huge believer and supporter in Trace. Trace has done great things in the marketplace in terms of transparency and particularly around what it's done for small investors. It's a huge win as has been outlined by several of my fellow panelists and I've agreed 100 percent.

That said, at the larger side of the trade distribution, the block trade size, for example, it is very difficult to move large blocks of security when an outside trade gets reported to the marketplace almost immediately. And I do think there's an opportunity

there to improve liquidity at a price slightly away from the current market price where liquidity premium is justified but it would be helpful to have -- I'll call it a tweak again, in terms of how we report block trades. And most markets have some sort of rule around block trades but the credit market does not.

MR. BAILY: We've just about run out of time. Do you have any last comments, Annette?

MS. NAZARETH: No, I agree with what was said.

MR. BAILY: Okay. Fairly quickly.

MR. KELLEHER: I agree. There's not going to be a single definition of liquidity that applies at all times in all places, or for market makers, and I think what you have to do, as alluded earlier, moving block trades and dealing with liquidity have been around since there's been trading and dealing with markets period. And so there's nothing new and exciting and different today except that with a larger context in terms of the Fed regulation, among other things has happened. And so I think instead of trying to look for kind of the magic solution or the one answer, I think as has been alluded repeatedly, it's a complex, multifactor analysis and you have to drive in to the facts of the market, the product, and the context at the time, and then try and deal with the facts then. And then you come up with a point that shows how you kind of deal with the particular problem at a particular time given the context.

MR. BAILY: Thank you. I'd like to ask the audience to thank our panelists.

(Applause)

MR. BAILY: And I'd like to thank them. That was terrific. And so we're now onto our next stage, and we're welcoming our keynote speakers. So we'll just take a minute to transfer over.

MR. ELLIOT: Good morning again everyone. It is now my honor to present the two keynote speakers for today. The first is Antonio Weiss -- Counselor to

Treasury Secretary Jack Lou. He will be followed by Governor J Powell of the Federal Reserve Board. After they each speak, we will gather back up here for me to have the chance to ask them a few questions. And then we'll give you, the audience, to ask your own questions. Both our speakers have had very distinguished careers combining the public and the private sectors. You can read the details and the bios that are provided out front, but I'm sure you'd rather hear them than hear me talk about them. So I'll leave it at that -- except to say that it is a true honor to have them speak here today. We are certainly grateful for their willingness to do so. So Antonio let me give you the podium first.

MR. WEISS: Thank you Doug. And let me also thank the previous panelists for talking about bond markets, but not Treasury bond markets. J and I are going to talk about Treasury bond markets and my remarks are going to focus on market structure and the effective technology.

Now as you may know Treasury staff -- working with the staff from the New York Fed, Federal Reserve Board, the SCC, the CFTC, the recently released report on the volatility on the treasury markets last October 15th. I would like to begin by acknowledging the teams at all five agencies for their hard work and close collaboration. The final report is the result of the rigorous analysis and it really allows us for the first time to have a fact based conversation about the events of that day and importantly the evolution of treasury markets. Now just to set the stage as you all know the treasury market is the deepest and most liquid bond market in the world. There are over twelve and a half trillion dollars of marketable securities outstanding and there are more than five hundred billion dollars of trades every day. Treasuries are the uncontested safe haven during periods of turbulence for investors all across the globe and they are a central element for primary and secondary market functioning and for so many other things.

October 15th remains an anomaly. But our analysis of that date underscores the profound changes taking place in the structure of the treasury market and in particular the effects of technology. Today I will provide a short description of what happened on October 15th and just remind everyone -- probably no one here can forget it. And also discuss the factors that contributed to the volatility. I will then highlight some questions about market structure and suggest a preliminary framework for evaluating potential risks.

Let's start with the events. As you all surely recall, that day was highly unusual. The ten year yield experienced a 37 basis point swing only to finish just six points lower. And there was a startling 16 basis point round trip during a 12 minute interval. There have only been three other days since 1998 when the ten year has traded in such a wide range. And each resulted from an identifiable, significant monetary policy announcement. And there was nothing of the kind on or about October 15th. So as that day began at 8:30 in the morning September retail sales were released and they were modestly below expectations. And ordinarily a miss of the magnitude -- it was about 0.4 percent -- would have driven yields down by maybe a couple basis points. Instead over the next hour treasury yields declined by about 20 basis points, and then at exactly 9:33 A.M. yields fell precipitously. Over the next six minutes the ten year yield dropped 16 basis points only to retrace the entire move in the following six minutes. This 16 basis point round trip is what many have dubbed "The Flash Rally." And what the report refers to as the event window. At that time the head of one trading desk described conditions quite simply as panicked.

In the days and weeks that followed many explanations for what happened were put forward. Some suggested that an algorithm had misfired. Or that human trader had accidentally submitted an order to purchase a large number of treasuries. And others suggested -- in fact many others suggested that algorithmic traders had simply shut off their machines. All of these suggestions however were

speculative and as it happens, inaccurate. At the time no one, including official institutions, had examined detailed trade and order book data to test these hypotheses. The staff report -- which I encourage all of you to read -- if you can, represents the most comprehensive study of trading in the U.S. Treasury markets since a 1992 report following the Saloman Brothers' bidding scandal, and the regulatory report to Congress that followed in 1998.

So what did we find? We find that a confluence of events laid the groundwork for the volatility of that day. As confidence in the economic recovery improved earlier in 2014 bets that U.S. interest rates would rise had become popular. In fact, by the end of September leverage short positions in near term interest rate futures had reached record levels. And there's a chart in the report that shows how dramatic that build up was. But instead of increasing, interest rates marched steadily lower. In the first two weeks of October growth and deflation risks in the Eurozone, accompanied by uncertainty at that stage about the ECB response generated real doubt on the part of investors about the prospects for global growth. The pessimistic tone of the IMF World Bank meetings, the weekend just prior to October 15th exacerbated sentiment. Investors and the public at large were also concerned and this was really the moment this was happening -- about the unprecedented outbreak of Ebola and its potential consequences.

So in response to all of these risks investors turned to treasuries, the safe haven -- driving up prices and lowering yields. Levered funds with record levels of short positions were obviously caught on the wrong side of this and they began to unwind the bets. And as they did so that obviously further compressed yields.

Now all of this set the stage for the initial volatility on October 15th -- that first 20 basis point move. But really none of it -- and the report is clear about this -- none of it explains the timing nor the distinctive pattern of treasury yields during the 12 minute interval. In those twelve minutes, trading volumes exploded. And market depth -- defined here as the amount available for purchaser sale in the order book collapsed.

Volumes in the futures market surged at nine times typical levels. And market depth thinned by up to 80 percent.

Now much of this trading was conducted by firms that engaged almost exclusively in algorithmic trading -- labeled principal trading firms, or PTFs in the report. In other words, instead of turning off their machines in mass as some had guessed -- PTFs not only stayed in the market, but they increased both their level and the proportion of overall volume. And in fact during the round trip in prices PTFs accounted for 70-75 percent of total trading in both cash and futures, up from about 50 percent on normal days.

At the same time -- bank dealers responded to the extreme volatility by widening their bid/ask spreads and at times they withdrew all together from the offer side of the order book. And this was especially true in the first six minutes of the rally. Both PTFs and bank dealers responded entirely rationally in an economic sense on October 15th. It made total sense for PTFs, who want to avoid accumulating large intradate positions to reduce order size, and equally it made sense for bank dealers to ask bid-ask spreads to compensate them for the risk they take in the midst of volatility. But the result of these rational individual decisions was a dramatic reduction in overall market depth.

So while prices moved at an extraordinary speed over those 12 minutes, price action remained continuous. And this was an important finding. Trading occurred all the way down in yield, and then all the way back up. There were absolutely no gaps. Indeed, many PTFs with whom treasuries spoke, unlike traditional banker dealers, noted that in their view the market continued to function well throughout the day. It was not broken like the equity markets during the May 6th 2010 flash crash.

So in addition to debunking the notion that PTFs turned off their machines -- the analysis did not find any evidence of a fat finger mistake, i.e.: an accidental larger order, or a runaway algorithm. There was also no cascade of stop-loss



orders as is often the case with mini-flash crashes in other markets. So what did happen and what was the cause?

Well from what we know, there was really no direct causal link between any one player and the activity we saw on October 15th. But a large part of the story of what happened between 9:33 and 9:45 am appears to turn to us on the interaction at very high speeds of complex algorithms that generate massive amounts of trading activity at speeds far too fast for human beings to track.

High speed trading algorithms, which are employed by many bank dealers and by hedge funds as well as by PTFs appear to respond to extraordinarily one sided trading environment with far more willing buyers and sellers by generating a rapid rally in treasuries. And human traders took a few minutes to react. So one active market participant we spoke of contrasted this dynamic to trading in Boeing stock in July 2013. And what happened in mid-July 2013 is that Boeing dropped suddenly by 7 percent because there was an unoccupied streamline error that got fire at Heathrow. So in contrast, this market participant said look on October 15th I needed to spend 5 minutes or so scanning news headlines, checking twitter feeds, making a few phone calls, and only then was I able to confirm that there was no identifiable event. There was no fire in this case. And he was willing to step in.

So the conclusions of the October 15th report were unsatisfying to some because we didn't uncover a single smoking gun. But as is often the case in complex systems, and certainly the treasury markets are on complex system. It is difficult to reduce outcomes to simple causes. Moreover, the broader findings of the report were equally, if not more significant. The evolution of treasury markets, in particular cash markets, represents a fundamental, technology driven shift in market structure. Now we have all been aware of this shift for some time but the report has cast a brighter light on it and has given us the facts and figures to able to see the extent of the shift.

Algorithmic trading as was discussed in the previous panel was established in equities and futures and has been that way since the 1990s. It now accounts for the majority of trading and the most standardized liquid securities. Including more than half of activity on inter dealer platforms and cash treasury markets.

High frequency trading, which is a subset of algorithmic trading, is applied in a number of strategies by a whole array of firms, ranging from owner operated startups to large hedge funds and indeed bank dealers. It is quite simply a disruptive technology innovation. And it has reshaped the entire industry structure. It has exerted competitive pressure on traditional players by tightening pricing parameters and it has created obvious informational advantages. As with any major technology disruption there are risks and benefits. Now the key for policy makers is to recognize that this technology is here to stay. And we need to be forward thinking about its effects on market functioning. At treasury we're engaged with market participants, academics, policy makers, to better understand this new market structure. And our view is that any policy proposals should be carefully tailored to address specific risks they are designed to address. So today I'll just share a few thoughts on four broad categories of risks that will help to guide our future inquiry -- operational oversight, fair dealing, and market resiliency.

First, operational risk -- now operational risk is of course inherent in any financial transaction. But the extraordinary speed and the automated nature of execution mean that this risk may be heightened in the case of high frequency trading and the race for ever faster technology. The constant pursuit to save one more millisecond not only consumes resources potentially better deployed elsewhere but it increases the pressure, as someone said in the last panel, and the plumbing of the system to handle ever increasing speeds and message traffic. So we need to consider whether the race for speed at this already very advanced stage is helping or hurting market functioning. A second related category is oversight and risk management. Many of the large new

entrance are not subject to regular oversight, and may not be sufficiently capitalized to expand unexpected losses.

Now we all remember 2012 and the collapse of night trading, which had about 17 percent of equity markets. Now that was a case where untested software wrought havoc in markets and it put one of the largest trading firms out of business in a matter of hours.

We need to assess how minimum standards are set for testing new systems and for introducing new algorithms. And there's the question equally of margin requirements. Which in some cases may only be assessed a couple of times per day, sometimes more frequently. But they are not set at the speed of high frequency trading which sees trades execute in a fraction of a second.

The third category might broadly be described as fair dealing. Now while trading practices that are manipulative or fraudulent are not new to financial markets. Automated trading may provide traders with additional tools to beat the system. The report discusses self-trading, which is simply where one legal entity is on both sides of a trade. Now during the flash rally the amount of self-trading was elevated and this was especially so in the first half of the event window. Now not all self-trading is illegal. And I want to be absolutely clear that I'm making no assumptions regarding the legality of the activity on that or any other day. But we do need to learn much more about the reasons for self-trading and we have to consider whether there are benefits that outweigh the potential appearance of impropriety.

Now the treasury markets practice group working with the New York Fed adopted a revised set of best practices encouraging firms quite simply to submit bonafide offers and to avoid manipulative practices such as submitting a barrage of order to increase latency in affect intentionally clouding the system or submitting orders with the intent to cancel them before execution. Both practices are an important -- best practices are an important complement to regulatory oversight but they are not universally adopted.

Moreover many participants as I mentioned in the treasury market are not even required to register with regulatory authorities. So additional work is required to determine best practices and to identify and close regulatory gaps.

The fourth category, and the broadest, is quite simply market resiliency. Perhaps the key question asked by the report is whether an improvement in average liquidity by certain metrics, not all but an improvement, whether that improvement may have come at the cost of rare but severe bouts of volatility. Now numerous factors are changing the way our markets function and the way liquidity is provided. The persistence of low bid-ask spreads on October 15th, together with record volumes and a severe deterioration of market depth may be an indication that we may need to rethink and methodize how we think about liquidity and the metrics we apply.

Underlying all of these issues, all of these questions are the essential role of access to data and co-ordination across markets and agencies. The only readily available data are futures market transaction reports provided to the CFTC. Order book data are available on request by the CFTC. Information about activity and cash treasury markets is not readily accessible. And authorities had virtually no visibility on dealer to customer activity, which by some estimates is over 40 percent of the market. Moreover regulatory authority over treasury cash and futures markets is highly fragmented making co-operation essential on the report is an example of effective co-operation but also slowing response times considerably.

Put simply we cannot get the information we need to analyze risk across treasury markets in anything that approaches real-time. And that has to change.

So in concluding the report on October 15th and the work to follow, including today's discussion represents an opportunity to take the most comprehensive review of the treasury market since 1998. Many years before algorithmic trading even began in treasuries. Now it's not clear what the end state for treasury markets will be. And in this period of transition policy makers and market participants have an opportunity

to shape events and we should learn from our experience in other markets as we do so. As we undertake this important work we will be deliberate in our analysis, diligent in gathering the best ideas and fact based in our policy prescriptions. And policy should ideally be tailored to the specific risks we identify. But it's clear that the treasury market is constantly evolving and we need to not only keep pace with events but also to plan and to plan wisely for the future. Thank you.

MR. POWELL: Let me thank too Doug and Martin for putting this together. It's great to be here today. I also enjoyed this morning's earlier panel and had the unusual experience of nodding my head affirmatively and listening to all four of the panelists.

My involvement with these markets -- treasury markets goes back to when I served as undersecretary for finance. Some of you will recall the Solomon brothers bidding scandal that broke in the summer of 1991. And that event required those of us with those oversight responsibilities to do a thorough evaluation with the structure of the primary treasury market, the auction market and ultimately to propose a series of reforms which made their way to an interagency report that Antonio mentioned a little earlier which we published in 1992.

As part of that process we also put together a public conference to consider further reforms to treasury auction procedures with participation from regulators, academics, and the financial sector. And some of the ideas that came out of that conference eventually led to changes in the way that primary auctions were conducted. Changes that I believe were beneficial to the integrity of the treasury market. I'm thinking in particular of the single price auction. Of course the issues were talking about today relate to the secondary market rather than to auctions. And although the treasury market remains deep and resilient, there are none the less reasonable questions as to whether market functioning can be improved.

The events of October 15th have unfolded into a more general debate about market liquidity across markets. And I'll say that I take concerns about a decline in market liquidity seriously. That said, its hard evidence on a level of liquidity on secondary treasury markets is mixed. There are some measures that are at or above pre-crisis levels and some suggest a reduced ability to trade large positions without material price impact which I would say is a reasonable definition of liquidity. And it's also possible that liquidity may be more prone to disappearing at times of stress. On October 15th for example market depth declined sharply and we saw a sudden spike in prices that was unprecedented for a period with little relevant news.

Other events, like the 2013 taper tantrum, the bond tantrum of last spring and the sharp moves on March 18th in the euro-dollar exchange rate all broadly show the same pattern -- rapidly diminishing liquidity and large price moves for a given quantum of news. But the causes and implications of these events are unclear. Is this the new normal? It's important to simply say that we don't know. Current macroeconomic and market conditions are unprecedented in many respects. For now what we have is a small number of broadly similar events that bear careful consideration.

Most of these considerations apply across markets but they are particularly important here in the treasury market because of the crucial role treasury series play in the global financial system. As Antonio covered in addition to serving the financing needs of the U.S. government, treasury markets are important for the conduct of monetary policy, to service high quality liquid assets for a wide range of financial institutions including in the treasury market and as collateral in countless transactions. Treasury securities are a global reserve asset and treasury markets are a key vehicle through which market participants manage their interest rate risk. The integrity and continued liquidity market affect nearly everyone. Treasury markets have undergone important changes over the years. The footprints of the major dealers who have long played the role of market makers are in several respects smaller than they were pre-crisis

and dealers cite a number of reasons for that change including reductions in their own risk appetite and the effect of post-crisis regulations. At the same time the Federal Reserve and foreign owners -- about half of which are foreign central banks -- have increased their ownership to over two thirds of outstanding treasuries up from 61 percent in 2004. Banks have also increased their holdings of treasuries to meet HQUA requirements. These holdings are less likely to turn over in the secondary market as the owners largely follow buy and hold strategies. But another change is the increased presence of asset managers which now hold a bigger share of treasuries as well. Mutual fund investors in particular now beneficially own a larger share of treasuries and they are accustomed to daily liquidity.

Perhaps the most fundamental change in these markets is the move to electronic trading which began in earnest about 15 years ago. And it is hard to overstate the transformation in these markets. Only two decades ago the dealers who participated in primary treasury auctions -- primary dealers -- had to send personal representatives to the offices of the Federal Reserve Bank of New York to submit their bids on auction days. They dropped their paper bids into a box. The secondary market was a bit more advanced. There were electronic systems for posting inter-dealer quotes in the cash market and the GlobeX platform had been introduced for futures. Still most interdealer trades were conducted over the phone and futures trading was conducted in the pit.

Today of course these markets are almost fully electronic. Interdealer trading in the cash treasury market is conducted over the electronic trading platforms and thanks to advances in telecommunications and computing the speed of trading has increased at least one million-fold. Advances in computing and faster access to trading platforms have also allowed new types of firms and trading strategies to enter the market. Algorithmic and high frequency trading firms deploy a wide and diverse range of strategies. In particular the technologies and strategies that people associate with high frequency trading are also regularly employed by broker-dealers, by hedge funds, and

even by individual investors. Compared with the speed of trading twenty years ago anyone can trade at high frequencies today. And so to me this transformation is really more about technology than it is about any one particular type of firm. Given all these changes we need to have a more nuanced discussion as to the state of the markets. And I would start by asking are there important market failures that are not likely to self-correct. And if so what are the causes and what are the costs and benefits of market led or regulatory responses?

Some observers point to post-crisis regulation as a key factor that's driving any decline or change in the nature of liquidity. Although regulation had little to do if anything with the events of October 15th I would agree that maybe one factor driving recent changes in market making. Requiring banks to hold much higher levels of capital level liquidity and to rely less on wholesale short term debt has raised funding costs. Regulation has also raised the cost of funding inventories through the repo markets. Thus regulation may have made regulation may have made market making less attractive to banks.

But these same regulations have also materially lowered the banks probabilities of default and the chances that another financial crisis like the last one which severely constrained liquidity and did so much damage to our economy will take place. These regulations are new and we should be willing to learn from experience that their basic goals to make the core of the financial safer and to reduce systemic risk are appropriate and necessary. And we should be prepared to accept some increase in the cost of market making in order to meet those goals.

And regulation is only one of the factors and clearly not the dominant one behind the evolution in market making. As we've seen markets were undergoing dramatic change long before the financial crisis. Technological change has allowed new types of trading firms to act as market makers for a large and growing share of transactions. Not just in equity and foreign exchange but also in treasury markets. As



traditional dealers have lost market share one way they've sought to remain competitive is by attempting to internalize their customer trades. Essentially trying to create their own markets by finding matches between their customers who are seeking to buy and sell. Internalization allows these firms to capture more of the bid ask spread but also may reduce liquidity in the public market. At the same time it does not eliminate the need for a public market where price discovery mainly occurs as dealers have to place the orders they can't internalize into that market.

So while the changes I've discussed are unlikely to simply go away I believe that markets will adapt to them over time. In the mean time we've got a responsibility to ensure that market and regulatory incentives appropriately encourage an evolution that will sustain market liquidity and functioning.

In thinking about market incentives one observer has noted that trading rules and structures have grown to matter critically as trading speed have increased. In her words, and I'm quoting here -- at very fast speeds only the market micro-structure matters. Trading algorithms are simply a set of rules after all and they will necessarily interact with and optimize against the trading platforms they operate on. If trading at nanoseconds, which are billionths of seconds, is taking place there won't be a lot of fundamental news to trade on or much time to formulate views about a long run value of an asset. Instead trading at these speeds can become a game against order books and the market rules. We can complain about certain trading practices in this environment but if the market is structured to incentivize these practices then we ought not be surprised when they occur.

So the trading platforms in both the interdealer cash and futures markets are based on a central limit order book in which quotes are executed based on price and the order they're posted. A central limit order book provides for continuous trading but it also provides incentives to the fastest. A trader that is faster than the others in the market will be able to post and remove orders in reaction to changes in the order book

before others can do so. Burying profits by hitting out of date quotes and avoiding losses by making sure that the traders own quotes are up to date.

Technology and greater competition have led to lower costs in many areas of our economy including the financial markets. At the same time slower traders may be put at a disadvantage in this environment which will cause them to withdraw from markets or seek other venues fracturing liquidity. And one can certainly question how social useful it is to build fiber-optic or microwave networks just to trade a millionths or billionths of a second rather than thousandths of a second.

The cost of these technologies, among other factors may also be driving greater concentration in markets which could threaten their resilience. And the type of internalization now done by dealers is really only profitable at large scale and that too may have led to greater concentration.

So a number of observers have suggested reforms for consideration. And let me be clear I'm not recommending any of these but merely noting the conversations going on and encouraging more. For example some recent commentators proposed frequent batch auctions as an alternative to the central limit order book, and argued that this would lead to greater market liquidity. Others have argued that the current market structure may lead to greater market volatility and suggested possible alterations designed to improve that situation.

Questions about market structure also arise in funding markets for treasuries. As many have noted there is a close link between funding liquidity and market liquidity. And for treasury markets the links to funding in the repo market are especially close. Most crisis reforms have made the repo market safer but also raised the cost of repo transactions. Greater use of central clearing could potentially lower these costs by allowing participants to net more of their transactions. And authorities have emphasized a greater use of clearing for a wide range of products and I believe there could be benefits from central clearing of repo markets as well. There are several

private proposals out there looking at that and trying to accomplish it and any solution will have to satisfy some fairly demanding regulatory requirements.

To wrap up we need more clarity on the implications of structural changes in these critical markets for market liquidity and market functioning. This is a good time to hold another public conference to discuss treasury market structure in fact. And that is one of the recommendations in the October 15th report released last month. The conference will take place this fall and in fact I was just informed this morning that we've settled on dates October 20 and 21 at the Federal Reserve Bank of New York in co-operation with the treasury department, the board of governors, the SEC and CFTC. My hope and expectation is that the conference will bring market participants and regulators closer to an understanding of whether there are changes in trading and risk management practices and regulation in market structure that could make our treasury markets even more liquid and more resilient. Thanks very much.

MR. ELLIOT: Thank you. And thank you both I thought those were very interesting remarks on a very complex subject. Let me ask each of you a few questions before we go to the audience. I'll do it in the same order as you spoke. And let me second your suggestion that the audience should read the inter-agency report if you have it. It's a little dry admittedly but there's a lot of very --

MR. WEISS: There are pictures in the back.

MR. ELLIOT: There are pictures in the back. By the way one of my recommendations would be to have them throughout the document. Would have been a lot more fun to read. It is a very useful report because as been pointed out we have lacked a lot of information about how the market works these days. But one thing you yourself noted, Antonio, was that it wasn't you and a data driven analysis to talk about the dealer interactions with their own customers, which is as much as 40 percent of the market. And I can respect your desire to only talk about what came from the data but you must have also had discussions with the banks and the other dealers as to what their

interactions were in general with their customers during that time period. Is there any color you can give us about what was going on at that level?

MR. WEISS: Well I mean, as you say Doug, we weren't able to get anywhere near the level of data that would be (inaudible) were able to provide us with everything we needed to get to the same level of analysis and cash as the futures. And we have nothing other than anecdotal evidence for the rest of it. We don't actually even know that it's 40 percent of the market broker to customer. So that's pure estimate. Could be higher, could be somewhat lower, maybe we'll hear different views on that. We do know because we were calling around all day and we were general speaking with bank dealers and not algorithms so -- and those bank dealers said look this is the most stressed the environment has been since the financial crisis. And they did say that these were panicked conditions. And we do have that evidence which I mentioned about the withdrawal on the offer side during the first six minutes of the spike so it's possible there was a more severe withdrawal on that part. I should mention there were some more anecdotes that we were unable to verify, the may be (inaudible) that there were volumes that came from that market onto the inter dealer market at during the spike. And so I really would just circle back to what I said at the end which is we have to rethink how officials receive data in all of these markets and the timeliness of the receipt of that data.

MR. POWELL: Okay, now something that I found very interesting in the report was when you looked at principal trading firms there seemed there were critical periods -- probably both on the up and on the down when one set of principal trading firms was effectively a provider of liquidity and another set was essentially a conserver of liquidity as they took positions. If I can over simplify and sound somewhat like there is a set of PTFs that are effectively taking market making roles and another set that are probably by and large momentum players that tend to be following the trends -- did you get any sense of whether there were clear groupings of which of these firms were in which category or am I being way over simplified or --?

MR. WEISS: I mean it's hard to talk about this without simplifying to some extent but no, firms had both passive and aggressive strategies and so the passive -- the resting orders -- both sides of the order book were predominantly from PTFs and the aggressive orders were also predominantly from PTFs. So really throughout the spike -- that 70 to 75 percent that we identified, PTFs were on both the passive and the aggressive side of things.

MR. ELLIOT: What I was guessing -- I'm just wondering if you have any sense of it -- is that while there was some overlap, there were a set of PTF that were mostly passive and a set that were mostly aggressive. Were you able to group them at all?

MR. WEISS: I mean we do have -- we have aggregated information we have to preserve the data that we received, but I think what we can say is that it's just not possible to categorize individual firms on that basis. There are firms which describe themselves as primarily providing resting orders. There are other firms that describe themselves as doing both. IT was very much of a mixed picture that day.

MR. ELLIOT: Okay if we could step back and on behalf of the audience ask you a big picture question and I think I'll bring it to J as well. It seems like there are two possible big picture theories here. One says who the hell cares what happens in a 12 minute period if at the end of the day you're done with it? Does this mean anything? And then there's another way of looking at it which says -- if things can go that wrong for a 12 minute period who knows what may be sparked in the future and maybe this is tip of the iceberg and there are deeper problems. Do you have -- what are your reactions to those theories? Do you think as usual the truth is kind of somewhere in between?

MR. WEISS: I think the truth is that this was a really an awakening for market participants. It was something like six standard deviations from what anybody had seen and so no, we need to take it very seriously for all reasons J described. I mean treasuries -- we fund the government with treasuries, treasuries are a benchmark for

pretty much every financing transaction, they are an integral part of pretty much every trade. High quality liquid asset and so no we need to be vigilant about events like that. It did of course self-correct, but because it self-corrected the one time, you can't count on it self-correcting on some future date. And so we feel we have a lot of work to do to understand it and we remain confident in the markets. I mean the markets are the most liquid in the world and with the fewest anomalous events of this sort. But they are the most important market. They are our market.

MR. ELLIOT: So do you think people should continue to buy treasuries?  
Is that your --

MR. WEISS: You said it Doug.

MR. ELLIOT: Exactly. J I know that was a rather amorphous question, but could you give us in your own views how much of this matters?

MR. POWELL: So I think it's important to take a step back and put it in context. So technology is evolving from risk appetite and risk management is evolving, the supply and demand of liquidity is evolving, and regulation is evolving, and they're all evolving at the same time. Markets are adapting to that at the same time. So you have to look at these events and ask whether they matter or not, which is kind of a sense of your question. Does it matter that the 12 minutes -- things that we couldn't really explain? So if it only happens once, maybe it doesn't matter so much, but the real question is, is there a pattern? And I just don't think we know, I think it's frustrating but we don't really know. I think rates will be increasing over time, presumably volatility as we get over the zero lower bound, volatility will return to normal levels just as an arithmetic matter we'll be able to do that. And I think we'll be learning. I think that's what we have to do is learn as this process goes on.

MR. ELLIOT: And a question for you J and Antonio maybe you want to chime in as well. I was very struck by, J, your explicit characterization and Antonio's implicit characterization that to some extent what happened was the first reactions were

from algorithmic trading systems that by definition pretty much act on so called technical information. And just to be clear -- this is a term of ours meaning that something that is based purely on price action and volume and things like that rather than an attempt to determine more fundamentally is the U.S. a better borrower at this point in time or a worse borrower or will there be changes in the way the markets operate or whatever? Mostly in things like economic news. There may be some algorithmic trades that try to trade on fundamentals, but given how fast they trade they can't really be doing very much of that. Because as you pointed out J there is not a lot of new fundamental information each millisecond. Do you think -- first of all, do you think that's a reasonable characterization. I presume you do because I think I'm partly paraphrasing you, but to the extent that's true, is it a problem if we have a market increasingly dominated, at least in the short run by technical analysis rather than an attempt to analyze underlying value?

MR. ELLIOT: So what I actually said in my remarks that at very very high speeds for some traders it can evolve into a game that is played against the order book and the market rules. It can for some traders become that. That doesn't mean, I think one of the take-aways from this excellent report and I think if I may say so, and from the reading that I've done is that there are just many many different strategies out there. I don't think -- it's very hard to generalize about what algorithmic and high frequency traders are doing. Certainly they are doing things which are all about price discovery; some of them are doing things which are all about market making. In fact they are taking share from the more traditional market makers who by the way are also operating with algorithms. So it's one of those areas where I think you have to really be very careful in drawing your conclusions and I didn't mean -- I really didn't mean to be putting that much of value judgement in that part of my remarks.

MR. ELLIOT: No and I'm sorry if I implied you were. I've designed technical trading (inaudible) for foreign exchange years ago. So this is something I've thought a lot about. There is a legitimate argument that while technical -- technical

trading may kind of help smooth out markets has some advantages. I personally would be a little worried if most of the trading out there ended up being on purely a technical basis. Not an attempt to see what the true underlying value was. So I was just curious if an opinion but I don't want to press you on that. Any comments you might want to add on that?

MR. WEISS: I agree with Jay's comments. There has been a large build up in fundamental investing and through the last ten or 15 years and in a record fixed income issuance and a bunch of that is in the hands of sovereign funds, long dated liability managers, mutual funds, investing on a fundamental basis and so forth. So these are not mutually exclusive. Perhaps I could come back to also what you said earlier about does it matter about the jump and so forth. I think what we need to particularly focused on is prices that overshoot and don't self-correct or price movements that create a lack of confidence in markets. And that's what makes the work so urgent. If a price overshoots it doesn't autocorrect and if that's in one of our major market's that's going to affect the cost of financing for some period of time in the real economy and it's going to affect confidence in real markets. Much as this is a complex system it's really on us to try to think through it to think ahead and starting with treasuries seems to us foundational for further work.

MR. ELLIOT: Okay and then one more question before I turn it to the audience. I'll start with you J but Antonio you can add thoughts if you want. Clearly part of what this groundbreaking study has demonstrated is a very significant shift in market making away from banks and their affiliates and other traditional broker dealers towards these principal trading firms as playing quite a similar role, effectively providing market making. What are the pros and cons of that shift?

MR. POWELL: So I think it's an empirical question actually. It may be -- I don't think you have an answer from theory here. I think if the algorithmic trading proves to be good at market making that's fine, of course the question is whether the



incentives and the nature and character of liquidity are different, because there's no balance sheet there with high frequency traders whereas with the old traders there was and still is a balance sheet. There is a balance sheet. Now admittedly I would say -- and the report says, they were short in medium term liquidity providers whereas the HOTs are really short term. Just short term, as in very short term. You can't even blink your eyes that fast in many cases. So is it better or worse? I don't know. There may be room for both approaches I think as Antonio indicated we have to -- our job is to look ahead and ask will this serve the public -- liquidity is a public good just like safe and sound large financial institutions are a public good. The safety and soundness of them is let's say. So I don't have a -- again I think it's an empirical question.

MR. ELLIOT: Antonio any thought on the benefits and the costs of that shift?

MR. WEISS: Well first I mean high frequency trading is an activity and it's an activity that's carried out by the PTFs we discuss but also by some number of hedge funds and some number of bank dealers. I think what's interesting about the ones who predominantly trade high frequency is that they just operate on their capital for the most part. Capital isn't much. They are relatively recent. We know far less about them than we know about the bank dealers and even the hedge funds. And I think I mentioned that there are these four areas of risk, I'm sure one can come up with more or categorize them differently. And I think as we do this work just as with anything -- first as I tried to mention we don't need blunt instruments that act in a broad way and don't address specific risks that concern us. And I think that the second point behind this that I should mention is that you don't make mass changes to complex systems rapidly. One of the aspects of this is that there's an opportunity for piloting. So J mentioned for example small batch auctions. And it is possible to pilot different policy ideas around high frequency trading and to get some initial results from it. But if something constitutes 50

percent plus of all standardized securities or headed to that you don't make radical changes in an instant.

MR. ELLIOT: Fair enough, all right. Let's give the audience a chance and again as Martin was pointing out as well, please make sure you ask an actual question if you could. And if you need a little prologue to that please try to keep it relatively short. Please identify yourself and your institution if you're associated with an institution. Sir.

SPEAKER: First question is to Governor Powell. Your former colleague Jeremy Stine has advocated for tough love (inaudible) monetary authorities. In plain English he doesn't really believe that the Federal Reserve Bank and all the central banks should incorporate what Counselor Weiss called panic mode conditions. I suppose my question to you sir is what is your stance on the proper parenting on the part of the monetary authorities. And assuming that you are for Federal Reserve between corporate and financial conditions what are implications for policy framework with the Fed?

MR. POWELL: Just to make sure I understood you, you were asking about whether financial stability concerns should be incorporated into the making of monetary policy?

SPEAKER: To some extent. In fact if I were to go back to the presentation of Mr. Weiss -- when we have a five sigma move in asset prices which turned out to be noise -- should the Fed be concerned about the noise in the market and what are the implications of the policy prescriptions?

MR. POWELL: This could be another whole conference --

MR. ELLIOT: Excellent idea!

MR. POWELL: Look the subject of how to think about financial stability in the context of monetary policy generally is too deep and broad in order to even answer in this context. I will though give you this. As monetary policy is normalized it's reasonable to expect increases in volatility -- if you look back at some of the events I

talked about -- the taper tantrum, the bond tantrum, you don't really see much of a mark on the real economy. October 15th certainly was so quick it wouldn't have left a mark, but in fact they don't seem to have had much effect on the real economy and from that standpoint wouldn't really play much a role in the broader question.

MR. ELLIOT: Other questions?

MR. AHAMED: Liaquat Ahamed, Brookings trustee. I want to ask a very broad question. Post-2008 there was this perception in part because of testimony in front of congress that there was a fundamental conflict of interest between market makers and their clients and whether that was correct or not that was the perception in the public. Then you get Michael Louis's new book *Flash Boys*. And I'm struck how what a major best seller it was. And the fundamental take away from that was that high frequency trading is sort of a form of institutionalized front running. And that all the markets are stacked against you know people, against individuals and final investors. How worried are you, about this sort of growing sense of cynicism about the way major financial markets work?

MR. POWELL: I'll take a swing, so. As Antonio indicated earlier, confidence in financial markets is absolutely critical. But loss of confidence was central to the financial crisis, so. People have to believe and it has to be true, that the markets are honest, and that people get a reasonable deal when they transact in the financial markets. So, nothing could be more fundamental in financial regulation and finance generally than confidence. I have to say, the story is way more complicated than the flash-boy story. You know, it's not just about sniping slowly moving traders at all. There's a lot going on, to take another swing at Doug's earlier question, the benefits of all this technology are more efficiency and narrower bid asks spreads and things like that. So you get, you get benefits from technology, as Antonio indicated, we need to be thinking ahead about how it's not going away, right. So we need to be thinking ahead about how technology can help, we can use technology to our benefits. And there, are

many, many different strategies going on out there, I don't think -- so I think you just to echo your point, it's unfortunate when bad things happen that damage confidence and we have to look out for those.

MR. WEISS: I would only add to that, that intermediaries are businesses. You know investors generally are either investing for profit or investing on behalf of others for profit. And we want them to be businesses, and high frequency trading firms are businesses. I think the question is, you know, is our knowledge and understanding of high frequency trading firms as a whole at the same level as our understanding of the other categories, and the answer is no.

At the same time, you know, we should not paint with a broad brush, I think there are a variety of firms, there are a variety of practices, there is a variety of practice around some of the risks that I identified, the way an algorithm is introduced for example, varies you know quite significantly from one firm to another. The way we preserve confidence is talking openly about these issues. And not ignoring them. But it's not simple, and one should expect, you know Jay mentioned the 1992 report and some of the regulatory oversight was done much later. But this will take time and it should take time.

MR. ELLIOT: Okay, Barton?

SPEAKER: This is a question about the impact of possible events in the real economy on financial markets and the current structure of financial markets. There's still some uncertainty about the Fed and when it's going to raise rates and how quickly so that's sort of hanging over the market a little bit. And then the budget negotiations look awfully tough. The bill's that are being reported out, I think mostly are going to be vetoed by the president, so we may have a shutdown, we may have a very difficult budget period coming up. Do you think the markets as we've described with mostly trading through algorithms. Are they sort of in shape that they're going to be able to deal with

this uncertainty, or is there concern that the changing structure makes it harder to deal with that kind of uncertainty.

MR. WEISS: That's a complex question, I will say that I mentioned that there were three intraday moves that were larger than 37 basis points and one of those was on the day that the United States was downgraded. And you know, one hopes that Congress will do the right thing as we approach this next debt limit, because it does have the capacity to spook markets, and to spook beyond just treasuries. You know this has been in place as a structure for several years. We've seen how it works, but it's precisely as we enter a period of more normalized interest rates and there is greater volatility, you know that we need to anticipate greater volatility, and that we need to be thinking deeply about market structures. You know part of the whole pitch and fever around this discussion of liquidity and this is Jay's area and his colleagues. You know it has also to do with a very simple reality that we're exiting, what is it; seven years at the lower bound. And that does create you know a general anxiousness and you know the one has to think about it is that not all volatility is illiquidity, some of it is price discovery.

Now price discovery today with more electronic trade for the standardized products is done differently than it was ten or fifteen years ago. It's done in smaller trades, that are sequenced, but we don't know that that produces a worse result or a better result than the old method of price discovery. I mean a large trade that you issue to your bank dealer, you know under the old system. You knew the price, and you knew the total amount of the trade, and the new system, at least in some of the standardized security is electronic. You know that will be unbundled into a bunch of trades, that doesn't necessarily mean that the investor is getting a worse deal. So, we're in this new environment, the fall or the next year, or whenever it comes. Will induce more volatility, but we all need to be disciplined about distinguishing between volatility and illiquidity because it always follows.

MR. POWELL: So I guess I would just add markets are very difficult to predict, in the short and medium term. And, they will do things and overreact sometimes and apparently underreact others, but not every market reaction has important implications for the real economy, so if you think about 2013, we have the fiscal cliff, we have the government shutdown, and in the middle of that we have the taper tantrum. And I challenge anyone to look back, take for example, look at monthly payrolls for 2013, or GDP for that matter and show me where the taper tantrum was, show me where the, you know where the government shutdown was, it didn't leave much of a mark, which isn't -- it isn't to say that markets won't react as interest rates rise, they very well may, but it's not clear that there will or won't be much of a reaction in the real economy.

MR. ELLIOT: Okay, I think there's somebody in the back? I guess I don't see, Alice, were you?

MS. RIVLIN: Alice Rivlin, Brookings. Let me turn Martin's question around. Because every -- he essentially said if the Congress does some -- if the Congress and the president really do something terribly stupid, will be there volatility in the markets. My question is, maybe there should be, what -- how much volatility in the markets would it take to change -- to get the attention of Congress and the president that maybe they're doing something really dumb. Back in 1987, the stock market drop was widely thought to have precipitated concern with the budget deficit; there probably was no connection between the two. But it was nice to have something bad that happened in the markets that got attention. (laughter)

MR. WEISS: That was a wonderful rhetorical question that contained its own answer. No, we're not wishing for a bad event in markets, were wishing for -- and we're not predicting markets -- and we're not predicting how the fall will unfold. But I guess I would just say what I said earlier which is that you know we expect, with respect to the debt limit, that Congress will do the right thing, and that it will not become complicated and hostage politically to other elements. So, as to how the markets

anticipate, as to whether that creates volatility or not. In the past it has, at times it hasn't and I think as you said and as Jay said, at times volatility emerges for reasons that have absolutely nothing to do with political or economic events. And I think we're beginning to have a deeper understanding as to why that occurs.

MR. ELLIOT: Okay, on that note. Dennis I'll give you -- that's okay, I know Antonio has an important meeting to go to but I think we have time probably for one more question so, Dennis?

MR. KELLEHER: I'm just going to say you know it's like the noise in the signal, right? So Congress can often be the noise that doesn't impact the real economy, of course it could if it did something blindingly stupid as Alice suggested they may have the ability to do. But it seems to me one of the bigger problems that we face is the slow erosion of confidence in our markets over time, apart from these particular things in Congress. And so while the markets may not be rigged as somebody says or somebody doesn't say, and the impact of HFT may be good or it may be bad. It seems to me there's a lack of confidence that government officials, policy makers and regulators actually know what's going on in the market.

And while I think this is an absolutely terrific report, a great public service, and everybody should read it, one of the underlying concerns that screams it is the lack of information, never mind real time, even after the fact that policy makers, and regulators have, about what's going on in the markets. And I think the problem with that is that of course it results in greater surprises more often. Surprises are what are going to kill confidence over time of investors and market participants. And so I wondered if both of you would comment. Were you surprised at the lack of data and information that you had real time, and even the lack of data that you could get after the fact?

MR. POWELL: I was very surprised at how difficult it was to get the data, and I was surprised that the data didn't have, in fact I thought at one point I was

thinking that it might be possible to release the October 15 on October 15. Of the next year. (laughter)

MR. ELLIOTT: Antonio do you want to add anything?

MR. WEISS: Dennis, you're confirming something I said at the end of my remarks, which is that you know we need better access to data across agencies, and we need something that approaches real time access to data, we worked well and diligently and intensively, looked at billions of transaction data, order book information, but this needs to be more readily available to authorities.

MR. ELLIOTT: Okay, thank you both very much, and thank you all.

(Applause)

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