THE BROOKINGS INSTITUTION

FALK AUDITORIUM

THE REPO MARKET DISRUPTION: WHAT HAPPENED, WHY, AND SHOULD SOMETHING BE DONE ABOUT IT?

Washington, D.C.

Thursday, December 5, 2019

Introduction:

NELLIE LIANG
Miriam K. Carliner Senior Fellow in Economic Studies
The Brookings Institution

What Happened?

PATRICIA MOSSER
Senior Research Scholar of International & Public Affairs
Director, MPA Program in Economic Policy Management
Columbia University

JEROME SCHNEIDER
Head of Short-Term Portfolio Management
PIMCO

What Are the Big Questions That We Need to Answer?

DANIEL K. TARULLO
Visiting Professor of Law
Harvard Law School

Moderator:

DAVID WESSEL
Director, Hutchins Center on Fiscal & Monetary Policy
The Brookings Institution

What Role Does the Federal Reserve Operating Framework Play?

WILLIAM B. ENGLISH
Professor in the Practice of Finance
Yale School of Organization & Management

BILL NELSON
Chief Economist
Bank Policy Institute

What Role Does Regulation Play?

NELLIE LIANG
Miriam K. Carliner Senior Fellow in Economic Studies
The Brookings Institution

SEAN CAMPBELL
Executive Vice President, Director of Policy Research
Financial Services Forum

TIM P. CLARK
Distinguished Senior Banking Advisor
Better Markets

SANDRA E. O'CONNOR
Former Chief Regulatory Affairs Officer
JPMorgan Chase & Co.

JIM WIGAND
Great Point Financial, LLC

P R O C E E D I N G S

MS. LIANG: Hello. Welcome. I see a lot of familiar faces. Good to see you all. Welcome to the Hutchins Center, Conference on what happened in the repo market, why and should something be done about it?

I'm going to start us off today, and then there will be a number of expert panelists to discuss these specific questions.

The rising volatility in the market for short-term collateralized borrowing, known as the repo market, punctuated with a rate spike in September has drawn public attention to a market usually of concern only to money market participants. The volatility reflects the confluence of significant changes in the financial system since the financial crisis.

It reflects changes in the Federal Reserve's monetary policy operations and in bank regulation and supervision; it also may reflect changes in attitudes towards daylight overdrafts, and discount window borrowing, and changes in the market structure of the financial system.

The September episode catalyzed interest in looking at the interactions of these different policies and assessing what is working well and what isn't. Before we rush to changes, however, we need to better understand what happened and why, and that's the goal of this event today.

So, why do we care about what happened in the repo market? Repo, as you know, is a critical element of the plumbing of the financial system. It is used, for example, by dealers to finance U.S. Treasury securities, and by money market funds to invest cash with safe collateral. It supports the primary securities markets and secondary market liquidity.

What happens in the repo market can influence other money market rates, including the Federal funds rate, which is the target rate for monetary policy. But periodic episodes of volatility in the repo market do not necessarily indicate significant problems in the financial system, though they are worth studying given the important role of repo in the financial system.

In the past couple of years, increases in repo rates at month-end and quarter-ends have become more pronounced as the Fed began to shrink its balance sheet and reserves continued to fall.

These increases are reminiscent of the money markets before the crisis when the Fed operated in a scarce reserves framework, but which basically disappeared with the Fed's new ample-

reserves approach.

But on September 17, although cash scarcity was predictable, given scheduled corporate tax payments and Treasury settlements, the spike in repo rates was big and took many by surprise. The fed funds rate moved above its target range. The Fed responded by adding reserves and money market rates stabilized quickly in the following days.

Still, the event raised questions about the ability of the Fed to control the policy rate and an abundant reserves framework. It also led to questions about the demand for reserves and the willingness of banks and dealers to arbitrage in the money markets, which reduces rate volatility.

We plan to discuss today what happened, the key policy objectives to keep in mind when considering any changes, and the pros and cons of some possible changes. In particular, given the revealed preference for reserves and the steep slope of the demand curve, our two broad and inter-related questions are: Would a larger Fed balance sheet with more reserves in the banking system solve the problem without creating others? And should the Fed create a standing repo facility to supply cash when others won't?

And second, are there regulations and supervisory practices that are reducing the incentives or the ability of players to lend cash when interest rates spike? And are there changes to regulations and practices that could reduce unwelcome market volatility without risking safety and soundness and overall financial stability?

So, we'll begin today with two presentations on what happened. First, Trish Mosser, now at Columbia University, formerly Deputy Manager of the Desk at the New York Fed; and then Jerome Schneider, Head of Short-Term Portfolio Management at PIMCO; they will be followed by Former Fed Governor, Dan Tarullo on policymaker objectives. Then my colleague, David Wessel will join the three of them on stage and we'll turn to further discussion and field your questions.

After a short break we'll come back, we'll turn to a closer examination of the Fed's operating framework and the role of financial regulations.

For those of you who are watching online, you can submit questions. And you can submit them by email to hutchinscenter@brookings.edu, or at Twitter at #RepoMarker.

So, with that, I'm going to turn this to Trish Mosser. And thank you all for coming.

(Applause)

MS. MOSSER: Thank you very much, Nellie. Good afternoon everybody. Before leaping into what happened in money markets in mid-September, let me start with a couple of points of background for everybody here and online. And I know many people in this room already know this, so I hope you'll just bear with me for a couple of minutes.

First background piece, a few words about the U.S. money markets, they are short-term lending, if you like short-term debt markets, used by a wide array of financial institutions and investors, and large non-financial companies as well, as well as by the U.S. Government and agencies.

In maturity they range from overnight to up to a year, although predominantly they tend to be less than six months in maturity. They come in lots of types, commercial paper, tradable bank deposits, Treasury bills, I could go on. But for the purposes of today's discussion, we are going to focus on largely on the federal funds market, and the repo market.

The fed funds market is the short-term lending and borrowing, if you like, between banks and the GSEs, we are going to focus on banks, but the GSEs are also part of the market.

Like many other money markets fed funds are unsecure, meaning, they're promissory notes, effectively, and of course the fed funds market also matters because it is, as Nellie pointed out, the market which -- whose interest rates the Fed targets for monetary policy.

In contrast the repo market is used by many, many different types of firms, and it is much, literally in order of magnitude, larger. In addition, it is collateralized, meaning no lender, only provides a short-term loan if a borrower provides collateral, some sort of long-term security, most commonly, U.S. treasuries and U.S. mortgage-backed securities, agency mortgage-backed securities.

Interest rates and money markets do tend to move together, they don't track each other exactly, but they do for many, many decades, tend to move together over time. In part because it's been relatively easy, at least historically, for participants to move back and forth, lending and borrowing, and even arbitraging the market.

Of course another important historical link between the two markets is that the Fed, like many central banks, while it seeks to influence the federal funds rate actually conducts its borrowing and lending operations in repo markets, that's actually fairly common.

So, second background point. One of the consequences of the Fed's very large asset purchase programs, or QE as we all call it, was an equally vast increase in the supply of reserves, in total, that the banking system had to hold.

Here's a picture of the Fed's balance sheet, the assets are on top in blue, the liabilities are on the bottom in orange, and you can see both the size of the QE as well as the equal growth in liabilities on the bottom.

The orange section is reserves, because the supply of reserves was so vast it was for many years substantially larger than the demand for reserves even when market interest rates were very close to zero, so supply is systematically above demand.

And by the way, that means that the actual trading in the federal funds market has been a shadow of its formal self, there is still trading but at much, much less than it was in previous years.

Obviously when the Fed finished QE, it was determining whether to shrink its balance sheet, they view that as a long-term process, and so they decided to run monetary policy with this strange supply-demand in balance in the reserves market.

So supply -- in fact they designed their regime around that, I think Bill English is going to say a few words about that later on, with supply sort of permanent above demand at the current market rate.

And given that they were going to run monetary policy with a very large balance sheet for the foreseeable future, so they wanted demand bigger than supply within the operating framework. But here is the quandary. The Fed did shrink its balance sheet, reserves were shrinking for other reasons as well, so at some point demand was going to get close to supply, and close to the point where reserves would all of a sudden become interest-sensitive again.

At what level of reserves was that? To the Feds' credit they were very clear that they didn't know what that level was, but they were going to try to stay away from it if possible. And the best an effective are a number of surveys or estimates, and then numbers range from a trillion dollars to a bit more than that as time went on.

So, what happened in September? Well, everybody found the downward sloping part of the demand curve for reserves, is the short answer. And it was at a substantially higher level of reserves

than many had expected, and the immediate impact of that of course was that interest rates became immediately sensitive to fed funds rate.

This is a picture of the repo rate in red, the actual federal funds rate in green, and the target range for the federal funds rates are the yellow boxes. Okay, I'm going back several years. And you can obviously see what happened in mid-September.

Now, the approximate cause of -- or maybe a better way to put it would be to say the trigger of the event since September, and the hiccup, if you like, were very large shifts in a kind of obscure part of the Feds' balance sheet that caused a sudden very large drop in the supply of reserves, and probably also increase the demand for reserves at the same time.

First, on September 16th, U.S. Treasury had some very big corporate tax receipts, plus settlement of a relatively large Treasury auction, and when the private sector decided to pay their tax bills, and to -- and for their Treasury investment, banks effectively shifted reserves out of their accounts, and into the U.S. Treasury account at the Fed.

This is a kind of complicated table, but I want you to focus on the two columns that are labeled September 11th, and September 18th, this is -- these are -- the Fed does not publish its balance sheet every day, they only do it weekly, there's a little history on the left if you're interested, but I want to focus on the two columns in the middle, the third and the fourth.

You can see what happened in the U.S. Treasury account, basically within a day, $150 billion shifted out of reserves and into the U.S. Treasury account, because of those events I just talked about. Now, this is weekly data so the number is only 120 billion because there were some offsets in the intervening days. But you get the idea that it was a very large number even for a Central Bank with a big balance sheet.

In addition, the other line down here, and the secured part of the Fed's liabilities, is the reverse -- are people which is largely, by the way, reverse repurchase agreements or the Fed lending but mostly from foreign official institutions, meaning other central banks, and so forth, and doing repo with them.

That went up during the same week by $40 billion. So, the combination of those both directly reduced reserves, and created the -- if you like, the drop in the supply of reserves.

Now, in response to the market kerfuffle, as someone said earlier today the Fed, as Nellie noted, immediately added reserves the next day that increased the supply of reserves, not by buying assets, but by actually engaging in repo operations, meaning lending, effectively to the core financial intermediaries.

In fact, they did that to the tune within a couple of days of $75 billion, which is circled white part up here, so repos which had been absolutely zero obviously, all the time if -- all the time that QE was in place, all of a sudden became significant almost right away.

In subsequent weeks, the Fed continued to lend out more repo, some of it at longer term, and they also started buying assets, specifically -- but not long-term assets that they had during QE, but short-term Treasury bill assets specifically to raise the supply of reserves.

The last column here is the current balance sheet, as of last week I should say, you can see that the repo pool is now nearly $200 billion in lending they're doing, and on top of it they have increased short-term treasuries by $140 billion. So, the Fed's overall balance sheet, looking at the assets on the top line, has gone back over $4 trillion, and the amount of reserves in the system, reserves are down here, are back up $1.5 trillion, almost $1.6 trillion in point of fact.

So that's what happened, kind of technical. That's the technical story. But the underlying drivers of what happened are much, much more complicated, and that's what the rest of today is like -- is about. I am going to give you my little short list of contributing factors, other speakers are going to expand on that, I know.

First of all, the post-crisis regulatory regime clearly has a role to play here. One reason that nobody knew where the demand curve for reserves was, in addition in fact they hadn't seen it in 10 years, is because during the time of QE and the huge balance sheet, the entire global financial framework around liquidity, counterparty risking capital had been completely redone, and for very good reasons.

And I want to be very clear that this is not just about bank regulations and things like the LCR, and leverage ratios, and liquidity planning -- liquidity planning for resolution. The structural and regulatory changes for money market funds, and repo markets, and derivatives, even in securitization which impacted other money markets, they have all had an impact in the way U.S. money markets function. So, this is not a simple thing, it's all about the banks.

A second reason, inexperience -- second factor I should say -- inexperience in money markets that actually function normally, meaning with a little volatility.

Back in the day, as they say, meaning for many years before the financial crisis, money market interest rates broadly moved together, not in unison but together. There was volatility, and sometimes there were even spikes in rates, and those were the days where (A), the Fed was working every day, they did repo operations every day to try to keep the fed funds rate stable, and not only that, there was active arbitrage on the part of the private sector, across different types of money markets.

The Fed did not smooth out everything in those days, and they were not expected to smooth out everything in those days. Let me give you an example. The top is repo fed funds and the target ranges again, but this is just for 2019, so it's just for this year.

On the bottom I have exactly the same interest money market rates, and the target rate and the same colors, but the year is 2005, so two years before the financial crisis.

The first thing I want to point out to you, is how much all these money market rates bounce around, and not only that they spike sometimes. I have a few vivid memories of the federal funds rate closing at 11 and 12 percent, at 5:00 o'clock on a few days. So volatility, periodic volatility that no one could quite manage is common in money markets and completely, completely normal.

A corollary to that of course is that there hasn’t been actually very active arbitrage in money markets for 12 years. Nobody knows how to do it. The rules of the game have all changed, particularly the regulatory rules, and let me be clear here, I'm not talking again just about the biggest banks, but the entire set of companies who actually function in the -- who actually use these markets.

A final complicating factor I want to point out too, and this has to do strictly with the repo market. Repo is collateralized, if there are very large changes in the quantity of collateral, and here I'm thinking U.S. Treasuries, that can actually impact repo rates, and in point of fact, ever since the U.S. deficits got big, starting in 2018, repo rates -- you'll notice in the top chart up here -- had actually popped up more than they did back in history before.

Sorry, let me go back to this slide. That's not an accident, lots of extra supply of collateral, means lots of people would really like to borrow against it, but there's an excess demand for borrowing so rates go up.

We are going to have big deficits and continue very high Treasury supply for the foreseeable future as far as I can determine, so I wouldn't expect that this is going to be something that goes away.

In short, this fall, the financial system has been relearning how to function in what I'll put in quotes is "normal" money markets, meaning volatility that the Central Bank doesn't completely preempt and offset, but with a really, really different regulatory regime.

This is actually an opportunity to do some learning, and to learn about what it is that making the money markets volatile in different ways. And I think a certain amount of learning by everybody might not hurt so much, and it might cause a -- it might and -- the nice side effect to that might be just less hysteria too. Thank you, all. (Applause)

MR. SCHNEIDER: Thank you, and good afternoon. Thank you to the Hutchins Center, and Brookings to hold this, and then to bringing some light to a part of the market that only seems to be about during times of stress or crisis. And quite honestly as a practitioner, and a manager of capital on behalf of clients, this market is of concern. It has raised a lot of awareness and issues, and probably for the time since the financial crisis, is back at the forefront of a lot of discussions, so it's poignant that we are sitting here today discussing this.

And then really bringing light to the fact that the repo markets are an effective way to, number one, obviously to transact and conduct monetary policy, but more importantly, it's a rational indicator of what the cost of capital is. And one of the things that you have to think about as a practitioner of capital is how that gets transmitted through the monetary system, and in a variety of ways.

So, for us, looking at the repo markets is not only a great barometer of the overall health of the market as you see it transform from balance sheets of moneys in our banks, to the private sector, and beyond. But really to thinking about how leverage and cost of capital is really managed.

To that end, it's important to highlight what happened, obviously back in September, but also highlight how the repo markets function, and ultimately where we should be thinking about this in the construction of an evolving system of monetary policy.

Number one, just to highlight, as Trish mentioned, there's three things that basically, a trifecta of circumferences that happened back in September, the Corporate Tax Day reduced a lot of

excess liquidity within the system, that's one clear cause.

Number two, an increased amount of collateral which needed to be financed, and as we've also highlighted here that's going to be a continuing need. So as deficits increase, the continued demands on financing collateral through primary dealers, on those settlement dates, is going to be a known known at that point in time, but something that's going to have to be dealt with at that point in time.

And then the third one is clearly the rebuilding of the cash position of the Treasury which all led to a consequential deficit in excess reserves in the system that day, or at least perceived that day.

Let's put it in context though. We have had eight times over the course of 2018 and '19, we've actually had reserve changes of greater amounts that we had in September, in that mid-September date. Meaning that the demand, decline in the reserves was actually greater than what we witnessed.

So, why, why it happened that day? What happened? Well, obviously the elasticity, or inelasticity of moving the reserves in the system has changed, and that's really what we need to be focused on is how the transmission mechanism gets permeated through the system at point in time.

So, there wasn’t anything extraordinary, and more important Treasury settlements happened all the time, and the demand of financing happen on a regularly-scheduled basis, they are known, that's a fact of the market. And actually we see spikes in repo rates happen on a frequent basis. When I see spikes, 5 to 10 basis points, for a few billion dollars, is something that is consequential as a practitioner in the marketplace, but not necessarily of concern.

When we think about this -- when we think about this, what's clearly happened is that there's become less -- those become dealer balance sheet inner elasticity, and when you combine that with the general opacity within the financial community, and really the primary dealer community about how much balance sheet is being allocated to repo, it creates a bit of illogical discussion of what is the proper rate, where repo rates should trade.

It's been that way, not just for the past three months, but really, the past 25 years, that there's an equation which dealers may or may not participate in providing the incremental dollar or funding. And I think we are finding what we are finding now is that when you combine that with monetary policy in a reduced state of excess reserves, or a declining state of excess reserves, it actually creates a little bit more volatility in the market.

The question is, is that volatility bad, and more importantly is it abnormal? Probably not, and I think that one of the -- cases that we have to consider today, is the fact that we've been relatively -- we've been relatively subdued in the volatility in the money markets, and we've become accustomed to the fact that there has been basically no volatility in money market rates, including repo rates, for quite some time.

But that's not necessarily normal. So, adjusting our expectations and adjusting policies to accommodate that rationality is something that we have to do as investors and practitioners within the market, combined with policy and regulatory frameworks.

So, to even money market participants like myself, some of these -- some of these situations that were occurring in September were a little bit more opaque in terms of how we approached it. Similar situations don't necessarily lead to the same outcomes over that period of time. All we see is that where those markets price in real time, and try to react accordingly.

So, at PIMCO, we clearly are thinking about this on a proactive basis, being defensive in terms of managing liquidity, having frameworks which help to gauge, and sort of be -- and be proactive about how to manage liquidity within changing rates and rates conditions, but not everybody has that capability, and what we saw back in September, was that incremental buyer, or that incremental borrower of liquidity, simply didn’t have that degree of freedom that other institutional investors, or even retail investors might have at that point in time, to take advantage of it.

So, fundamentally, what we have to do is overcome that inner elasticity that I referred to a moment ago, and think about how dealer balance sheets can become resilient and more importantly, try to quantity it better how balance sheets from those banks, et cetera, are utilized to fund the repo markets, especially given higher collateral management, and higher collateral needs.

So, this leads us where we basically are today. Post-crisis regulation has been impacting the money markets, we've seen it through money market reforms, we've seen it through more technical markets like cross currency basis, where we've stresses from time to time, and it can happen for a variety of reasons, and it can be permeating different segments of the market, but it may not.

And what we saw in September it's clearly, it was a pretty defined impact to just the repo markets at that point in time, which actually should be alleviating a lot of broader market concerns.

Fundamentally, this isn't in 2008, and that's the number question, we have been talking with clients about. It's not a structural breakage; it's just not a counterparty credit risk, so it's fundamentally different in that regard.

But what it is, it's recognition that the cost of funding, the cost of liquidity has -- is a dynamic, and more importantly can rapidly change given certain circumstances in time.

So what is the role of the Fed? Ultimately the role of the Fed needs to be thinking about how it can be the lender of last resort at point in time. Perhaps it's a standing repo facility, perhaps it's some regulatory relief in the future of how to manage CLAR. But we need to be thinking about how, ultimately, the banks should be reacting to this, and how they can be, potentially -- potentially a beneficiary to the broader marketplace.

Context is important. So while 7 percent or 10 percent repo rates aren't necessarily ideal it wasn’t destructive to the market long-term, the Fed obviously responded to that. But what we are seeing is that banks are being regulated into and unstable equilibrium, meaning often times their degrees of freedom are being curtailed in a lot of ways, which don't necessarily mean for a smooth pricing of overnight repo and zero volatility in the marketplace.

Again, something that we should be growing increasingly comfortable with is some modest volatility within the marketplace. Procyclicality in the post-banking crisis, has led to some of this, but we really need to be thinking about it's not the primary order of impacts of what's going on in the marketplace, but it's second order of impacts of what regards to regulations of how those regulations are having on non-bank participants in the market.

So the primary dealers have their equation, but it's the secondary participants who may or may not be impacted by those higher rates to come. So, in short, what we saw back in September was not a shortage of cash or primary liquidity, but it was a shortage of cash to their internal liquidity buffers of those primary dealers, of those G-SIBs above their CLAR requirements. So, the buffers on buffers are what actually matter at that point in time.

The other aspect to think about is simply a little bit of complacency. At PIMCO, we've been tracking the decline of excess reserves as anybody has, and yet we still don't expect the impact on the September hike -- or the September settlement date.

But what we do see and we have been thinking about, is how to be more dynamic in terms of approaching liquidity management. So, given the current market environment, it is an ideal time to reflect, as we are here today, to the overall environment, and more importantly, think about ways to actively manager liquidity in the context of a slightly more volatile liquidity and funding cost environment for repo at that point in time.

So, the consequences that a large portion of the market simply doesn’t understand how their primary funding, counterparties and primary funding partners operate, it's going to simply mean that they're going to be carrying a certain amount of hire prudential risk than throughout the cycle of the economic cycle, than might prudent, and should cause a bit of hesitation. And at least reflection about how to more dynamically approach liquidity management, and frankly, higher cost of capital, or changing cost of capital as transmitted through the repo markets.

So, investors should look to be cognizant of those leverage points, they should be thinking about repo as an indicator of the ultimate cost of capital, and more importantly secure term funding and ways to mitigate funding risks so they aren't caught off sides of these points in time.

And ultimately, that will lead us to take what's happened in September and make it more of less than oriented experience at that point in time. Thank you very much. (Applause)

MR. TARULLO: So, my assignment today is to introduce the questions we might be asking in light of the September repo market disruption that Trish and Jerome have just discussed. In the prepared remarks I try to level-set a bit by identifying three sets of potentially relevant changes that should inform the discussion of those issues.

Trish already gave a terrific little precis of the first, which is the change in Fed monetary policy mechanisms, and the fact that the Fed has now found a little bit more about where the kink in the demand curve is, and that that may -- that that played an important role in the September disruption.

The second change is, again, Trish alluded to it, the changes in the last couple of years in the Treasury market, with the budget deficit having increased by about 50 percent in the last two years, the supply of new treasuries, that need to be absorbed by debt markets has grown absorbed by debt markets has grown enormously.

Another thing that's happened, and Jerome was alluding to this just a moment ago, is

that the marginal purchaser of the increased supply of treasuries has changed. Until the last couple of years, the Fed was marginal purchaser of treasuries, right, and the bonds under QE. And, prior to the 2017 tax changes, U.S. multinationals with large offshore cash holdings were also significant purchasers of treasuries.

Today, though, the marginal purchaser at least is probably a primary dealer and may be one of the biggest primary dealers. And this shift means that those purchases are going to need to be financed, at least until end investors acquire the treasuries, and may be longer.

It's not surprising that the volume of Treasury-backed repo transactions has increased substantially in the last year-and-a-half. You put all of this together and it seems reasonably clear that digesting the increased supply of treasuries is going to be a continuing challenge, with potential ramifications for both to the Fed balance sheet and for regulatory policies.

So, the third are where the existence or non-existence of change is obviously relevant is in prudential regulation. It's not clear how much of a high significance for repo has changed in the last couple of years. But, as I think everybody in this room knows, to the degree there have been changes in regulation over the last couple of years, it's been deregulation.

Now, whether existing regulations work differently because of the first two set of changes, is problem one of the things that people want to take into account.

So, now turning to my actual assignment, what are the issues raised? I'm going to start Fed Balance Sheet Policies which obviously do relate to monetary policy.

Most immediately, will there be another reserve shortage and price spike at the end of the year? The Fed will be only partway through its renewed purchase program, and end-of-year balance sheet window dressing by some banks may further constrict their capacity or willingness to increase their repo market activity.

So, are the ingredients there for a problem? Yes, it appears as though there may be. Now, I presume that the Fed is just focused on this possibility as markets are, and that's it's going to be prepared to augment reserves as needed toward the end of this month, but we'll see.

The more interesting issue is what recent experience implies for balance sheet policies over the longer term. And addressing that issue, I think at least, involves answering two related

questions. The first is what is or should be the Fed's tolerance for volatility in Treasury-backed repo markets? You heard both Trish and Jerome refer to the fact that if we haven't been quite vol free over the last eight or nine years, we've been very much vol suppressed, not just in the repo market but in a lot of other markets as well.

The second question is, given that risk tolerance the -- excuse me -- volatility tolerance the Fed does have, what specific balance sheet policies should it adopt?

So first, In the October 11 statement regarding Monetary Policy Implementation, the Fed reaffirmed its commitment to an ample reserve monetary policy regime that operates primarily through the setting administered interest-on-excess-reserves, and reverse-repo rates, and does not require active management of the supply of reserves.

The Fed identified the risk it's concerned with, as avoiding money market pressures that could adversely affect policy implementation. This office is intuitive, right, this is what the guys in Monetary Affairs, are going to work -- anything that's happening that makes it harder to transmit the FOMC decisions every six or seven weeks.

The question I have though, and the question I think is worth discussing is whether the Fed understands adverse effects on policy implementation to be more or less synonymous with any spike in repo prices.

As Trish said, the pre-crisis scarce reserve monetary policy regime predictably experienced transitory spikes. Is there something about the current policy regime that would make similar spikes more of a risk to effective monetary policy implementation?

Relatively, is there reason to believe that it will be more difficult to distinguish transitory from persistent reserve shortages? And thus is it desirable for reserve levels to be large enough that they stay comfortably on the flat part of that demand curve?

On the other side, though, are there advantages to tolerating some measure of volatility in this market and, indeed, in other financial markets? Such tolerance would obviously permit a somewhat smaller Fed balance sheet, which the Fed might favor for a variety of reasons. But there's also the broader issue of whether policies that largely suppress volatility in normal times may yield more intense volatility when a significant shock occurs.

So, that's the first question. What should the volatility appetite be? The second question is, given that, what the balance sheet policies that the Fed should adopt? Again, in the October Statement the Fed noted its intention to continue balance sheet growth as non-reserve liabilities grow. So that's currency, for example.

That helps make -- that means that you maintain reserves at about the level that prevailed in the early part of September. The question is, is this intended size for a buffer adequate? And the answer to that must, in part, depend on whether the Fed is now reasonably confident in predicting the effective, the effective capacity of banks to respond to spikes in demand for repo.

It’s pretty clear that pre-September assumptions were not wholly accurate, and there's a variety of factors that may have been at work here. Many identified regulatory constraints the culprit. And I'll say more on that in a moment.

Others have suggested that the apparent additional reserves of banks may not translate into actual additional repo activity during spikes. Banks have different strategies for holding reserves versus treasuries, some which were, at least, indirectly driven by regulation, some which are just internally developed. It may also be the case that the internal risk and other limits established by some banks for their treasuries function have not been designed to take advantage of short-term price spikes.

There wasn’t the incentive to put in place a mechanism for having an exception to your normal limit. A key decision for the Fed will be the means by which makes additional reserves available, given its volatility tolerance, and its assumptions about effective bank capacity.

I think the most risk-averse approach would probably be to grow the permanent balance sheet enough to maintain a truly sizeable buffer of reserves beyond what will probably be a shifting in somewhat uncertain point at which the slope of the demand curve steepens.

This though would be closer to an "abundant" or "really abundant" reserves policy than an ample one. And of course, all the considerations that have been discussed for years in debates on the right size of the balance sheet will be relevant here. If there's discomfort with the prospect of a larger and possibly quickly-growing balance sheet, the Fed might opt for some kind of back-up mechanism to deal with surges in repo demand.

One possibility is obviously the much-discussed standing repo facility. In his last press

conference Chair Powell hinted that might be some way to facilitate bank use of intraday overdrafts in their Fed accounts.

Now, either of these, or a different kind of facilities could presumably be priced to respond to anything more than a hiccup in demand for reserves, if that's what the Fed wanted to do. Or not to click in until there was some moderate amount of volatility, and does not -- allow some volatility before you start to pump in the liquidity.

There's an additional question, which is a little orthogonal to what we've been talking about so far. Zoltan Poszar has written on this several times, and that relates to the impact of the Fed's foreign repo pool in taking up balance sheet space.

This long-standing facility, but in the last five years, since the Fed lifted the caps on its use, it's at least tripled in size. To the degree that foreign official institutions were or are selling treasuries to invest in the pool, the already-growing market supply of treasuries will be further increased. And in any case, the pool is going to create another non-reserve liability.

All right, now to regulation, so let me begin with two introductory points before I get to the questions. First, as I alluded to a minute ago, the various regulations that various people have blamed for the price spike, were in place for at least several years before September. Yet, until a few months ago, while there were a few hints of possible problems as the Fed began to reduce its balance sheet, there hadn't been any repo disruptions.

So to the degree that one feels the need to rethink the regulatory framework, it must be because of the interaction of that framework with some of the developments that people have already chronicled.

My second introductory point is that for both heuristic and policy purposes, it may be useful to distinguish between regulatory requirements directed at the size of banks' balance sheets, leave capital there, and those directed at the composition of assets on those balance sheets, broadly speaking, leave liquidity there.

Beginning with balance sheet size: notwithstanding some of the instant commentary that suggested that the enhanced supplemental leverage ratio, and/or the G-SIB surcharge, bore responsibility for the September price spike, the evidence that I, at least, have seen to date, seems rather

thin.

The largest banks all room within their leverage ratio requirements to increase lending, although this might not always be the case. And in any case, for purposes of the quarterly reporting of leverage rations the asset component of the denominator, is based on the medium size of the balance sheet over each day of the quarter. So a temporary, a truly temporary increase to take advantage of the price spike, could have been smoothed out in the remainder of the quarter.

Now, with respect to the G-SIB surcharge, it is indeed the case that the formula for determining the surcharge bucket into which a bank falls, it does take into account the amount of repo financing undertaken by the bank.

And it is true that the repo amount is measured at the end of each quarter, not just at the end of the year, so you can say that there might have been the motivation to take the repo component of the G-SIBs surcharge formula into account, even in Q3.

But the impact is fairly attenuated. A pretty big decrease in repo financing will not shave that many points off the surcharge score. And as various market analysts have been noted in the intervening few months, in past years banks have made more adjustments in other balance sheet items where the -- paying for adjustment, as it were, it's greater.

But if a bank is close to the cutoff between brackets, every little bit of regulatory arbitrage may help, and thus there may well some incentive there. I think the G-SIBs surcharge issue raises several questions.

First, would it really make sense to reduce capital requirements for the largest, most systemically important banks just so that they can ramp up their repo activity? The musing by some observers that the September price spike was significantly accounted for by JPMorgan staying on the sidelines arguably reinforces, rather than undermines, the case for a higher capital surcharge.

A key motivation for the post-crisis reforms was to take account of the systemic importance of institutions whose weakness or failure could disrupt the whole financial system. This is especially important in the area of runnable short-term funding. Reducing capital requirements to facilitate a private bank becoming a quasi-lender of last resort would seem to pervert the very aim of requiring extra resiliency as the systemic footprint of the bank grows.

Second, might it not be better regulatory policy to calculate most metrics for the surcharge formula, including repo activity, based on averages over the course of the preceding year rather than a point in time, or four points in time basis. This will both accommodate temporary increases and some bank activity even at the end of the year, because you'll be working with an average from the preceding 360 days, while precluding the window-dressing exercise, by which a bank that is engaged in higher levels of that activity over the course of the year, artificially slims down for a quarterly or annual snapshot of its balance sheet.

Third, the window dressing exercise that can involve year-end reductions in repo activity does reflect the cliff-effect disadvantage of the bucket approach to surcharges, as adopted by the Financial Stability Board following the financial crisis.

That is, for those of you who aren't familiar with this, the formula produces a score for the bank, for the systemically important bank, but those scores, those scores have been put into several distinct buckets, so banks with somewhat different scores can be in the same bucket and a small difference in score can mean 50 basis points increase in your surcharge.

Within the Fed, at least, this is back when we were thinking of the post-crisis regulatory regime, within the Fed we were thinking tentatively about more of a continuous-function approach, by which a bank’s systemic score would correlate directly with the resulting surcharge rather than be in one of these cliff-effect bucket circumferences.

A change of this sort, like the previously-mentioned idea of using averages rather than point-in-time measures, could be effected in a way that would be relatively capital neutral, though it would probably take more technical work than the data issue.

Now, the issues raised by the repo disruption with respect to regulations affecting the composition of bank balance sheets are, for me at least, more difficult. As nearly everyone immediately recognized, the Liquidity Coverage Ratio was essentially irrelevant in September, since Treasuries and Central Bank reserves are treated identically, but they're not treated as fungible in resolution planning or -- and what I'm about to say is a contested point as to -- (laughter) --

And it's contested within my own mind. I don't know what the answer is here, because both some bank executives, and yesterday as Vice Chair Quarles, seem to indicate that they were not

treated as fungible in meeting the CLAR liquidity stress test. That was not my recollection of the way the liquidity stress testing was done, but I just don't know enough about how it's being done now, so maybe there is some such effect. I know there is though in the resolution planning context.

Now, the specific requirements under both these frameworks are not published, so it's hard to draw any conclusions as to how binding these requirements may be. But during JPMorgan's Q3 earnings call in October, Jamie Dimon identified these requirements as the constraint that prevented JPMorgan from doing more repo, and said his bank is required to maintain at least $60 billion in intraday reserves at the Fed.

Although one would expect that JPMorgan's size and complexity mean that its requirement is considerably higher than that of other banks, even some rough back-of-the-envelope calculations would suggest that the aggregate requirement for all banks could be quite significant.

Now, why would supervisors discriminate between treasuries and reserves? As a credit-worthiness matter you know -- (laughter) -- there's not much between reserves and treasuries. But treasuries do need to be monetized, and in stressed circumstances, when liquidity providers generally become more cautious even as borrowers need more funding, monetization through other market actors may not be immediately possible.

So, if the aim of resolution planning and liquidity requirements, more generally, is to assure funding self-sufficiency by banks under all circumstances, there will be a preference for reserves. So long as reserves have been plentiful, this preference was a feasible regulatory choice.

If they prove not to be, though, these requirements might contribute to the kind of episode that has motivated this conference. Given the pace of increase in the supply of treasuries created by the post-2017 budget deficits, the importance of the asymmetric treatment of treasuries and reserves may become more significant. And I do think that's a regulatory issue that's worth revisiting, again, with the problem that for those of us outside the Fed we don't have the numbers we just have a kind of conceptual framework.

Now, as always, one must caution that the mere fact that a regulatory requirement contributes to reduce lending or some other financial outcome does not clinch the argument for changing the regulation. That depends on the seriousness of the effect, as well as the relative availability of

alternative means both to address the effect and to achieve the financial stability aims that motivated the regulation in the first place.

But as I say, it seems to me that Jamie had a very plausible account of what part of regulation might actually be playing a role and that one I think at least is worth talking about. In part, because of my closing remark here, which is to suggest an even broader regulatory issue that I think was implicated by the repo episode, although you wouldn't need to tackle this big issue in order to deal with the repo episode.

The post-crisis approach to liquidity regulation -- and here the liquidity coverage ratio is relevant -- requires banks to amass large quantities of liquid assets to ensure their self-sufficiency during periods of stress.

I have for some time been concerned that while this approach does a reasonable job of countering what Jean Tirole called the "underhoarding" of liquidity by banks during normal times, it may exacerbate the problem of banks "overhoarding" liquidity during stress periods, and it does little, if anything, to address the use of runnable funding by shadow banks.

Having every regulated bank completely self-insure its liquidity needs, even under severe stress or failure, may make sense as a microprudential matter, you can see the logic of it. But if every bank must sit on its pool of readily-usable liquidity in anticipation of possible failure, the result could, in periods of stress, be a decidedly suboptimal macroprudential policy that starves an already strained financial system of needed liquidity.

Questions about the theoretical foundations for the current approach to liquidity regulation have been further complicated by the torrent of new Treasury issuance and the reduction in the size of the Fed’s balance sheet.

Now, it’s neither realistic nor I think desirable to delay decisions on the more immediate issues surrounding Fed balance sheet policies. Devising a different approach to liquidity regulation may be one that centers more on sustainable funding practices rather than pools of liquidity would take time, especially since any significant change would need to be internationally coordinated.

And if an element of a different approach were to include more or less short liquidity assistance, such as a Fed facility that would stand ready to monetize treasuries or other assets, the

possible resulting increase in moral hazard would need to be addressed.

But the disruption in repo markets, along with the recent reports of serious potential funding vulnerabilities among non-banks involved in mortgage lending, together remind us from two very different points that liquidity regulation remains an important unfinished piece of post-crisis regulatory reform. Thank you. (Applause)

MR. WESSEL: Thank you, all, for that. I have a few simple-minded questions, and then I'm going to turn it over to the audience for people who have much more sophisticated questions than I have.

So, my first question is, I draw from what the three of you said, that this is a little bit of a lot of attention to something that you don't think is a very big problem. It's a symptom of the Fed learning what ample reserves means. It's maybe a symptom of some unintended consequences of liquidity regulation that we could tweak a little bit.

It's a symptom of changes in the way the market works, but bottom line we shouldn't make radical changes because even though this looks very dramatic and makes a lot of us think, oh, my, god, this is 2007, 2008 all over again, it's not.

Have I completely turned everything you said upside down or do I have it right?

MS. MOSSER: Okay. I'm so lucky I get to go first. Not quite. I do not disagree that if some of the things that both Dan and Jerome pointed out, and certainly stories that one hears, happened in a period of true financial stress, true financial stress, liquidity hoarding, and I'll use that word, by the very largest financial institutions when they themselves have ample liquidity would be a mess, and a complete disaster.

My argument about allowing for a certain amount of volatility is partly to learn exactly amongst the regulations, not just the banks, but I would also some of the other regulatory changes, about what is it that is creating the binding constraint, and could particularly, to our best estimate, cause a problem in a period of true financial stress?

So, that's part of the reason I think this is worth looking at it carefully and taking some time to learn a little from at least a moderate amount of volatility if that's possible. Also the regulations are not going to change fast, and so better that you start now, or if you think there are pieces that you want to

tinker with, that is a slow boat, as we all know.

MR. SCHNEIDER: I'll just add to that. You know, the focus ultimately is the concern not necessarily with primary liquidity within the market, but thinking about those second-order impacts to the market, meaning those that are impacted by the higher rates that we saw back in September, and more importantly how the regulations buy those primarily, non-primary dealer participants could be impacted, and how it's perceived.

And that's the market risk that we have currently. Maybe some regulatory changes can alter that in the future, but the systemic -- that's viewed as a systemic impact, and how to or what degree that's something that, as practitioners, we have to gauge, and then manage against, and think about how it could impact the broader capital markets.

MR. WESSEL: So the point is that if this is the symptom of something much bigger, and perceive that it's a symptom of something much bigger, it could have -- the ripple effects could be big. Is that your point?

MR. SCHNEIDER: Well, it may not be, I mean, quite honestly it may be decided that that -- you know, the ripple effect might be somewhat subdued. But let's put this again in context, context is important, the markets that are impacted, whilst severe on the overnight repo basis, was the repo market.

MR. WESSEL: Right.

MR. SCHNEIDER: It wasn’t the FX market, it wasn’t the basis markets. There are a lot of other markets that remain relatively inoculated from any type of further volatility, if you want to call it that. So, it might decided that whatever -- that whoever needs that marginal liquidity, it's just a function of that they were on the wrong side of managing the liquidity during those points of stress.

I think the broader point is the fact that keeping it again, in context, that G-SIBs were basically not short of liquidity back in September, that clearly was not the case, regulations did exactly what they intended to do, and that's fine. It's the consequence of thinking about, you know, how they managed that liquidity against their own internal liquidity buffers.

MR. WESSEL: Right.

MR. SCHNEIDER: And ultimately how that comes into play with the CLAR requirements, et cetera, and that is where --

MR. WESSEL: And we are going to keep this an acronym free zone, you're violating the rules.

MR. SCHNEIDER: I get to use them once so there's not going to be any more of that --

MR. WESSEL: Yeah, you've used up your quota.

MR. SCHNEIDER: Yeah, that's it.

MR. WESSEL: (Laughter) To me what you're saying is, the big banks had lots of cash and the big conundrum is, given that they could have lent this cash for very high interest rates, they didn't?

MR. SCHNEIDER: Well, cash is not liquidity always to everybody.

MR. WESSEL: Right.

MR. SCHNEIDER: And I think that that's what, when thinking about it as a practitioner, you have to realize that that's the friction within the market that exists today.

MR. WESSEL: Dan, you can answer that question if you want to add something.

MR. TARULLO: Yes.

MS. MOSSER: Sorry, just one small thing. This, the second order effect that Jerome talks about, really matter, most of the U.S. financial system is not banks, most of it is non-banks, and if the dependency at least at the moment is on that group and the liquidity stays there, that's not going to necessarily be helpful from a credit formation --

MR. WESSEL: So, why? But why, I mean, J. Powell and John Williams noted this in their letter to Congressman McHenry, firms not subject to bank regulations such money market funds, GSEs, pension funds, also seem reluctant to step in and take advantage of very high repo rates in mid-September? So, why is that?

MS. MOSSER: Inexperience, nobody had seen it in 12 years, nobody has a limit, nobody has a trader -- I'm sorry -- I shouldn't say that.

MR. SCHNEIDER: No, no, I think that's part of it, but I also I also think --

MS. MOSSER: I think so many (inaudible) at the desk there --

MR. WESSEL: (Laughter) We'll be collecting liquidity at the back of the room when this is over.

MR. SCHNEIDER: Well, I think there are -- were participants who stepped in, but maybe not to the degree that was satisfactory. That's clearly, you know, if you get to a 10 percent repo rate when it should be, you know, sub-2, that's some supply and demand mismatch.

But I do think that this all goes back to my point about thinking about the context of capital, and more importantly liquidity management, and being defensive in that regard. And to those who are potentially susceptible to changes in funding cost, have to think about it as a more elaborate and approach to deal with this dynamism that's now in place in the marketplace.

So, is it a bad thing? No. It's just simply the steps that highlight awareness that the framework and paradigm simply needs to be adapted at that point in time.

MR. WESSEL: So, Dan, (a) should we worry? And (b) I was asked the following question at Thanksgiving by my niece's fiancé who works on Wall Street, and he said to me, everybody I work with thinks that when the Fed increases the balance sheet by $280 billion that's QE, and they just don't want to admit it. What would you have said to him?

MR. TARULLO: So, on the first point -- on the first question you asked, yeah, to a considerable extent, I took the episode -- I took the episode to reinforce my concern about liquidity regulatory system in general. There are two parts of it the one I spoke a little bit about which is the emphasis on pools that may never get effectively drained.

And the second is that we are not -- as Trish just said -- we haven't brought into this system most of the U.S. financial system and so in effect, I think, I mean, nobody would say this, but in effect we're asking JP, and Citi, and maybe a few others, to be the liquidity insurers for the entire financial system, which strikes me as not a particularly good position to be in.

So that's why it just provoked these broader thoughts on liquidity regulation. As you can tell from what I -- I was trying to be sort of neutral on this, but I do think that allowing more, anticipating more, and almost demanding more volatility is actually a good thing.

On the point here -- the point, you know, QE, Quantitative Easing is presumably designed to try to affect interest rates, or the shape of the yield curve, or just (inaudible), that's not what the purpose of the bill purchases. And they are bill purchases by the Fed, they're not 10 years that are being purchased.

And so I'm sure that their aim is not to change the federal funds rate, they expect that the bills are going to roll off and they're not going to have that effect. I mean, we'll see, sometimes people are surprised, but it isn't -- it certainly is in QE in motivation, and I think the Fed has strong reason to believe it won't be QE in effect.

MR. WESSEL: All right. Okay. So one final question, if I could just get a simple answer -- a quick answer and then I'm going to go to the audience -- if it were up to you, would you create a standing repo facility at the Fed that would lend not only to primary dealers, but a broader array of counterparties. Yes or no? To all of you.

It's like the (inaudible) at the Presidential Debates, raise your hand, you know. (Laughter)

MR. TARULLO: So my answer to that is going to be, after three breakfasts with my colleagues from the Business School and the Econ Department, I still don't know what I think.

MR. WESSEL: Okay. That's a good answer.

MR. SCHNEIDER: If your concern is of the second-order impact to the market, then it obviously has to be yes, if not, then obviously no.

MS. MOSSER: I'm going to be careful how I phrase this, since I sat on this stage and actually talked about preparedness for the next financial crisis about a year ago. And I'm looking at Bill English -- on a chapter that we wrote and one of our preparedness things was the Fed needs to figure out in advance, at least on in extremis how it would lend to the non-banking part of the financial institution.

And one way to do that, without invoking 13(3) and a whole lot of other legal hoops, is to set up a facility that would basically take acceptable collateral with a relatively wide range of counterparties. None of those things would violate any -- of any restrictions in Dodd-Frank.

Whether it should be there all the time or not, is the part that I'm still somewhat undecided about. But should it be there, and should it be known that the Fed could do this, in extremis, I think that level of moral hazard at least, I could deal with, of course I'm not a regulator, I don't --

MR. WESSEL: So just to -- that paper and a number of others from a conference we did on the 10th anniversary of the crisis will be published by the Yale University Press in a book called *First Responders*, in February of next year. And I promise you that Trish and Bill English will personally

autograph your copies if you buy one.

So let's, there are a lot of people here. I'm going to take two or three questions and then we'll go around. The woman there, could you stand -- so a favor -- wait for the mic, tell us who you are and be respectful, there are a lot of people here so let's keep it short.

QUESTIONER: Viva Hammer. Many people here have been talking about the idealness of volatility, and although raising the question, having to address how you create a range for ideal volatility, and what you want to accomplish from volatility. Is it just information? Or is there something else that the market needs? Is it a kind of inoculation against further volatility, or is it something more specific about the information of volatility, gives to the market.

So, two parts, is there a range? Should there be a range, how is it calculated? And second of all what do you what do you want to achieve by doing that?

MR. WESSEL: Okay. Thank you. Over here, there was someone. If you stand up, the mic will find an easier time finding you.

MR. SELGIN: Yes, thank you. Professor Tarullo, you mentioned that --

MR. WESSEL: Can you tell us who you are?

MR. SELGIN: George Selgin, Cato Institute. Pardon. You mentioned Pozar's writing about the role of foreign repo pool, you didn't mention the role of the TGA, though Patricia talked about that a little bit. That's also another liability that used to be controlled very narrowly through cooperation between the Fed and the Treasury. My question for you and all the speakers who would like to answer is, why isn't the Fed talking about trying to rein in those liabilities by having foreign central banks and the Treasury take advantage of or come up with alternative places to park their dollars.

MR. WESSEL: TGA is the Treasure Account.

MR. SELGIN: I'm sorry about that.

MR. WESSEL: Over here in the front. If you stand up the mic will have an easier time finding you.

QUESTIONER: Hi. Nancy Jacklyn. I was wondering, you talked about the changes in this market since before the crisis of 2005, and I was wondering in looking at the behaviors, have you taken a look at things like the fact there's only one tri-party repo facility now, and that's Bank of New York,

and JPMorgan is out of it. And the reason they got out of it may also be affecting the reasons they're not there to continue to provide as much liquidity.

And on the demand side is there real difference in who in the second order participants is really looking for all the short-term financing. In other words, is the demand in this market, substantially changed, not just because of the amount of government borrowing that's out there, that needs to be financed in a market but that there's a lot of longer-term demand, what should be demand for longer term funds, seeking shorter term funds, and so distorting supply and demand dynamics in this market.

MR. WESSEL: Okay. So, we don't -- you should not all feel the need to answer every question, but we should get an answer to each question. So, volatility, why do we want volatility and how much is too much? (Laughter)

MR. TARULLO: I don't know how much is too much, but I think you mentioned several complementary reasons why you do want some volatility. I mean, to me, thinking of it as a policymaker, the most important thing is you don't want a situation in which markets get used to the notion that any time there's a hiccup somebody, usually at Central Bank, steps in. Because then, if somebody has a big hiccup, nobody is going to -- nobody will have developed either prepared for, or developed the capacity to respond adroitly to whatever is going on in markets.

They won't have really priced risk in appropriately, and so to me as a -- from a policy perspective that is what's important. I think Jerome could probably speak better to the learning on the market side, but I think it's basically the flip side of what I was saying a minute ago.

MR. SCHNEIDER: Yes. I would concur with some of that. There is from a practitioner point of view, you had to have these degrees of freedom, and not everybody has in the same as pre-crisis. And so the cost of that liquidity is inherently correlated to the volatility you see in the market to that regard.

The fact that we've had zero volatility, or near zero volatility because of monetary policy and other structural changes, lends itself to, when any does occur, it becomes this headline-grabbing experience, when frankly it shouldn't. And it's something the repo markets, as we've seen from the charts that Trish highlighted, is something that we're just reverting back to the old normal, if you will.

So, with that regard, we just have to adapt and think about modest volatility as being part

of the daily structure, especially over reporting dates like quarter ends and year ends especially, we don't get out of this habit of discrete reporting periods.

MR. WESSEL: Trish, do you want to take the tri-party? Should we worry that there's only one tri-party?

MS. MOSSER: There are reasons to be concerned that there's only one tri-party provider, but I don't think in the context of volatility, frankly. Honestly, I'm guessing -- I have to go back -- my rough memory is that they -- the Bank of New York was probably at least 75 percent of the tri-party market in 2005 as well. So, I don't think it's really correlated with -- at all with the volatility --

MR. WESSEL: Just to be clear, the tri-party market is where the lender and the borrower go through an intermediary.

MS. MOSSER: Correct. Right now any --

MR. WESSEL: In this case the Bank of New York, as compared to other deals where it's just between the borrower and the lender?

MS. MOSSER: Correct. Correct, and in 2005 there were two institutions who did that, Bank of New York Mellon and JPMorgan Chase, now there's only Bank of New York Mellon. It was always a very -- frankly, always having a small number of infrastructure is a risk, but it's a different kind of a risk from this.

I'll also make a comment about George's question, about the Treasury account, and the foreign repo pool. I'm probably showing I'm an old-fashioned central banker here, but I have no idea whether the Fed is speaking to those counterparties about those facilities or not, but my personal opinion is that they should be. The Treasury account has always been a source of volatility, and it's one reason that it was very small historically.

And in fact if volatility was kept as low as it humanly could. Let me be clear that the foreign repo pool is not particularly a source of volatility, on the Fed's liability sides, it's just --

MR. WESSEL: Big.

MS. MOSSER: -- it's just large, and on top of that these are people who could be -- or institutions who very easily in private markets if they were -- did not repo with the Fed, could in fact be opportunistically take advantage, not as the arbitrage because they're not intermediaries, but literally take

advantage and help to close some of the gap and when you have things like spikes in repo. And so the fact that they are on this side as opposed to that side of the lending --

MR. WESSEL: Do you mean the foreign central bank doesn't go into the market and help smooth this volatility because they have this special deal?

MS. MOSSER: Right. Exactly. Thank you.

MR. WESSEL: Sure. Here, stand up, please. And there's one in the back. In the back, if you stand up, the mic will -- Thank you.

MR. EAGAN: Sean Eagan, Eagan-Jones Ratings Company, we are named the number one firm for worrying about the credit crisis of 2008, by *Fortune Magazine*. My question is what if you're wrong? What if this is an early indication of bigger problems, and that is -- and you don't now, by the way, ahead of time?

That is, that you have a structural change in the indebtedness of a lot of countries that are right now using their central banks to support the funding needs of various countries. And what if this is an early indication -- not of some mismatching or anything of that -- but of more structural problem? What early indications might you have and how do you respond?

MR. WESSEL: Thank you.

QUESTIONER: Hi. My name is Sebastian Fontie. I have a question that -- regarding the draining of liquidity the triggers were the settlement of Treasury and of tax payments, and those presumably settled on the 16th, and yet we saw the biggest increase in volatility on the 17th. And so my question is, is that -- was that surprising to people on the panel, and may that be an important piece of evidence for us to think about how banks actually manage liquidity in terms of what they've experienced, and what they may be happening going forward? Thank you.

MR. WESSEL: There's a woman here, if you stand up, please?

MS. McDONALD: Thank you. My name is Buna McDonald. I have rather a different question. Does the volatility experienced in September, and the Feds -- New York Feds' continuing support of the repo rate, does that not affect the usefulness of SOFR as the replacement benchmark for LIBOR, particularly in view of the fact that suffers essentially a backward-looking rate, whereas LIBOR, which I believe should be retained, is a forward-looking rate? Thank you.

MR. WESSEL: Thank you. All right, let's start with the narrow ones first. So is there something about the 16th and 17th, Jerome, that tells us something?

MR. SCHNEIDER: No. I mean, quite honestly we started to see it very early in the morning on the 16th, and so while it wasn't headline grabbing for probably, you know, another 36 hours, quite honestly, it was something that we saw, starting probably about 5:30, 6:00 o'clock in the morning, that specific time. Sorry. (Laughter)

MR. WESSEL: Jerome tells me he gets up at 3:00 a.m. every morning. That's the advantage of living in California.

MR. SCHNEIDER: It's all dark, it doesn't matter where you are. (Laughter) So, but it was --

MR. WESSEL: The (inaudible) says well I the dark. (Laughter)

MR. SCHNEIDER: I did not say that.

MR. WESSEL: Sorry.

MR. SCHNEIDER: My media folks are cagey right now. Thanks. Anyway, in all sincerity is, if anything we are not in the dark about the liquidity markets, we always continue to look at them on a real-time basis for that barometric pressure indicator. So what I would say is, the transmission mechanism worked effectively, what we started to see is the second-tier demands start to come in on what we call Reg repo.

The repo not for cash settlement, meaning the same day on that Monday, but the one for T plus 1, meaning the Tuesday and beyond, which is why it was very useful for the market to only be placated once we had a response that was term in nature. Not simply the overnight market operations that were one day, overnight, that we had something going for, you know, two weeks at a time.

So getting ahead of the curve is essential. So, we did see it pretty early on. Again, we often have settlement, we often have late-day blips in terms of funding, that's something that we've always dealt with in market operations, and funding operations, but it also leads to what we typically will see these blips materialize now in this current paradigm, T plus 1, meaning trading for tomorrow's settlement because that's a way that the banks can avoid their daylight overdraft charges.

MR. WESSEL: So, Dan, what if this is an indication of something bigger and we just

don't understand what it is?

MR. TARULLO: Well, I mean, two things about that. One, you always have to kind of do our best -- you know, make your best judgment, because at some level you can be wrong about everything. And so in terms of policy response, that's the way people have to think, number one.

Number two, I guess three -- number two, when something happens that in and of itself is not hugely troubling, but you think it may reveal some problems somewhere else, you should probably spend some time. That's why it's provoked me to talk more about liquidity regulation writ large in the system.

And three, and this really quite important, so when the Fed created the office now Division of Financial Stability, part of the idea was, what Nellie, and the people who started that office did, was to basically take everything that was happening that the main stream Fed staff said, said, oh, that's okay, don't worry about that. This is okay.

And asked the question, well, what if it's not okay? You know, what else might be going on to have produced this? And it wasn't that they believed it all of the time, but they were an institutionalized intellectual devil's advocate that we thought of, and I know the guys of the Bank of England think the same way, as an important institutional component of any financial regulatory system.

But you've got to be -- you've got to invite it, you have to actually foster it, and you can't get angry with people when they tell you there may be a bigger problem here than you think, and I hope that's still going on at the Treasury -- at the FSOC and the Fed.

MS. MOSSER: I actually interpreted your question slightly differently as much more of a fiscal risk. Maybe that's because I just misheard you, or a combination. And there are -- there's absolutely no question that the degree of fiscal risk in the United States is higher, it's very high in Japan, of course it's been very high in Japan for a long time. Not as high in Europe, although in certain countries it is obviously.

The U.S. of course has the great -- has unbelievably exorbitant privilege being the benchmark currency for the rest of the world, until it's incredibly difficult to judge. It has happened historically that demand for U.S. treasuries has gone up, but it's very difficult to know exactly when that point is, because it happens very rarely.

So, is that a risk? I think it is. It's a financial stability risk, it gets highlighted I don't know that there are many signals, other than the repo market having a little trouble swallowing things, but that's happened a lot without there being a natural fiscal crisis.

So, I don't know, but it's certainly worth keeping an eye on, particularly given that the size of the deficits are not going to be going down anytime soon, as far as I can tell.

MR. WESSEL: Trish, so we're switching from the London interbank offered rate to the secured overnight financing rate, which I will not define. Does this say anything -- tell us anything about that?

MS. MOSSER: I'm actually less concerned about that. The part of the LIBOR transition that I'm more concerned about, is the fact that it was the last thing you said, which is that this is not a forward rate, there is not a forward market yet, it's just an overnight rate, there will be -- or there needs to be for it to be viable -- and yes, exactly, and no, I know the deadlines, which is interesting.

I'm not close enough to the debate to know, or to the inner workings of what's going on to know maybe other people know more about this, but my much bigger concern is when is that forward market going to get going, and be big enough that we can actually use -- that it's actually usable.

MR. WESSEL: Do you have a final word on that? Okay, please.

MR. SCHNEIDER: I wanted to address a question that was posed that wasn't addressed.

MR. WESSEL: Okay. Yes, right.

MR. SCHNEIDER: I mean, not get this 100 percent correct, but the question basically was is there something in the market structure today that lends -- for potential disruption between the demand for term funding, term liabilities and asset mix.

And I think it's important to say that this has always been a function of the market, and typically, back in the day, you had commercial banks with a much more fungible balance sheet and appetite, that provided that term funding at a cost because that's what they do. But now in this environment there've been things to supplant that, and to obviously change that risk tolerance.

One of those things, quite honestly is evolution of the structured -- if the evolution of the sponsored repo market. And with the sponsored repo basically is effectively taking collateralized lending

and moving it to essentially clear domains.

The point I would make there is that a lot of that is done via overnight demands, overnight repos. And so while there is incremental supply of balance sheet, it's coming in the form of very short-dated appetite. And I would just say that one of the things, as a risk manager, we always think about is that cost of liquidity, and more importantly how to more appropriately structure that.

But just because you have ample liquidity to meet on a daily basis, supply and demand doesn't necessarily mean that the term horizon for funding has actually been met.

So, it's a great evolutionary development in the funding and in the repo markets, but at the same time we should also be cognizant that there is that potential for that mismatch to -- you know, to open up one day, and we need to be prudent about how we approach as we are.

MR. WESSEL: Okay. I want thank the panel. We are only just beginning. We are going to take a 10-minute break. So, we'll resume. There's coffee outside, but we are going to try and get going shortly after 3:00 o'clock, so drink quickly, or whatever else you have to do.

(Recess)

MS. LIANG: So, welcome back. We're going to get started. So, the next part of this program is we're going to turn to a closer examination of the Fed's operating framework and then financial regulations and how they affect the repo market and what role they played in the event, if any.

So, for the operating framework, we're going to start with that. We have two experts, I think many of you know them. Bill English, Yale University and former director of monetary affairs at the board and he'll describe the ample reserve framework. Then we have Bill Nelson, now with the Bank Policy Institute, former director of monetary affairs. And then after their presentations, we'll continue with discussion and take some questions. So, I'll turn to Bill.

MR. ENGLISH: Thank you very much, Trish, and thanks to Hutchins for inviting me here today. What I'd like to do is just talk about three things. I want to talk a little bit about policy implementation frameworks as background, talk a little bit about what did the Fed learn in September about reserves demand. And then talk about possible adjustments to the policy implementation framework in light of what the Fed learned.

So, going back to kind of the pre-crisis era, as many of you know, the Fed had a small

balance sheet, it had a low level of reserves, the desk went in every day, did operations to try to adjust the supply of reserves to intersect the demand curve for reserves at the desired federal funds rate. And that system worked fine. But as Trish noted, after the crisis, that system didn't work anymore. Basically, after QE, the level of reserves was too big, those sorts of small daily interventions weren't really feasible.

So, when it came time to lift off, the Fed did a lot of thinking about how to implement monetary policy and they decided to administer monetary policy with a system of administered rates. So, the rate paid on reserves, the IOER rate, and the rate paid on a new overnight RRP facility that took funds from non-banks at a fixed rate. And that system also proved effective. So, when it came time to lift off, the Fed raised the IOER rate, raised the overnight RRP rate, market rates moved up and subsequently as policy was tightened, those rates were moved further and further and market rates moved up along with them.

Then, of course, we got to balance sheet normalization in 2017. And no decision at that point had been made about what the policy implementation framework would be in the long run. The committee said, we'll learn and we'll make decisions later which seemed fair enough. And it was only last winter that the committee announced that they were going to go with an abundant reserves framework for policy implementation. Abundant but not too abundant. In some sense, they wanted to be at the smallest level of reserves. It was consistent with kind of being on the flat part of that demand curve for reserves so they were going to operate with a larger system then prior to the crisis. How much larger, as Trish said earlier, they didn't know and they were quite up front that they weren't sure.

And so, they would allow reserves to run down slowly over time and at some point, market signals would be such that they'd realize they were kind of getting to the point where they were getting to that curve. And the demand curve for reserves and then they'd stop running the balance sheet off.

So, that gets us to what happened in September. They were learning about reserves demand and they were surprised. They learned that the demand for reserves was higher and less elastic than they thought. They had done surveys, they talked to institutions and they just found that in markets, the reserves demand steepened faster than they thought.

And so, money rates rose unexpectedly and in addition, repo demand was strong at the time, as Trish discussed. Banks didn't step in to provide repo financing so repo rates spiked quite a lot.

So, that's my story for what happened in September. And the question is so okay, what are you going to do about that. And one thing you could do is add more reserves. That's, in some sense, what the Fed has done. And a second is you could establish a standing RP facility. So, let me take those in turn.

So, the Fed realized it had allowed reserves to fall to too low a level. So, the immediate response was kind of short run temporary reserves adding up. Operation to the desk got to work, they added reserves and that stabilized rates and got the situation into a manageable place.

And then after some discussion, in the longer run the committee decided they'd do permanent reserve operations. They'd go out and they would buy bills. The purchase of bills was, I think, clever communication as I think Dan discussed. The purchases really weren't purchases like the asset purchases into the LSAPs. They weren't buying longer term treasuries to push down term premia to provide more monetary accommodation.

This is kind of old fashioned in a way. It's just doing transactions to add reserves to make policy implementation work better, to work more efficiently. It just had to be much bigger because we now live in a world of kind of jumbo sized reserves. And so, the operations are larger and that has worked as Trish showed back at the beginning.

Now you could go even further. You could add reserves, much more reserves. You could move to Dan's really abundant reserve system is you wanted to. That's going to provide a cushion, that's going to help to smooth out the volatility and money markets. You could add reserves until you start getting significant usage of the overnight RRP facility, for example, which has been very, very small for some time. That would provide a cushion of funds that could then be allocated to the private repo markets if rates began to spike. But that would require a bigger role for the overnight RRP program and a bigger role for money market funds in implementing monetary policy.

The committee, at least back in 2014, when they discussed these issues in some detail, just wasn't really comfortable with that. They thought that was too big a role for the Fed, too big a footprint. And so, they were not inclined to do something like that, my guess is they still aren't inclined to do something like that.

So, what else could you do. You could do a standing RP facility. It's be always on at a fixed rate. The hope would be that would lead to automatic increases in reserves. When market rates

began to move up, more folks would come to this facility. They'd bring their treasuries, they'd get their cash and that would put down pressure again on money market rates. That could be an effective ceiling on money market rates. That would be helpful because we don't really have one of those these days. We used to have one, it was called the discount window. Unfortunately, the discount window is so stigmatized post-crisis, nobody wants to come to it, it just doesn't work very well.

And so, in effect, a standing RP facility might be a stand in for the discount window and providing a cap on market rates. But it would raise a number of questions for the Fed. Two kind of framing questions are first, the issue of footprint. How big a role does the Fed want in the repo market. That again, back in 2014, they didn't want that big a role and so they may still not want that big a role.

The second question is effectiveness. How effective would this be. Would market participants want to use it, would it too be stigmatized like the discount window is. So, these are tricky issues that you'd have to bear in mind as you think about the structural questions of how would you design a standing RP facility.

So, three questions there. One is who can participate, presumably the primary dealers. They're the counterparties for OMO, open market operations. Second, I think probably banks, at least healthy banks, of course. Again, that would help that cap the funds rate. It also is (inaudible) and that rate can emphasize, could help encourage banks to shrink their reserves holdings. That would be to a smaller Fed balance sheet, people probably would like that on the whole.

Do you want to let others into the program, I think probably not if you can avoid it. Because then that gets the Fed in again, into a much bigger role in the repo market doing repo with hedge funds or whoever. And my guess is they wouldn't be comfortable with that. A second issue is what is the collateral, probably just treasuries. I think you want it as boring as possible, as plain vanilla as possible. Maybe in a time of market stress, you could move to a single tranche program, you could allow agency debt and agency MDS, for example, as collateral. That would provide some flexibility in times of stress, that might be helpful but in normal times, I think just treasuries.

Maybe the hardest question is at what rate do you want to do this. Higher rates would, of course, encourage more market intervention, it would reduce footprint, it would avoid moral hazard. You wouldn't end up with a large group of smaller, perhaps, weaker banks borrowing regularly from the Fed

through the RP facility which you might be pretty uncomfortable about.

On the other hand, a lower rate would encourage participation, it would limit stigma. It would make it clear, this isn't a penalty rate, this is just something we want you to use. It would limit volatility, now as Dan says, I'm not sure how much volatility you want but it would make the program presumably more effective.

So there, I think, just some hard decisions to be made. I don't expect an answer from the Fed soon on this. I think they'll want to see how the planned purchases of bills and how the bigger balance sheet work and maybe get through year end and see how things go. And allow firms to learn and adjust to every body's learning and adjusting in some sense. But if there still after that is an amount of market volatility, they're uncomfortable with, it certainly is a program that they could engage in. Thanks very much.

MR. NELSON: So, thank you, Nellie and Hutchins Center for the invitation to be here. So, I'm going to take a look, to some extent, sort of the other side of that but not completely. So, I pretty much agree with everything that Bill just said actually which is perhaps not surprising since we worked side by side for 21 years. But there are two critical points in which we may disagree.

First, what the Fed bumped into in mid-September is the short run not the long run demand for reserves. In the long run, the steep part of the demand for reserves is much lower. Second, the cost of the large-balance sheet implementation framework the Fed has adopted, increases with the size of the balance sheet necessary to operate it. In my remarks, I will address these two points and describe the course the Fed could follow to reduce the level of reserves considerably. And I will argue that doing so is in the interest of the Federal Reserve and the economy.

Now the quantity of reserves that the Fed has judged to be necessary for reserves to be abundant has grown remarkably over time. In April 2008 when the Federal Reserve staff first considered the possibility of operating policy with an abundant reserves framework, staff estimated that the level of reserves that would be needed might be on the order of $35 billion but could be larger on some days.

The assumption rose to $100 billion in 2016, $500 billion in 2017, $600 billion in 2018. Now it's not possible to know precisely what level the FOMC judged necessary at the beginning of this year when it made its decision to adopt a large-balance-sheet framework. Because the Fed decided to

break with its own tradition and not disclose its forecast. However, available information suggests that at that time, the FOMC judged about $1 trillion in reserves was abundant. I'd guess that their current estimate is about $1.5 trillion.

Now why is the Fed's forecast of the minimum abundant level of reserves grown steadily over time. When the Fed completed QE3, reserves peaked at $2.8 trillion and for nearly a decade the interest the Fed paid on reserve balances was above the interest rate Banks could earn on other similar liquid assets. Over time, banks and their supervisors took actions that made sense in that environment and they then became accustomed to the resulting important role of reserves in banks liquidity management.

A banker recently provided me an example of this process. When the interest rate on reserves was higher than market rates, her bank elected to hold reserves in an amount equal to its projected cash needs in under stress over one week and Treasury's securities to cover needs over the following three weeks. When the repo rates moved higher than the interest rate on reserves, the bank considered reducing its cash holdings to its projected need over three days. Still holding treasury securities to cover the rest of the month.

While both arrangements are consistent with liquidity requirements, supervisors would expect an explanation for the reduction in cash. An experience the banker's management decided they would rather avoid and the bank elected not to make the change. In short, the Fed's estimate of the amount of reserves needed to operate a large balance sheet implementation framework has grown over time because the level needed has risen with the level provided.

Now such a dynamic led the Norges Bank, central bank of Norway in 2010 to switch from a system with abundant reserves to a system with more scarce reserves which is roughly the reverse of the FOMC's decision in January. When seeking comment on their decision, they indicated: When Norges Bank keeps reserves relatively high for a period, it appears that banks gradually adjust to this level. With ever increasing reserves in the banking system, there is risk that Norges Bank assumes functions that should be left to the market. It is not Norges Bank's role to provide funding for banks. If a bank has a deficit of reserves toward the end of the day, banks must be able to deal with this by trading in the interbank market.

The dynamic can also be seen in a graph of the fed funds-IOER spread versus the level of excess reserves. The purple line shows the relationship as the Fed increased the level of reserves and the orange line shows the relationship as reserves declined in recent years. As ca be seen, the interest rate response as reserves has declined has been sharper, suggesting that banks, and their supervisors, grew accustomed to reserves as a source of liquidity and it has taken higher spreads to move them off their preferred arrangements than I t did to make them willing to hold the reserves in the first place.

The dependence of the demand for reserves on supervisory preferences should not have taken the Fed by surprise. In late 2015, I informed the Board members and the LISCC, the committee that oversees the supervision of the largest institutions, which I was on, that the FOMC would not be able to shrink reserve balances any lower than the level bank supervisors were encouraging banks to hold.

In May 2018, I asked Vice Chair Quarles at a conference if supervisors were telling banks that they have to meet a material part of their high-quality liquid asset requirements with reserves. Pointing out that if so, the FOMC would not be able to get its balance sheet much smaller. The Vice Chair answered, I do know that that message has been communicated at least in some supervisory circumstances in the past. I would say that that's in the process of being rethought.

Now while it's true that the Fed's two recent Senior Financial Officer Survey's did not find that supervisory expectation, guidance or regulations were important determinants of bank's demand for reserves. That's probably because the Fed did not include those possible reasons as potential responses to its questions on the surveys.

Now, in response to a BPI survey conducted in January, many banks judge that supervision and regulation were important or very important as reasons for their reserve demand. Including Reg YY liquidity monitoring, the LCR, examiner expectations about the composition of liquidity buffers, and resolution liquidity requirements.

Now bank's elevated demand for reserves also reportedly stems from an unwillingness to risk running a daylight overdraft in their accounts at the Fed. Bankers have explained to me that, while a daylight overdraft used to be unremarkable, now, because overdrafts are rare, supervisors want an explanation if one occurs.

There is an almost religions disagreement over whether it is costly for the Fed to operate

with a large balance sheet. For my part, here are the reasons why I judge that a large balance sheet is costly for the Fed.

First, it cost taxpayers money. Term premiums are negative and have been for years. Moreover, the short-rates used to calculate those term premiums have been below the IOER rate when the balance sheet is especially large. For both reasons, going forward, every dollar the Fed invests above and beyond the amount of currency reduces expected Fed income over the term of the securities. That's what a negative term premium means. Using conventional estimates, $1.5 trillion in reserves cost the Fed, and therefore taxpayers, about $15 billion a year in seigniorage.

Second, it reduces the ability of the Fed to conduct QE. The FOMC perceived its ability to expand the balance sheet to be limited because of political considerations. If the Fed starts with a big portfolio it will have less far to go. Now while the Fed could engage in another maturity extension program if it held short-dated securities, some estimates indicate that the MEP was less effective that other LSAPS.

Third, it puts Fed independence at risk. A large balance sheet means large interest payments to large domestic and foreign banks. Eventually, those payments will serve as fodder for those who would attack the Fed. Moreover, a large balance sheet will prove irresistible to Congress as a way to pay for things. For example, considering the financing plank of the Green New Deal. As checks go out, the government's bank, the Federal Reserve, clears the payments by crediting the seller's bank account with digital dollars. In other words, Congress can pass any budget it chooses, and our government already pays for everything by creating new money.

But as Dave Lindsey would often remind us when we were drafting the bluebook, they don’t care what we think. The minutes of the November 2018 FOMC meetings explain what they think. So sorry about the long quote. Potential drawbacks of an abundant reserve's regime include, the need to maintain relatively sizeable quantities of reserves and holdings of securities, and relatively large ongoing interest expenses associated with the remuneration of reserves.

But FOMC participants thought that reserve supply could be reduced substantially below its current level while remaining in such a regime. Participants judged that if the level of reserves needed for a regime with abundant excess reserves turned out to be considerably higher than anticipated, the

possibility of returning to a regime in which excess reserves were limited and adjustments in reserve supply were used to influence money market rates, could warrant further consideration.

Now even though the Fed's estimate of the quantity of reserves necessary to implement the large-balance-sheet approach has probably been increased by at least half over the past year, the FOMC does not appear to be giving a small-balance-sheet approach further consideration. In fact, two weeks ago, the President of the New York Fed said, I don't see any real need to seriously reconsider this. The fact that reserve levels are higher than perhaps we were anticipating a year or so ago doesn't fundamentally change this calculus that this is a very effective and efficient way to run monetary policy.

Now if the Fed can get much smaller, and it is costly to be bigger, it follows that the Fed should take steps to shrink. To get much smaller, the Fed needs to take three steps. First, the Fed needs to control volatility in reserve balances including especially those caused by swings in the Treasure General Account and, to a lesser extent, the Foreign Repo Pool.

Now a little background is in order. In 2008, the Fed allowed the Treasury to switch from keeping most of its cash at commercial banks to keeping all of its cash at the Fed. The Treasury initially increased its deposits to help the Fed finance its emergency lending, but the Treasury ended up keeping all of its cash at the Fed because doing so saved taxpayers' money when interest rates were near zero. Whereas before the crisis the Treasury kept about $5 billion at the Fed, the Treasury's deposit is currently about $300 billion and highly variable.

Another Fed liability that has increased significantly over time is the Foreign Repo Pool, where foreign official and international holders of accounts at the Fed invest in overnight reverse repurchase agreements. That pool has grown from about $30 billion before the crisis to about $300 billion now. The growth owes in part to the New Your Fed's removal of constraints on customers' ability to vary the size of their investments.

When the Treasury General Account and the Foreign Repo Pool vary there is a corresponding equal and opposite change in reserve balances. The Fed can control variability in reserves using repos in the near term, but in the intermediate term, Treasury needs to return to keeping its cash in the private sector, and the Fed needs to reimpose constraints on the Foreign Repo Pool.

Second, the Fed needs to conduct a reeducation campaign for bankers and bank

supervisors to root out any unwarranted bias toward deposits at the Fed as a liquid asset, and to reinstall the view that collateralized daylight overdrafts are unremarkable and appropriate.

Third, the Fed should then restart the graduate decline in the System's portfolio of securities. The resulting upward pressure on short-term interest rates relative to the IOER rate will lead banks to economize on their holdings of reserve balances. Now these steps will promote a virtuous cycle. Reduced volatility of reserves will allow the Fed to shrink with less risk of turmoil in money markets. Greater willingness to allow banks to substitute Treasuries for reserve balances for purposes of meeting liquidity requirements will allow the Fed to shrink further and also reduce the risk of money market volatility. And then increased opportunity const of keeping deposits at the Fed will lead banks to find alternatives and supervisors eventually to become more comfortable with those alternatives. Thank you.

MS. LIANG: So, thank you both for those very interesting presentations. I'm going to start with a couple questions just to try to highlight some of the distinctions among the framework that you are both talking about. So, let me first start with Bill English. You don't actually seem to be that worried about September's market volatility. And is that right and then why.

MR. ENGLISH: So, I think you're basically right and I think there are three reasons. One important one, of course, is it's not my livelihood, not my bonus that's on the line if financing is expensive for a few days. But leaving that aside, I think the key question here is do you have a monetary implementation framework that actually allows you to implement monetary policy. And I think they do, they have a system that works. The system with abundant reserves is effective, they can, by moving their administered rates get rates to come out when they want them to come out. And at least if they leave some additional reserves which they are now doing, that system is pretty effective and the volatility in that system seems pretty low.

So, I think the third piece of why I am reasonably comfortable is that the desk is much more active, the committee seems comfortable with the desk being more active. Taking steps to reduce volatility and kind of ensure they end up with rates trading in the range where they want them to trade. So, those things together, I think, make me more relaxed, perhaps, about the September events than a lot of people are.

I do take Trish's comment earlier seriously that this could, nonetheless, be kind of an indicator of an underlying problem that you need to worry about about liquidity and resiliency. So, it's worth holding conferences like this and thinking about these things. But am I really worried, not really, no.

MS. LIANG: Okay. And Bill, I'll let you have an opportunity at that question.

MR. NELSON: I would just echo the last part of what Bill said in terms of implementing monetary policy. While it does seem like they're now in a regime where they both have a giant balance sheet and they're actively intervening which doesn't seem to be providing the benefits hoped for. But more seriously, I'm more worried about the fact that, you know, this happened in a very benign situation in terms of concerns about other credit quality. And I think it could well be an indicator that there's a more structural problem that could be much worse in a time when this financial system is weaker.

MS. LIANG: Okay. So, one question I want to get to is something about something called a financial footprint, which is the Fed's footprint in the financial markets which is sort of used in different ways. And I think there's this general view of it's good for the Fed's footprint in the market to not be too big. Now I think that means different things to different people.

So, I'm kind of curious in both frameworks, I think both of you would say that your framework, one with a smaller balance sheet, one with ample reserves or abundant reserves, both have smaller financial footprints. So, could you just sort of, you know, talk about what you mean by financial footprint and how your framework means the Fed has a less imprint in the market. So, Bill you want to start with that?

MR. ENGLISH: We're both Bill.

MS. LIANG: Both Bill's. This is a standard problem for the last 20 years.

MR. ENGLISH: Sure, I'll start. So, the question of footprint arose in a big way in 2014 as the committee was thinking about their policy implementation framework that they wanted to move toward over the longer run. And I guess I took it to mean that the policymakers didn't want to operate in great size, at least, in markets or with counterparties that weren't the traditional markets and counterparties in which it operated.

And so, it came up in particular in 2014 around the overnight RRP program and their desire that that program be small and that they not end up doing operations with money market funds in size every day. But rather most of their operations being with banks through the payment of interest on

reserves.

So, I think an ample reserve system of the sort that they've outlined with kind of a lowish level of ample reserves means that the overnight RRP program is small, they're not having to do a whole lot of RP's once they finish buying the bills. I think they're hoping that they won't have to do a lot of RPs.

MR. NELSON: It's a strategy.

MR. ENGLISH: It is a strategy. Sometimes that's all you got. And, you know, mostly the Fed will just be operating through the banking system in kind of a way that they're comfortable with. So, that's the idea. Whether in fact, as Bill and I were just joking about, I mean, whether they can get to size that actually allows them to not have to be doing operations in a fairly high frequency way is unclear. They may have to operate with a somewhat bigger balance sheet than they want to but I think they can find a size that works if they want to do that kind of thing.

MS. LIANG: Yeah, Bill, you talk about shrinking the balance sheet and, you know, implementing monetary policy. How does that work to keep the footprint out?

MR. NELSON: So, to put my cards on the table, I'm actually one of the few people who really thinks the Fed should go back to conducting policy the way it did before the crisis. Now before the crisis, the Fed conducted small operations with broker dealers in the repo market. The broker dealers were not dependent upon those operations. The rate that they cleared at the Fed didn't care about and it used those operations to manipulate the supply of reserves in the federal funds market. They cared about the federal funds market but it wasn't actually operating in that market.

So, it had very good control, the supply and demand in a relatively small market that it wasn't operating in and that rate was well transmitted into the rest of the economy. Now and just to sort of see how different things are now, if you add up and this is kind of not good economics but if you add up the assets and liabilities from the Fed's balance sheet pre-crisis that were with entities other than the U.S. Government and currency. So, all foreign entities, private entities, pre-crisis, that number was $66 billion and it represented 4 percent of the sum of assets and liabilities.

Right now, that number is $1.99 trillion. So, it's $2 trillion and it's about 25 percent of the Fed's balance sheet. So, I mean, I that, you know, the Fed is on a path of being much more involved in being part of the financial system. If it, and I think that the really scary prospect is if the Fed takes the

step to decide that it needs to control the repo rate. Or it even says, well we're going to control a range of rates and that includes the repo rate, then it's going to have to try to control a trillion dollar market instead of a relatively small market in which is does not control supply or demand. And it's going to have to do it with its standing overnight RRP facility and potentially an RP facility. Be on both sides of that market and it's going to take very large transactions to do it and it's effectively going to be the clearer of that market of first resort.

MS. LIANG: Has the Fed entertained the idea of changing the target rate or are you just --

MR. NELSON: Oh no, yes, absolutely it's come up over the time in FOMC meetings and sort of often been mentioned favorably by the New York Fed.

MS. LIANG: Yeah.

MR. NELSON: And I know Joe and Brian, for example, in a piece recently, Brian Sack, who was the former desk operator, called for the Fed to target the repo rate.

MS. LIANG: Right, right. I'm going to have just one more question and then we'll turn to the audience. So, there's been a fair amount of confusion about intraday liquidity. And Bill Nelson, you raised the idea of daylight overdrafts. Could you just expand on that and there seems to be some reserves, the need for reserves to meet intraday payments. And so, some demand for reserves coming from that but also, you know, the ability to use daylight overdrafts. Can you just talk about that a little bit?

MR. NELSON: Yeah, happy to. So, BPI, we've actually had three symposiums now on the growing pressure in reserve markets that became apparent about a year or so ago. And in the second one, actually which was four or five months ago, bankers said the biggest determiner of their cash needs is actually their intraday needs. And I wish I would have paid more attention to that then because story became a big part of it. And that was mentioned prominently in response to the Fed's senior financial officer service. Because that was one of the reasons they did give the banks.

So, large banks experience a significant flow in their cash holdings over the course of the day. Payments go out at the beginning of the day, it runs down their reserves and then they come back in at the end of the day. Now, if you go back pre-crisis, banks would typically run a daylight overdraft. The Fed wanted them to run daylight overdrafts, it was how the system worked. And in 2011, the Fed

changed its payment system risk policy to establish collateralized daylight overdraft specifically to sort of promote that operation. During the day, their accounts run negative and then they come back positive and that's all collateralized.

MS. LIANG: Right.

MR. NELSON: But those overdrafts have become so rare because there's so much cash, the reserves are so high that people didn't run daylight overdrafts. And now if you run a daylight overdraft, it's actually something fairly extraordinary and your supervisor is going to want to know, well why did you run a daylight overdraft.

Now, I've also heard from various sources that you are not allowed to anticipate running a daylight overdraft in your title I resolution plans. And that's contributed to the view among bankers that while we really shouldn't run daylight overdrafts. Now in terms of the repo volatility, you know, late in the day, later in the day, late in the morning once the pressures started to materialize. That was when banks were at their low eb of cash and they weren't willing to just redeploy it and risk running a daylight overdraft.

MS. LIANG: Let me turn to the audience for questions. There are some microphones. Please say your name, we'll start with Joe. Can you stand up and the microphone will come to you.

MR. GAGNON: Thank you. Joe Gagnon, Peterson Institute for International economics and a former colleague of all three of you. So, my question is for Bill English but I think Bill Nelson will probably want to chime in too. So, you gave a good explanation of how the committee is thinking about these issues include the standing RP facility which is the other thing that Brian Sack and I recently wrote about. So, just to put we favor that.

But you didn't really, I didn't get a good sense of how you feel about it yourself, you more characterize how the committee feels. I'd like to hear, in particular, the previous panel people talk about, you know, moral hazard and if we had this facility permanently out there would that cause, you know, banks to be overly, you know, not sufficiently concerned about managing their liquidity. But I guess my question is well, if moral hazard is usually a concern if it leads to a harmful catastrophe like your house burning down and that's bad for everyone.

In this case, if it leads to banks turning to the Fed for funding, at no cost to the taxpayer,

because these are -- I'm referring to only funding, government guaranteed securities. So, with a (inaudible) and a surcharge, whatever the spread would be. The Fed would if anything make money, there's almost no risk at all. So, what is the harm in telling banks and regulators they don't need to spend a lot of valuable resources worrying about that risk when it's a risk the Fed can easily offset and forcing banks to worry about the other risks in financing the rest of their portfolios.

MS. LIANG: Okay thank you. Other questions right now?

MS. SMIALEK: Hi, Jeanna Smialek, *New York Times*. Bill English, this is also a question for you and kind of along the same lines. But you mentioned this idea that the Fed has noted in the minutes and elsewhere that like the discount window, there's a chance that a standing repo facility would face a stigma. And I'm just curious what your view is on that. Do you think it's likely that there would be a stigma and how important it is where that rate is at to whether that stigma exists?

MS. LIANG: Do you want to take those questions right now? What do you think of a standing repo facility?

MR. ENGLISH: Sure. So, I'm going to give a couple of answers but then I'm going to pass to Bill because he actually has a nice paper on, do we need liquidity regulation and lender of last resort. Which, I think gets at Joe's point, right? You know, if you can do this for free why not do it. Why do we make banks hold lots of costly liquidities, so that's up your ally, I think.

So, do I think an RP facility is a good idea, basically yes, I do. I think one for broker dealers, you know, primary dealers and banks would be very helpful. I worry that the discount window doesn't work. We need to have some sort of safety valve for money markets and that safety valve could be an RP facility. And so, I think that would be helpful. I think the questions that I listed earlier are real and the hardest one for me is the rate. So, what is the rate that you want.

So, what am I worried about, I guess I would worry a bit that if I said we're going to have an RP facility it's going to be open to all DI's and you set a rate such that, you know, a 1000 DI's would be using it every day. Because for them, it was not a rate that was unattractive, it was a rate that was attractive. They're small, they're in markets where deposit markets aren't that great and they're paying higher rates. And so, for them, this is a great marginal cost in funds.

I guess I'd worry about that. I'd worry that that is causing distortions. But, you know, so

that's why I wouldn't want to set a really low RP rate. But how high, I think is hard. And this gets to your question. I think if it's too high, it will look like a penalty rate and it will look like this isn't something you're supposed to do, you're only using it because you screwed up and then there are problems. And your name will be published in two years under the new rules.

So, I think it's just hard to say. I mean, currently the discount rate is 50 basis points above the top of the Fed's fund target. So, lower than that because as Joe said, this is really safe, good collateral. How much lower, I don't really know. I'd have to think hard and get more information than I have about how much take up do you think you would get as you move that rate down. I think that would be the question for me.

MR. NELSON: And I also wrote something more recently on challenges with the standing repo facility. So, just to follow up a little bit and amplify what Bill said. In 2003, the Federal Reserve went from a below market rate using a facility called adjustment credit to an above market rate, something called primary credit. That was intended, adjustment credit was a facility with a lot of rules and a lot of stigma and the objective was to go to primary credit which had no rules. It was going to be a rate rationed thing alone with a fairly strict credit quality requirement to reduce stigma to make it simple.

And it took from 1999 or so to 2003 to really get it done. And because of what Bill's describing, it was very difficult to come up with a system that you could just sort of let it operate by itself and people would choose to use it only when there was pressure and not use it too much. And those terms had to work for what are, I think there's about 10,000 depository institutions out there when you count all the little credit unions that can all borrow from the Fed.

And you don't need thousands of them to want to borrow all the time to have a problem, you just need five or six of them to want to borrow all the time to have problem. The Fed doesn't want to be the federal home loan banks. So, I think it could be a real challenge to stand such a facility up. You could open it for just the primary dealers but I'm not sure how helpful that would be.

But to get to the deeper question of moral hazard I tend to agree that the moral hazard associated with a facility that converts Treasury's for cash would be pretty de minimis. Because really, moral hazard in my view is mostly a problem when there's a question about the solvency of the institution or maybe the quality of the collateral. And I don't think that that would be the case in either circumstance.

MS. LIANG: Thank you. Any other questions right now? Please. Be brief please. Tell us your name and a brief question please and we get a couple more.

MR. YOUNGER: Sure, Josh Younger. I guess one of the themes that's emerging is there's plenty of cash it's just not where it needs to be when it needs to be. And we haven't really talked about the federal funds market very much and that's supposed to be the solution. The distributional issues are supposed to be resolved through that market. So, I guess the fact that fed effective volumes went down on the 17th of September and it's turned into this very bilateral market. FHLB's lending and so forth, like keeping it brief, I guess. Like the fact that Fed funds doesn't trade, are you concerned about that and if we want it to trade how do we incentivize that in this current environment.

MS. LIANG: I saw a couple others right there. Stand up, George.

MR. SELGIN: George Selgin from Cato. Some other countries, of course, have similar facilities to the standard repo facility and seem to manage corridor systems using them. Why should it be more of a problem for us? What's different about us? That's for both speakers, of course.

MS. LIANG: And one, can you stand up, yes.

MR. GREEN: Thank you. Micha Green with Steptoe and Johnson. Picking up on your point about primary dealers or beyond primary dealers if the collateral is Treasury. What we heard in the previous panel is that there does seem to be some concentration risk in the marketplace and there's not enough breadth of demand. There may be plenty of cash but it may be concentrated in too few entities. What would be the problem with having a facility if it was based on treasuries with having a broader set of access to it to broaden up the market demand.

MS. LIANG: Do you want to start? We have a few questions about fed funds market, trading.

MR. ENGLISH: So, I'll take a stab at these and then Bill can clean up after me as he did for so long. So, the first question was gee, there's a lot of reserves out there but they're not where they're supposed to be, why aren't we seeing more feds funds trades. I don't know in some sense exactly why. I think partly it's because as Bill was describing earlier, the demand for reserves by some firms is really strong. They don't want to trade fed funds much. They don't want to be providing fed funds.

So, I guess the question is as we were discussing over lunch, there is a high level of

reserves but is it really high relative to what people really want to have for these various regulatory reasons. Repo facilities have been used, different central banks use different ways of implementing monetary policy. You certainly could implement monetary policy using a repo facility and a RP facility very much along the lines that Joe and co-author have discussed. So, that certainly is a possibility.

I think the FOMC in the past has just been concerned about dominating that market and it requires large operations and operations with a lot of firms. And that just is something they've not wanted to do as part of their implementation process. And sorry, the third question was?

MS. LIANG: The concentration of primary dealers and is that effecting the way arbitrage or willingness to bank markets.

MR. ENGLISH: I guess I don't feel like I have enough knowledge about those markets to answer that.

MS. LIANG: Go ahead, Bill. Clean up and also quickly.

MR. NELSON: And also, in my career, I've always been one step behind you and you also give all the good answers first. So, I think the big surprise about the fed funds market is not how small it is but the fact that it exists at all. Since the QE's, there really shouldn't be a fed funds market. So, for a long time, it was FBO's borrowing from GSE's who don’t get into a strong reserve and it was the FBO's because they don't pay FDIC premiums so they were the marginal borrower.

And now, as you point out, it's FHLB's trading with larger institutions that it's an LCR play reduces their LCR to do that. It's effectively like, you know, the Fed could have paid interest on reserves to banks with odd ABA numbers and not the ones with even ABA numbers and then switch it in order to have a fed funds market.

But to get the fed funds market back is to continue to shrink until you get enough separation between market rates and IOER that banks will want to economize on their holding. And so, at the end of the day if they have extra reserves, they'll trade around with it. Now, that's going to, you know, to get more detail would take a very long answer, I think.

Another question was, why not open a standing repo facility for more institutions. And I think the answer there really is it would just really scare the b'Jesus out of people. So, the people that you would want to open it to that wouldn't have access because their banks are branches or primary

dealers which to a large extent be hedge funds who are big borrowers in the repo market.

And the Fed's been saying, look this is nothing like 2008 and they're right and they have the authority under Section 14 to do open market operations with anyone against Treasury agency collateral. So, they could open it up for hedge funds. But I think that honestly if they did, people would really say well wow, I think that something has really, really gone bad out there.

Now there's one more question about --

MS. LIANG: Concentration.

MR. NELSON: No what was the other question about? What's that?

MS. LIANG: That was one we can take in the next session because we have other people on that topic.

MR. NELSON: Oh, that's right. So, when designing the primary dealer facility, I was actually on the team that interviewed other countries to talk about why, you know, why didn't the (inaudible) experience stigma with their, I forget what it's called now, their facility, their above market facility. And then that was sort of what the ICD adopted. And what I was told by the person who ran the facility, because to be clear, the Fed has had stigma problems probably since its inception, at least for 50 years, it is not a new thing.

And his point was, don't have all these rules. Don't, you know, and sort of don't make it -- and make it common. That was his view. I think it also has to do with the fact that the Fed has always used one facility to be both its monetary policy facility, putting a ceiling on rate and also its first go to facility when there's an emergency. So, when you combine those things, you know, it looks like something has gone wrong if you're using your backup liquidity source.

MS. LIANG: Okay. So, join me in thanking this panel. Okay so I'm going to invite the four panelists for the financial regulation. So, this last panel is going to focus on specific, the role of financial regulations. And we structured this where I asked each of them to focus on a particular regulation, explain what it is with no acronyms if possible, what it does, how it might have played a role in repo. And then each will just briefly describe that piece and then we'll have a broader discussion about sort of all of them together.

So, but I'm going to start with, so we have four panelists here who many of you know are experts.

Sean Campbell is now with the Financial Services Forum, was previously at the Board in both BSNR and the research division. We have Tim Clark, also previously at the Federal Reserve Board BSNR head of supervision.

MR. CLARK: Deputy Director.

MS. LIANG: Deputy of something in supervision. Jim Wigand, previously head of complex financial institutions at FDIC and Sandy O'Connor who was just recently retired from JPMorgan as Chief Regulatory Officer. So, we'll go each. There's a timer over here. Each of you have been asked like to keep it somewhat brief so we can have a conversation. So, we're going to start with Sean. Thank you.

MR. CAMPBELL: So, Nellie, thanks very much for the invite today and thanks to the Hutchins Center. I think this is a really important topic and happy to have the opportunity to engage in the conversation.

So, you know, while our focus today quite appropriately, still the main focus today is thinking about the more recent repo market volatility that we saw in the past, you know, few weeks or few months or whatever. I really think it's very hard to understand where we are in the repo market without understanding how we got here.

And so, if you think about the repo markets more generally, the repo markets more generally both in the U.S. and abroad have been deteriorating for several years. And people in the repo markets and more broadly well understand that. So, in 2017, the committee on the global financial system which is essentially a consortium of central banks, including the Federal Reserve, published a study, a really good study on the functioning of repo markets. That I would suggest everybody who is interested in this topic take a look at.

And that report found pretty conclusively that repo markets have been deteriorating, that have been sort of their robustness has been declining over time. And they cited a variety of evidence supporting that including higher costs to end users and lower volumes and lower liquidity in the repo market.

So, if you think about a very basic analogy in the repo market, the repo market has been deteriorating. In some sense, the plane is flying a little bit closer to the ground than it used to be. So, any

bit of turbulence has the potential to do more damage and is going to be tougher to control. And so, I think that, you know, having that as a background is actually quite important. If you think about that background, capital is actually quite relevant for thinking about that background.

So, in particular, there are two types of capital regulation which I'm going to talk about today. Leverage ratios and the use of surcharge. So, a leverage ratio is a risk blind capital requirement that measures equity relative to total assets without any or in some cases in the case of the supplementary leverage ratio, hardly any regard to risk.

As a result, leverage ratios penalize an asset if it is low risk like cash or U.S. Treasuries. A bank that intermediates repos between supplier and demanders of cash will face heightened capital unrelated to its risk profile that just makes it less economic to intermediate low risk and low return assets like repo.

The 2017 report presents data and analysis that specifically identified the leverage ratio as a cause of reduced repo activity. Moreover, a variety of academic researchers including Dale Duffy from Stanford University have published a variety of research pieces showing that the leverage ratio as having a real and binding impact on the repo market.

The second capital charge that I would talk about is the GSIB capital surcharge. So, the GSIB capital surcharge is a capital surcharge that's only faced by GSIB, basically the largest most important banks across the globe and in particular in the U.S. It's an extra capital buffer that applies to those GSIB's based on some notion of their systemic footprint where their systemic footprint is essentially a quantity that is determined by regulation. It's effectively a regulatory assessment of systemic footprints.

And in the context of measuring that systemic footprint, much of the problem that exists with the leverage ratio also exists inside the GSIB surcharge. In a sense that many of the factors that determine your GSIB sur score are effectively risk blind. So, the simplest one to articulate is size. So, overall balance sheet size is a factor that determines your GSIB surcharge, in size is risk blind. If you have $100 in treasuries or $100 in corporate bonds your size is 100.

So, to the extent that size related factors and other risk blind factors are components that have a perceptible influence on the GSIB surcharge, that’s also another source of basically a risk blink capital requirement which makes it less economically compelling to engage in low risk, low return

activities. You know previous research and the CGSF report and sort of other sources have shown have led to a broad decline in the robustness of the repo market over the past several years.

So, that's sort of how we got to where we are today. If we think about where are we today and what's going on, there are also components of these capital charges or capital requirements that have sort of more acute effects that might be a play for understanding some of the short term volatility that we've seen in the past and may see in the future.

So, in particular, turning back to the GSIB surcharge and Governor Tarullo already sort of covered much of this in remarks so I'll just sort of recap some of the points that he made. You know, there are two parts of the GSIB surcharge which contribute to sort of this possible volatility in repo markets and potentially elsewhere.

So, the first is that the GSIB surcharge is set up in such a way it's specified so that your capital charge jumps by 50 basis points every time your score jumps by 100 basis points. And to be clear, if you jump to the next bucket by one point, you have a 50 basis point higher capital surcharge. And for a large GSIB, that means $5 to 10 billion more in equity financing which is significant.

So, the existence of a capital surcharge where you move in chunky buckets, economists call that a cliff effect. Where there are cliff effects, basically creates a system in which you can have very big and abrupt changes to your capital surcharge. And if you're a bank and if you're GSIB surcharge is very close to that bucket or a little bit above it as we get close to the end of the year, you're going to have a very significant incentive to want to manage your capital as you well should and try and get below that GSIB capital surcharge level.

The second point which Governor Tarullo also mentioned in his remarks is that a variety of the measures, not all of them but a variety of the measures are based on the value of certain balance sheet variables on the December 31st of the year in which the GSIB surcharge is going into effect. So, this is another example of basically, you know, of a design feature of the GSIB surcharge which just means that you potentially have much more volatility in your GSIB surcharge.

Because as you get close to the end of the year, whether, you know, your GSIB surcharge score is a 100 or 101 is going to depend on whatever is going on 12/31 in that year. So, those two things together sort of provide for cliff effects and incentives that lead a bank in many instances to want to manage its

GSIB surcharge towards the end of the year.

When a bank wants to manage its GSIB surcharge towards the end of the year, how is it going to do that. Most of the components that enter the GSIB surcharge are sticky and are relatively hard to move in a moments notice. So, if you think about corporate loans, consumer loans, mortgages, you can't basically increase and decrease those things very quickly. What can you increase and decrease relatively quickly, repo, OTC derivatives. Things like that are easier to move on a dime and so those are things that in some sense bear the brunt when they GSIB surcharge comes into play.

So, I think capital, it may not be the thing that's at the top of the list, but capital in particular the leverage ratio in the GSIB surcharge should be on the list for discussion about the incentives that they create that may have had something to do in sort of the repo activity that we saw a couple months ago. The repo activity we may see as we get to the end of this year and also the repo sort of kerfuffle that we saw at the end of last year which happened which was real but just didn't create as much as a media splash as the one this September. So, am I up?

MS. LIANG: You've got 45 seconds.

MR. CAMPBELL: Cool, all right. So, in the last 45 seconds, I briefly want to cover what I think people should be doing about this. So, in the 2017 report, the issuers of that report said that people ought to be really monitoring the repo market on an ongoing basis very closely. And I think that regulators in the public should take that to heart.

And in particular, I think that a lot of the analysis that was conducted in that report could be usefully sort of extended to the modern period on an ongoing basis for further review and consideration by regulators like the Federal Reserve and the public and that should be made public for all to see.

If you think about what happened during the flash trash which is not exactly analogous to what happened in the context of the repo market but it was a sharp market event happened at one point in time. Regulators in the government they took a considerable deliberate period of time, they studied it, they wrote a report, they made those results public and I think that did a lot to improve public transparency and understanding. I mean much of the same could be done here.

The second thing is that regulators should be actively thinking about how bank regulations can impact other markets. I think we've heard that from a variety of other speakers here

today and I think that's really crucial and I think that that's something that has not gotten enough attention in the context of the financial reform movement over the past ten years. In that the way that you regulate banks definitely has the potential to impact the way other markets operate and other markets get into mediated and that really matters and should be included when bank regulators are thinking about bank regulation.

And then the final thing that I'll say is that I think it's really important to understand that details matter. Details really matter. God is in the details. And some of these things about, you know, cliff effects, in the GSIB surcharge, in the risk sensitivity and certain capital charges. And other people talk about liquidity rules, those details details right is really crucial and that regulators and the public really need to be attuned to thinking about those details.

MS. LIANG: Great, thank you, Sean. So, we're going to turn to Tim Clark.

MR. CLARK: Okay, great. Thanks. So, I think really, really great to be here and thanks to Brookings for hosting it. A very timely event that's, I think gained much more interested actually, I might have assumed as Nellie referred to in her opening comments. There've been a lot of different claims about the possible causes of what happened in September, specifically the repo rate spike, which is, I think what we're here to talk about. It's great to talk about along with place, light them all up and then take a look at them. I would say from, my perspective, of all the claims of the causes and the associated solutions that have been associated with these claims, the least compelling have been about banking regulation and supervision.

There's really been no factual provided of any direct impact from the regulations to what actually -- what happened in September. Unlike with any of the other things discussed today, including the shrinkage of the Fed's balance sheet; the growth in supply of treasuries; growth of the treasury account, et cetera. Also, unlike some of those other factors, the regulations haven't changed recently. As Governor Tarullo mentioned earlier, they've been in place for a while and irregular periodic spikes in treasury reprints do happen and it hasn't required the Fed to step into the market. And then lastly, the claims about the, about the damage is being caused by supervision and regulation. I've covered literally every key element of the post-crisis enhancements. So, it starts to feel like some of this is just being seen as a really good opportunity to pressure the Fed into weakening important post-crisis rules.

So, there's a real concerns about what's going on and not just an attempt to use this to garner such changes. I kind of encourage you, I'm going to take a little bit of a deep breath on the regulation supervision side. We're not in a crisis has been amply discussed today. A thoughtful, fact-based deliberation is needed. It appears the Fed is doing that. I think that's great. And I'm going to come back later to the Fed's comments yesterday about the seal, about the comprehensive liquidity analysis and review.

MS. LIANG: I promise I'd ask, okay? (Laughter)

MR. CLARK: So, while there remain questions about what's happened in the repo markets, what's not in question is that the stronger post-crisis regulations and supervision have made the largest banks more financially resilient and that has made the system safer. My view, not still, still not safe enough. There's more, there's much more work to do to reduce probability that could cause another grave crisis. But going in the opposite direction and hastily making changes that increase the probability of failure at these banks by weakening capital and liquidity rules isn't a good answer to any question frankly. And I certainly don't think it's a good answer to how to address the repo market issues. A lot more thought needs to go into that relationship.

And so now, I will actually turn to the liquidity, which is what I was asked to talk about. (Laughter) The introduction of liquidity regulations was a huge and important development. And it has made the banks more resilient to a range of potential problems, including the type that directly contributed to the financial crisis. Pre-crisis, quantitative liquidity requirements were minimal at best. And banks, risk management and bank supervision in this area were, to be kind, not well-developed.

So, let me briefly discuss the two most important ones that have come up. Really the two things that already exist, the liquidity coverage ratio, sometimes called the LCR and the comprehensive liquidity assessment and analysis and review. So, LCR, the litter, the clarity coverage ratio, as I mentioned before, so, puts simply it requires each of the largest banks to hold a pool of high quality liquid assets sufficient to cover stress level of net outflows over a 30-day period. Seems pretty reasonable. Those outflows are expected to be higher. The greater the use of less stable funding, such as short-term wholesale funding. So, all things equal, the more stable the bank's funding sources, the smaller the pool of high quality liquid assets it has to hold. Put slightly differently, the required size of the liquidity pool is

appropriately a function both of the bank size and how it manages to -- how it chooses to manage and fund its operations. These are actually business decisions that banks make.

For today's discussion has gotten the most attention is what counts as a high quality liquid asset. Treasury securities and excess reserves at the Fed are treated equally and are both considered of the highest quality as has been noted frequently. So, the LCR does not constrain a bank from lending cash into the refi market to buy treasury securities. Doing so has no negative impact on this measure of liquidity at all. But it's also important to think about banks' internal liquidity risk management practices, which is a good segue to the comprehensive liquidity analysis and review program that the Fed put in place after the crisis, often referred to as the Fed's Liquidity Stress Test.

Just to be really clear on that, CLR is not a Federal Reserve run liquidity stress test. There are no specific quantitative threshold requirements the banks have to meet associated with CLR. CLR is an assessment of banks, internal liquidity risk management practices, including their use of liquidity, stress testing and other liquidity metrics and risk management processes. It's an easy thing to pick on in a way because there's a supervision and supervision actually is not as transparent as sometimes I'd like it to be. I was going to stick to script and not run out of time here. So, let me stop that.

This type of supervisory program is critically important because like any regulation, liquidity coverage ratio cannot account for all situations at all banks, including that the bank might structure its positions specifically to meet regulatory requirements while ending up with the same risk in a different form that's not captured by the regulation. This is one of the reasons supervision is so valuable.

Simply meeting the LCR does not mean a bank can stop worrying about liquidity risk. And it's appropriate that the supervisors assess how good and how thoughtful the banks are at worrying about this. To look at how or if the banks vulnerabilities that aren't captured by the LCR, are finding their way into banks internal considerations about capital, actual liquidity needs under stress. Okay. I am actually going to just move this one aside, I guess. If you're going to ask the question, I will.

So one last point in closing, the capital and liquidity regulations can and do affect banks' business decisions and they may constrain their activities. If you define constraint as attaching a higher cost to a bank, the greater it's a level of risk and the risk of represents to the system. They don't actually restrict the engagement in those activities. What they mean, is they need to have appropriate levels of

capital and liquidity to support them. The post-crisis regulations increase the level of confidence we can have in the largest banks that they could withstand another severe downturn, not turn it into a full blown crisis. That's a critical goal In my view, that level of confidence actually should be and could be higher still. And I think capital standards could be and should be higher still. And importantly addressing the too big to fail problem via the resolution planning and trying to set up a system where you can resolve a massive bank and a time of stress without disruption is far from complete.

In the meantime, we're left with the critical importance of the other key pillar of addressing this problem, which is reducing the probability of default that these banks in the first place, there was a strong capital and liquidity requirements. That's how you do that. If for some reason it's determined that liquidity standards should be loosened because of these events, which I really hope, I really think would be a mistake and maybe there's more information that will come out and like I said, it should give a thought for consideration. I think there'll be a need for significant offsetting increases in capital requirements to leave the system as just simply unchanged from its current level of safety, which as I already mentioned, I think it should be higher. Well, I'll stop there.

MS. LIANG: Thank you. Thank you. Jim?

MR. WIGAND: Okay. There's nothing worse than starting the discussion about resolution planning and already seen some members of the audience you don't want. I mean, this is actually going to be a hopefully good tie in to some of the comments made earlier with respect to how resolution planning with some of you may be asking can relate to the repo market. Large financial companies are required to develop plans for the early resolution under the U.S. Bankruptcy Code. Now, unlike the FDIC's authorities for resolving banks or insured depository institutions under the FDI Act, or systemically important financial companies under Title II where the FDIC can either use working capital from the Deposit Insurance Fund for resolving banks or have a borrowing line with the Treasury to resolve the systemically important financial institution under Title II, the companies that have to put together a Title I resolution plans under the Bankruptcy Code have to rely on private sector sources to fund their bankruptcy.

Now, what was the largest source of private sector funds ever to be used in a bankruptcy? Ten billion dollars, that's it. So, that's the largest source of external funds to fund the

bankruptcy, $10 billion. So, the regulator said, look, institutions, in order to develop plans that we're going to view as being realistic and feasible to execute, you're going to need to rely on internal funds to be used as working capital to basically fund your bankruptcy. What this meant is that the entities had to do two things. They had to model the quantum or the amount of working capital or liquidity they're going to need in order to work through their bankruptcy.

And I'm using the term working capital, they're both in the context of ensuring that the amount of liquidity is sufficient to keep -- in order to execute the plan appropriately and keep the operations that need to be operating doing so. Okay and because I mean there are certain operations that are performed by these companies that you don't want to cease. So, it's both the liquidity necessary to do that. And then also, the actual capital amount that is necessary in order to ensure that they satisfy regulatory court requirements and that market competence is maintained that those entities have the ability to do it. Okay, so to some extent we're talking about both capital and liquidity here and in both cases, both have to be modeled and in modeling, the institution's plan itself drives the quantum that is necessary in order to be identified as the successful amount for plan execution.

So, in that modeling, depending on what the plan contemplates, the entities themselves will develop a set of assumptions. The regulators don't impose assumptions on the entities because each plan is idiosyncratic based on the footprint, the business model, the characteristics of the entity itself. And so a blanket set of assumptions really isn't realistic. So, they're dependent on the entities to develop the assumptions themselves for this type of modeling. Now, one of the expectations though is that if you're monetizing assets, you're going to have to look at a realistic market reaction to what you're going to recover in converting that asset from something other than cash into cash. And so the rate at which you're monetizing an asset and the market step and ability to monetize that asset at a certain price is something the regulators are going to be looking at.

This is something which we've heard is an incentive for cash versus treasuries because if a high volume of treasuries are being monetized at one point in time, then there's going to be a discount imposed by the market because you're putting all these treasuries monetizing in the market. So, there's going to be a discount provided on it. And that discount is something which indicates a preference for cash. Now, there's no stated preference in any of the guidance that is provided by either the Fed or the

FDIC on resolution plan, there's no stated preference for using reserves in the resolution process. However, it is a market reality. And I think a very realistic assumption that if an asset class is being monetized in the market, that a realistic view as to what the market is willing to pay for that asset has to be taken into consideration. And that's what basically the regulators do when they review the resolution plans.

So, how does all of this end up relating to business as usual? Because when we're talking about resolution, none of these institutions today are in resolution that may participate in the repo market. And resolution, at least for now, is a hypothetical exercise. So, how does this relate to basically their ability to participate in the repo market today? Well, the amount of liquidity that gets calculated its position within the entity and it's positioned based on what the needs are in -- for resolution planning purposes where the needs are in order to successfully execute the plan. The quantum is also that pool of liquidity, that quantthat amount is also combined with satisfying the other regulatory requirements Tim alluded to with respect to prudential supervision, safety and soundness.

You're looking at the entities using this pool of liquidity, basically to say, all right, this is the amount we're going to have in order to operate safely and soundly and to satisfy our prudential regulatory requirements. And it's the amount, or subset of it that we're going to need in order to execute a resolution plan. So, it basically serves those purposes. Now, the question becomes is this amount of liquidity and the liquidity has to be the high quality liquid assets. And once again, I said there's no stated preference with respect to treasuries, which is a high quality liquid asset or reserves, is that amount of binding constraints?

I think that's the first question regulators can take a look at. Does this amount of liquidity necessary to successfully execute a resolution plan hit the threshold of being a binding constraint or safety and soundness or other risk management liquidity requirements? Actually the binding constraints. Next question I would ask the regulators to take a look at is whether or not the expectations associated with resolution can be better communicated to the banks and to the systemically important financial companies with respect to some of the issues that have been raised today. So, governor Tarullo mentioned earlier, daylight overdrafts and that has basically created a resolution planning and issue with the willingness of institutions to go below a certain amount of reserves. Well, maybe, maybe not. I don't

know the answer to that, but that's something that certainly can be looked at. And my recommendation would be for the regulators to both see whether or not there is a binding constraint that occurs with respect to the liquidity required in order to successfully execute a resolution plan. And then also whether or not other aspects of developing the models that are used to calculate the amount and the positioning of that, whether or not there are other aspects, aspects of that, which in fact need to be reviewed in the context of how an institution operates in the business as usual environment.

MS.O'CONNOR: Okay. I guess I'm on cleanup before we get to questions. So, what I'm going to try to talk a little bit about is the impact of some of these regulations in aggregate, because you heard each of them described sort of individually and some other interactions. And I'm going to take on first though, just a couple of comments around regulations haven't changed much in the last couple of years because a few of the different panels were talking about that. So, therefore, how can it be an issue now? And the reality is, yes, we've been in implementation mode collectively in financial services. However, what has changed is the amount of excess reserves that Bill has been talking about is down dramatically. So, when there was an awful lot going around, the impacts of optimization could be less obvious. So, I think that's just important. So, the fact that you haven't seen this before doesn't necessarily mean that it's not at all related to. Although I would agree you should no one should be running around and saying it's only about regulation. There's an awful lot going on here to point to any single variable and call that the major cause.

The second thing that I would say with regard to sort of liquidity and liquidity management, I think it's very, very important to note that it's essential to keep the operating mode1 functioning, but just like capital and financial stability more is not always equal to better. You have to understand the aspects of liquidity and collateral and their importance in lubricating the system of financial services to make sure that cash moves from those that have it to those that need it. Trish talked a little bit about that as it related to financing against collateral.

Those are important aspects. And the key here is now finding the balance. Now, that said, I don't think it's about rolling back anything and what do I think there's opportunity for? We have a whole bunch of rules that target a lot of the same risks. Many of them very highly inappropriately focused around short-term wholesale financing. Now, wholesale -- short-term wholesale fund financing, if I could

speak. And here the issue is, do each of those rules as they layer on top of each other, make the system safer and sounder or do they just change the cost? And I think that's an opportunity to take a look because if they're making the system safer and sounder, that's fine. Where they're just layered and don't contemplate the other rules that came before that already addressed the risk, if it's addressed appropriately, well, then clearly, it's going to be a less attractive, less economic trade for the traditional intermediaries to go after.

So, onto sort of the remarks I prepared. Dislocations between cash and collateral on a temporary basis happen all the time. They have happened all the time. Again, you have different sectors operating with different criteria and that's the norm. What is different is in today's environment, the functional -- how the intermediaries function has changed. And, of course, it's changed. We've put in place a variety of different regulations to change the actual behavior of the amount of liquidity transformation that they did, the footprint, the size. So, it can't, that can't be a surprise, but the real question is, is what we want to be intermediated actually being intermediated. So, a couple of things to think about is while requirements broadly changed, they've resulted in changing behaviors. They've also resulted in changes in how people interact in the short-term wholesale funding market and the economics of certain trades.

And by the way, the economics of certain trades most importantly in that short-term wholesale funding space. So, what does it look like these days? Banks have a lot more HQLA, that's a good thing, right? Because we should be able to collectively ensure in our financial system that liquidity, stress can be met as mentioned by some previous panels and here as well, the SLR&G surcharges have been put in place, but they're size-based, not necessarily risk-based so they can weigh more heavily again, on this low risk, low margin, U.S. Treasury financing. And why do we care? This is not about financial services institutions. We care because risk based metrics around financing the treasury market matter. They really do matter because we want to make sure that we maintain the health and soundness of the functioning of the financial markets. And by the way, that impacts the cost of debt financing for the economy, which means taxpayer value. Right. And, and, and it also means that so many other corporate borrowings that are tied to the underlying cost of Treasury are impacted in price as well. So, this is, this is not about again, banks per se and I think that conversation has to be broader. It's really about the cost of

financing for the government, the economy as well as banking institutions.

I think while binding constraints, people have mentioned them here, the reality is the framework and I think Governor Tarullo would agree with this, the framework was written to make the bonding constraint move, right, through time and can be different based on a business model. Well, as a result, you actually have financial services institutions that are managing their capital and liquidity in a much more centralized way and with a lot less flexibility with a lot more cushions because the cost of getting it wrong is quite expensive.

And moving to now a couple of other thoughts. While folks say, well, financial institutions have so much HQLA and whether it's cash or it's treasury and so much in excess reserves, why weren't, why didn't they show up in September? Right? Why didn't they show up? Well, just because their excess reserves were greater than the reserve requirement, it didn't mean that the cash on hand or the treasuries weren't earmarked for something else. And that goes back to some of the other comments that were made here. So, firstly, Bill talked earlier, Bill Nelson talked earlier about the volatility of settlements and intraday overdrafts, right? This is really an important feature here. The largest banking institutions manage so many settlements, both in deposits and securities. The quantum is enormous. It varies, both in the size every single day, as well as in the timing with which it occurs. So, as a result, excess reserves are really the shock absorbers, right? To ensure that you don't breach intraday overdraft.

Well, maybe there's not so much excess there, if you will from a management perspective because there's a, there's a stigma that is associated with, with, with that protection, that potential breach. There's also a low tolerance, as we talked about earlier for any of those introduced over overdrafts to occur, so the risk aversion, as excess reserves come down, guess what? There's a lot less willingness to lend out that last dollar because it could result in an overdraft. And it certainly you wouldn't want it to result into overnight loan that may not come back the next day in time to meet your next series of cash flow. So, besides that, the day-to-day management, you've had this bank management liquidity stress testing, which is occurring monthly, right? Management teams can be more conservative than what the LCR is doing. So, in fact, they're going to look at cash insecurities and they might again, earmark a piece that they want to keep on their balance sheets.

Talked about the non-public supervisory assessments as they relate to the, the

comprehensive liquidity assessment. And then, of course, what we've talked about related to resolution and recovery. Now, the resolution recovery one I think is very important because there is this distinction between our reserves preferred of over treasuries. And the reality is we are financing today, earmarking today, liquidity and collateral for the potential eventuality of a substantial demise. And the real question is, maybe there should be more fungibility between treasuries and reserves in that instance because this is the nearly risk-free asset in the world that we're thinking about.

And the other piece here, which we haven't spent a lot of time talking about, is the changing market, not only market dynamics, but also the market power players. Everyone's mentioned asset managers, right? Asset managers have become substantially bigger participants in both auctions as well as in the repo market. You talked a little bit about the decline in repo. Over this course of the last year, a former colleague of mine, Alex mentioned repo's up 30 percent. The repo market, repo financing is up 30 percent no surprise. Why? Because the deficits up, right? Well, who's doing all of this repo? Well, you have the primary dealers that are underwriting all of these auctions. So, it's sitting on their balance sheet. Well, who's financing them? Asset managers are financing them. Asset managers are providing $1.3 trillion. Again, another number, thanks to a former colleague of mine, Alex, $1.3 trillion in repo financing against U.S. treasuries. That's up $300 billion a year-on-year. And so when you saw that, that tax day change, well, there's a withdrawal, a withdrawal from the funds as well as, then a pull back from repo financing because the bulk of that financing is done an overnight basis. Why? Because asset money market funds also have new liquidity requirements and they need to have highly liquid assets, hence their buyers of bills. And hence they're big users of repo.

So, now you're faced with, well you have a pullback by a sector driven by those types of criteria. Nothing wrong with it. And by the way, think about the investment thesis. The investment thesis of Gove funds is very similar and the investor behavior of those that are putting money into them is equally very similar. So, you've got a print that's more highly concentrated and operates in a very similar way and there you come back to them. And now what, who's going to provide that financing when those dislocations occur? Because the traditional intermediary may not because of the increased cost of capital on these low risk, low margin activities, they're not likely to be the marginal buyer of repo or provider of financing in that environment. And I will stop there.

MS. LIANG: So, thank you very much for very well informed discussions. I'm going to start with one question for everybody. So, you were all asked to focus on something specific, but let's assume the Fed increases its balance sheet a bit with the term and the repo that it's done. So, there's a bit more reserves in the system. We're not operating no on the up on the steep part of the demand curve. If there were one change in regulations you would make that you think would help the repo market sort of be narrow without, what would it be and what would it cost be in terms of financial stability or safety and soundness? So, it looks like Tim is suggesting you start.

MR. CLARK: I'm suggesting anyone other than me. MR. CAMPBELL: So, being so close to Christmas, I can't possibly pass on a great opportunity to -- what's an old friend for. So, I mean I think that's a really important question. And again, if I think about Christmas just a little bit more, rather than sort of provide them am answer on, well, I'd like a pony or I'd really like a new iPod or something. I really think it's important to think -- what I would really change that I think would be very sensible and very useful for improving the repo market and potentially other markets too, but definitely the repo market, again, is for this point that I made at the end of my remarks, which is really for it to be the case that bank regulators think very seriously and very carefully about the impact of bank regulations on other markets including the repo markets and the cash markets that repo markets are financing. And I mean, a point that was that I think I heard in Governor Tarullo's remarks this afternoon and I'm sure he'll let me know if I misconstrued it is that at some point if we try to make the bank safer and safer and safer, especially with respect to a liquidity situation, we are going to make the rest of the system less safe.

And I think that what you saw on the repo markets this September was a situation in which there was clearly a less permeable barrier between the banking system and the rest of the financial markets. And that is not necessarily isolated to the repo market. There are lots of markets that banks intermediate where that lack of permeability could get, could be a problem. And I think that as a, I think we should all agree from a sort of first principles perspective, what would she care about is maximizing financial stability in the U.S. and that is not always the same as maximizing financial stability, especially from a liquidity perspective of the banks.

MS. LIANG: Thanks. Anybody else?

MR. WIGAND: I would say that yeah, there was a comment made earlier, I think Sean

made. Well, I'll say the devil's in the details instead God's in the details and you know a lot of this modeling is based, well, some of the modeling not a lot. Some of the modeling is based off of point in time versus several points in time or rolling averages. And to the extent that there are models that deal with liquidity and capital, then perhaps taking a look at changing those two being averages or over multiple periods of time, instead of points in time might be a worthwhile exercise because it then avoids kind of the window dressing effect. The blip that you get where institutions start managing their balance sheets in order to satisfy a regulatory requirement. And to the extent that something can be done with respect to that, I think it'd be worthwhile exercise to investigate it.

MR. CLARK: So, I guess, honestly, as I said before, I'm not sure that all the time has been taken to thoughtfully consider all of this. I can't really think offhand of liquidity or capital regulation that I would trade given what we just learned about the repo markets in the last couple of months. But I guess this is strangely, I may be agreeing with some of the comments made by some of the folks who've wrote, who has been weighing in on this sort of what's called the industry side of this one, about the G-sub surcharge calculation, but I don't think we have the same solution.

If we're worried that that calculation actually is leading firms to take significant market moving actions to do window dressing at the end of a period, I would actually measure the G-sub surcharge at its peak point throughout the period. So, that a firm actually is wind is measured when -- it's at the point where it's the most systemically important. That is the capital that is required to hold.

MS. O'CONNOR: So, just to hop in --

MR. CLARK: I don't think that's what they meant when they said it, but yeah, I think it's, I think it's a good idea.

MR. CAMPBELL: That would be really good for market continuity.

MS. O'CONNOR: I have to say, I'm so glad I retired (laughter). But one thing I will say is several of you awesome guys up here have been talking also about window dressing and there definitely is -- institutions manage downward. But I think it's important to note again, my past experience is that you cannot engage in intermediating and use it as a spigot in a massive way period. Full stop. So, I, by the way, I'm not averse to going to sort of an averaging or reducing a step function, but I think it should be clear that it's not like folks are ramping up enormously and then slamming it down because that's not

acceptable to your underlying clients and that's who you're providing intermediation for. You can't disappear.

And so for me, I think there -- the couple of things that I liked the idea about Treasury's potentially being considered as reserves because that could free up potentially for intraday activity moving back and forth and it doesn't add risk to the Fed or to the environment that that's sort of an interesting -- I'm looking at Bill because he's the guy that put that one up there. I think that's a pretty interesting one. But I also think not getting rid of any one rule per se, but really looking at them now as a package because they are a package. When G-sub surcharge both the calculus as well as the rule itself were written, it was sort of assuming nothing else was in place cause you know, what, nothing else was in place.

But there is an awful lot of bits in place and while we can all agree that resolution and recovery has come a long way, it may not be fully done for everybody. The reality is if you've got lots of resolution and recovery in place, then the risk of systemic footprint that is meant to be mitigated by the G-sub surcharge, there's probably some offset that could occur there. So, I would say look at it as a package and see where there's opportunity to unpack and you know, sort of get the risk assessment right and the costs right. Because we get the cost rate where people will transact.

MS. LIANG: Okay. Great. So, let me -- I want to follow-up on and I'll come back to your question, Tim. So, I want to follow-up on one thing, which is sort of market dynamism in the money markets and that sort of effect there. And Sandy, you point, you mentioned the growth of money market funds and Gove funds and big buyers of treasuries or reverse repo. And so is it your view that sort of concentration in this market and the repo market has changed or it's more money funds and less dealers or that is changing it and is any of it due to some of it, of course, is money from reform, but is any of even due to bank regulation?

MS. O'CONNOR: Yeah, look, I think sort of all of the above. Firstly, anytime you add more diversity into the market, it a good thing. I think my point is really the market's different, the players are different and who's engaging day-to-day and what their behaviors are is fundamentally changed. Therefore, how we manage the flow of collateral and cash have to adjust accordingly. So, when you think about the rule changes and asset management that the two big ones were floating the net asset value for

prime funds, what did we see? We saw over a trillion move out of prime and into Gove funds. Right and then of course the liquidity rules associated with both prime and Gove funds that makes sure that you have enough money on hand to meet the expectations and demands of those investors, those bits they make really perfect sense, but that means you can have starts and stops on the financing. It doesn't mean it should go away, but it's a different characteristic. And, and you've got this push, those liquidity rules actually push asset managers in money market funds to overnight repo.

Well, they're not going to term out. So, the answer isn't go term out. They're not going to do it in a substantive way because they need access to that liquidity, which is exactly the opposite of what you've wanted, what you'd want the broker dealers to be doing, which is take down term repo. So, you've got a mismatch in the drivers for liquidity on both the buy side and the sell side. So, how do you think about that? And particularly when it comes to sort of the U.S. treasury market. So, again, I don't think it's bad or wrong, it's just a matter of what do we do on those tax days? And how do we ensure that intermediation can occur appropriately or to the best of its ability and where intermediation can no longer provide the elasticity of balance sheet well, who can provide it for us treasuries? And that's where I think we've already seen the Fed stepping in.

And the one other comment that I would make is with regard to buying bills, that's a really good idea, right? However, I would also say one of the largest buyers of bills these days are the Gove funds themselves. So, the question is, since they're buying them, because they've had $500 billion worth of flows come into funds this year, are they really going to be willing to sell those bills in the size, the quantum that the Fed wants? Or do you have to start thinking also about coupons? So, again, the behavioral, the drivers, they all need to be contemplated and it's much more, it's not so binary, I guess.

MR. WIGAND: So, now if I could make one point. So, I would say -- the first thing I would say is that trying to understand whether or not the repo market is very concentrated is difficult in my opinion because there's a visitor tri-party market, there's a bilateral market, the data's not where it needs to be to the extent that that's occurring, things that I've been sort of hearing about and reading about. So, one thing that was already mentioned this afternoon is the increase in centrally cleared repo so that has the potential to give some rise. So, a little bit more concentration because the way that those utilities are set up is that they have a relatively small set of members, at least now that's growing over time. So, that

will improve. But right now, it's a relatively small sub numbers. So, then you ask yourself, well, why is that? Why are people going to essentially clear to repo? Well, they're going into essentially cleared repo because the bank gets the netting benefit and they get to cut it out of the SLR measure. It's a capital related incentive. So, we need, this is exactly the point that I was trying to make earlier. We need to be asking the question, what is it in the capital regulations or the liquidity regulations or whatever else that's leading to these kinds of activities in other markets and closely related markets. And I think essentially cleared repo example is a good example of where that's occurring.

MS. LIANG: Any other examples. Okay. So, I'm going to turn to the issue of rules versus supervision because this has been a big issue lately. And so I'll start with Tim and maybe Jim might want to say something and others I can join in. So in Q&A yesterday to some testimony that the Vice Chair Quarrels gave at the House, I believe was the House, he mentioned the Fed may have created some incentives that contributed to the spike in repo rates. And particularly among them are the internal liquidity stress tests that we run, quote unquote. So -- but Tim, you just told us the Fed doesn't run the stress test. The banks do. So, could you just explain a little bit what --

MR. CLARK: Sure. Yeah, that happened. Let me start by expressing my gratitude that he used so many qualifiers in the statement because it's clearly still very uncertain what the relationships are here, but -- the Fed, as I mentioned before, comprehensive and liquidity analysis and review does not include a Federal Reserve stress test and there are no binding minimum thresholds as any part of it. It's a -- for the stress test part of this is the Federal Reserve assessing the firm's use of internal stress testing for liquidity management purposes.

Jim actually said this quite nicely, but I'll reiterate it hopefully as well, I think what they mean, and I don't know this for sure, is that the preference for cash or over security is that shows up in these internal stress tests is because unlike in the LCR calculation, which appropriately as I said before, treats treasuries and cash the same, the bank's liquidity stress test may not. And frankly probably shouldn't. And I don't know if this is exact, well, actually not probably it shouldn't. I don't know if this is exactly what they meant, but I'm assuming. So, put that another way. Banks' liquidity risk managers and supervisors, I've learned a couple things from experience, thankfully. Turning treasuries into cash is different than having cash. First, you have to turn the treasury into cash. You have to either sell them or

you have to use them as collateral and repo. Sometimes particularly in a stressful environment, which is what stress tests are testing, and as a function of the size of the amount you need to sell, when you try to do that, you're not going to get as much as you would like. Cash is cash, treasuries are one step removed. They're extremely -- they are the second most. But so it's actually, I think, reasonable for a large bank to be thinking about in a stressful environment which it might have to unload a huge amount of treasuries to fund it. So, to get cash either again through selling it through repos, using it as collateral, et cetera, that the haircut they could take, could be quite large.

That's a very rational concern of the banks borne out by history. A rational concern, I think, for supervisors to be thinking about. In fact, I'd go a little bit further if risk managers and the management of the banks aren't doing that, then I think it would be kind of frightening. And if they're not making it clear to their boards of directors that a bank might have to spend a few extra dollars to build a liquidity pool because in the event of stress, their treasuries might not be worth 100 cents on the dollar when they sell hundreds of billions of them at the same time, then I think they wouldn't be doing their job very well. So, that's my view.

MR. WIGAND: I mean, the only comment I'd add to that is much of this is, is nuanced. Okay. And a discussion of preference versus incentives versus requirements versus regulations, whatever. I mean the reality is that I think the communication between the regulated entities and their supervisors is extraordinarily important and that communication needs to be clear. And it -- I think a lot of it actually could be more transparent. I think Tim mentioned this earlier that it would be nice to have a little greater transparency in the supervisory world. Once, again, on the outside you appreciate it more than when you're on the inside. I can say that from experience. (Laughter) But the reality is, is that the communication is extraordinarily important. And if, for example, and aspect of resolution planning is being unintentionally carried over into business as usual, then there should be a discussion around that and there shouldn't be a reluctance to talk about it. And there might be very rational reasons why it makes sense. I mean, as Tim indicated, I think it's a very reasonable assumption that if you're selling a lot of an asset class into a market, there's going to be a haircut that is taken at that point in time.

Regardless of what the asset class is and so having a discussion around this, just serves -- anybody's interested and hopefully will make the system better.

MS. O'CONNOR: I just, again, I think back to the LCR, the CLR and the resolution recovery, that's a continuum of stress tests, right? And while I agree completely with the LCR and agree completely with the CLR, because you are, liquidating under stress and if you're liquidating a treasury bill, it's going to have or, or note it's going to have different you know, aspects given size versus depth. The question that I would posit though is for resolution and recovery, right? Resolution and recovery, are we making the right tradeoff between holding massive amounts of cash upfront because it's preferable to treasuries for that for what is a low probability outcome and one can argue so what, let's have it that way but then we can't be surprised of the consequences of lots of cash and liquidity sitting on financial institutions balance sheets that are not available for the traditional daily operating of movement of cash and securities through the system.

MS. LIANG: That's the only one I'm thinking of.

MR. CAMPBELL: I just want to be clear because it's part of the point of here to be so CLR and resolution and recovery are not the same thing.

MS. LIANG: No, they're different. They're very different.

MR. CAMPBELL: So, what I was talking about with CLR and risk management and fortunately Jim can talk about resolution and recovery.

MR. WIGAND: And with respect to for example, an incentive to hold cash versus an explicit preference to hold cash. And it goes back to the question is, what's behind the incentive and if in fact the incentive is to avoid daylight overdrafts at the bank because this liquidity is just more than at the bank level. The liquidity in resolution planning is for the entire enterprise and much of the liquidity demands is actually driven. The acute liquidity advance is driven by the broker-dealer affiliate. So, when you're looking at, when you're looking at the resolution plan, quantum liquidity requirements, you and what that is composed of, you really need to break down what is your objective associated with that. And if in fact, for example, build confidence avoid intraday or daylight overdress yeah, that's an issue. And if the requirement is, well you need this level of cash to do that, then you have to have a discussion about the balance and the tradeoffs associated with it.

MS. LIANG: So, we turn to if anyone has a question, if you raise your hand, there are some microphones, either that or I'm going to ask a couple of more as we're getting ready.

QUESTIONER: It's winding down.

MS. LIANG: So, I'm going to just raise one. I'm going to put Sean on the spot for a second, because --

MR. CAMPBELL: Just like all the time.

MS. LIANG: Yeah, I know (laughter) so the G-sub, it sort of suggests that there is some capital and balance sheet constraints over year-end. That is not clear, the Fed, putting reserves in the system solves that problem, but I'm not sure.

MR. CAMPBELL: Okay.

MR. LIANG: So, how concerned are you about your end?

MR. CAMPBELL: So, again, I think it's -- I'd like to address the sort of the first point you made, which is this issue about putting reserves in the system. I think there are real questions about whether or not that is going to work. If the primary intermediaries that intermediate those reserves feels though they're full up for the year --

MS. LIANG: Yep. That's right.

MR. CAMPBELL: Seems like you don't need a PhD in anything to get that one, in my opinion. The second point is and I worried so in some cosmic sense if I look back at last year, there was definitely something that went on in repo markets last year. It didn't get the same press that the September event got and not much has changed in the interim. And so we're heading into another year.

QUESTIONER: It wasn't a crisis.

MR. CAMPBELL: That's true too. So we're heading into another year-end. So, do I think that there's a sort of a possibility or is there scope for there to sort of be end of the year volatility that is driven by that regulation? Yes, I think there is. Do I think it's going to be resulted in a financial crisis, or it's going to be something that the world can't handle? No, I don't think that broadly speaking, but actually this gets to a broader point which was raised several times during the presentations today. So, I want to address it now, which is there's been this point made a number of times which is like, wow, volatility is good and a little volatility is a good thing. So, what's the worry?

So, the worry is if the volatility is self-inflicted because of a design flaw in regulation, we should all agree that that's a mistake and we should all agree to take a hard look at that and fix it if

possible. So, I would be, as an economist, I would be the first thing to say that volatility is helping the economy and that sources of volatility beget trade an exchange of views. And that's good in a healthy economy and, and also in a democratic society. But if the volatility is being driven effectively by design flaw in the underlying regulation, there is no good argument for not addressing it.

MS. LIANG: So, I think yes --

QUESTIONER: From the ground.

MS. LIANG: Okay. Yeah, I should -- we should let, yes, Dennis. Yes. If you stand up. I've got all kinds of questions I could ask.

QUESTIONER: I saw one person in the back raise their hands. And I thought we'd --

MR. KELLER: I don't know if I want to go before Bill. I think I want to go after Bill, but Dennis Keller from Better Markets. You know, one thing that's, it's interesting, and Sean just alluded to this, but a theme through all three panels is that September, nobody thinks that's going to lead to a major crisis and a failure, kind of a cascading failure. Other than Sean's question early about, maybe it's a leading indicator, but maybe it is, but let's leave that small probability aside and said is broad agreement, but that doesn't mean we're going to have '08 all over again. And Sean just said as for an end of the year, we could we have increased volatility. Yes we are going to have a massive collapse of the financial system? No. Everybody's saying it and that's the forest that occasionally gets mentioned and the rest of the time we're talking about the trees and the particular tree which is the repo market and -- but I think one of the reasons is broad agreement that none of this is going to lead to a collapse or a cascading crisis is because at the macro level, we have massive resiliency. Now, maybe it's not where it should be. Maybe there should be more capital and yes, it's better than '08, but is it where it should be? I don't know but it's certainly miles and miles away from where we were in '08 in terms of resiliency and that's because of numerous rules, regulations, changes in practice, changes in markets.

And so you're saying if there's a design floor in this particular market and then Sandra and you both talk about there being many markets, we only talking about one is a little change here and lets a little change here and each change you're talking about relates to capital and liquidity. That's what makes it so stable at the macro level though, that's why everybody (inaudible) so, comfortably say it's not, it didn't lead to a crisis in September and it probably won't lead to a crisis in December. The macro level,

the resiliency and stability there is what gives you that comfort. And so when you talk about the changes at the micro level, are you worried about each one cumulatively leading to a question for your overall, your premise of all these discussions of the resiliency at the macro level.

MR. CAMPBELL: So, I don't think you've appropriately characterized why I'm not worried. So, it has nothing to do with the fact that we have so much resiliency in the banking sector that we don't have to worry about anything. It has everything to do with the fact that we're in basically a 3.8 percent unemployment macro economy. It's the strongest macro economy we've seen in a generation, maybe in 50 or 60 years and right now. We are at the top of a very robust macroeconomic business cycle as was already raised earlier by other people today. We can't be sure how this will affect the economy in the markets. If we were in a much more precarious economic situation, no one has repealed the business cycle. We're in a really good spot today. I would grant you that part of that is probably due to the significant improvements in capital liquidity that has happened from the crisis, but that is an absolutely not the sole reason and that does not pretend that these problems, if they raise their heads in the future, couldn't be a problem. And I think this also, you know this is an important point because we're having our conference today about sort of the repo market problems that occurred in September. Who wants to put an X on the calendar for the future Brookings institution sort of a seminar on the volatility that occurred in say the corporate bond market and some of the things, some of the fundamental concerns with these regulations that are being discussed today have the potential to cause volatility in those markets just in the way they did in the repo market. And that may not occur at a point in time when the unemployment is unemployment rate is only 3.8 or 4 percent.

MS. LIANG: Can we just take a couple more questions and then --

MR. CLARK: I just need a slight response there, but --

MS. LIANG: No.

MR. CAMPBELL: There's a -- I'm not even sure how to respond to what Sean just said, but there is an extent to which regulation to make the system safer and more resilient. That's a good thing. Have those regulations created some incremental volatility in markets that have been incredibly un-volatile? I'm really not even sure what your point is to be honest on that one. But, so I guess are you arguing that we need to roll back regulations that make the bank safer in order to --

MR. CLARK: No, I'm saying if you find a design flaw in a regulation that is adding volatility that does not have any policy goal attached to it.

MR. CAMPBELL: Okay. And that's a source of inefficiency that you should be, you should squeeze out of the system that that would be the same, Tim, that would be the same if you are building a car, or a house, it has nothing to do with regulation. It's basic efficiency in trying to govern a system. If there's something that's wrong that doesn't have any policy benefit associated with it, let's not have it. If we can't agree on that, I think we don't have much to talk about.

MR. CLARK: Yeah, so --

MS. LIANG: Okay. So, Bill questions (inaudible).

MS. O'CONNOR: Billy, I got to say something too, sorry.

QUESTIONER: We haven't found an equilibrium.

MS. O'CONNOR: No, but I think you talk about what is -- volatility is fine. You have to look at what the driver of volatility is. And we've already discussed, right, that some of the drivers of volatility here is because the capital associated with intermediating and financing of U.S. treasuries is oversized, right? And, therefore, it's not -- it's capital and liquidity there different things. What we're talking about here is not a liquidity issue. We're talking about a financing issue, moving funding from one place to the other. There's not an inadequate stock of liquidity. There's not an inadequate stock of cash. So, you come back to you, and this is Sean's point and I agree with him completely. If the volatility is driven by the fact that banks won't intermediate, because we've gotten the cost of capital for low risk activity wrong, we should contemplate trying to get it right and try to rebalance it so that we can have institutions engaging in that marketplace to support the financial plumbing. And by the way, it doesn't just matter for the financing and repo markets. HQLA and treasuries are critical to every aspect of operating economy. There is no intraday unsecured overdraft anywhere anymore. Everything must be collateralized for centralized clearing to work. It's all supported by collateral. So, if our collateral markets don't function adequately and we don't get the velocity of collateral right because we don't have proper capital tied to treasuries, not anything else we're talking about here, well, then we're going to have a fundamental issue.

MR. ENGLISH: Do I just like to, I do want to add just quickly, I really need to -- we have

discussed that issue. I agree. I don't think we've agreed or proven actually the relationship between the capital and the assets. So, I just want to be clear.

MR. CAMPBELL: Yeah, and I just want to make one comment about volatility and that is, I really am in the camp. It's a good thing. And the reason why it is a good thing is because it's going to bring new entrance into this market. Volatility means the opportunity to make money very simply.

MS. LIANG: I think we're have --

MS. O'CONNOR: But durability will matter and durability will matter.

MS. LIANG: -- two references to volatility today, just to be clear, I think there's a little bit of confusion. I would just clarify. So, there's volatility in short-term money markets. What where ample reserves and the huge excess reserves may have stamped out for a while. And so you're not seeing any fluctuations there or any like measurement or credit risk even in the short-term markets because it's all, and then there's volatility from spikes at quarter-end and year-end and lead ups to reporting dates. So, I think we're talking about two different things and I just want to be clear.

So, I am really taking some, a couple of questions. And Bill Nelson and then one more and that's it. And then let's take all three and then we can -- thank you.

MR. MUNSIN: So yeah, I think since most of the --

MS. LIANG: Please say your name and where you're from.

MR. MUNSIN: I'm from the IMF, my name's Ahmed Munsin. Although the topic is repo that cash to collateral exchange happens in many markets. Sec lending, prime brokerage or wholesale derivatives. We understand the importance of repo market, especially the U.S. Treasury market. Now, if the treasury, the U.S. Treasury market cannot find room in balance sheet space, what I mean balance sheet. I also mean off balance sheet because when you read the 10Ks, a lot of this flows off balance sheet.

MS. LIANG: Yeah.

MR. MUNSIN: There has to be a way to either make, to make reserves and treasury equal either find balance sheet space for treasuries or make the results unattractive. Has the thought of lowering IOER so that there is more of an equilibrium between U.S. Treasury choice and result choice assuming if we can't find the balance sheet space.

MS. LIANG: Yup. Thank you, Bill? Bill Nelson.

MR. NELSON: Hi. Thank you. Bill Nelson from the Bank Policy Institute. So, I'll just note that I think the only two things that I've heard the bank representatives suggest encouraging supervisors in banks to not have an unwarranted bias towards reserves and to calculate the G-sub surcharge on an average basis rather than on a year-end basis. So, that doesn't sound like a big ask or, in fact, amusing. But in any case, let me then raise a couple of issues.

MS. LIANG: Is there a questions at the end of this?

MR. NELSON: There's two questions. (Laughter) So, when you go back to look, watch the video in which the board adopted the SLR and the SLR, every board member around the table said, we're doing so because we, it is our expectation that as basically as the G-sub surcharge rolled in. But anyway, it's our expectation that this will not be the binding constraint. Now, my colleague, Francisco Colus at BPI has done some great work calculating what's the binding constraint for everyone? And what he's concluded is that for half the banks, the binding constraint is actually the SLR requirement in the stress tests. So, my question is, is that an intended outcome and is it a desirable outcome? The other question is with respect to thinking about what an institution should do, that's under stress, that has a big pile of treasuries, isn't that exactly what the discount window is for? And if, and that doesn't have a market impact, in fact, it isn't even visible. And so if the answer is yes, then well, shouldn't that be the plan and isn't, why not? Why not collateralized by treasuries? Envision them using the discount window?

MS. LIANG: Okay, thank you.

MR. CLARK: Short answers. No, I don't think we have. We really have to stop. So, I think we should answer these.

MS. LIANG: Yeah. If anyone wants to respond please and, but short. Thank you.

MR. WIGAND: Should the post-stress leveraging should be a binding constraint? Is that what your question was? So, I think leverage ratio in stress is actually a pretty good measure, personally. I think that it does a few things. It's nice and simple as leverage ratios are designed to be, but actually has the benefit of being risk sensitive as well. So, you have an ending number post the stress. It's actually very easy to understand. This is my capital, these are my assets, right? If you remember back to the crisis 2008, there were analysts all over the place doing these posts, dressed tangible, common

equity analyses that were freaking out the market. And in a sense, this is a nice consistent way to get the information out to the public. That actually something approaching it post stress, tangible common equity ratio. Here it is. That's the post just leverage ratio. Is it a good constraint?

MR. NELSON: (Inaudible) my question.

MR. WIGAND: Well, I'm not sure constraint of what -- in --

MS. LIANG: Yeah, so we could pick up on that (inaudible).

MR. CLARK: I would just quickly address Bill's point about the discount window, which I basically agree with completely, but I think ultimately this sort of a -- there's a human behavior sort of stigma issue associated with that, which would make it really hard to -- even in the best of circumstances if the Fed would roll into every large bank and say, look, we really, we mean it. There will be no consequences, so on and so forth. It could be very, very, very hard for banks to internalize that and ultimately to use it. It could I think that getting rid of that stigma problem, at least if I understood your question correctly could be very, very difficult.

MS. LIANG: And to wrap up that last piece too is when -- doesn't matter if people like or dislike the supplementary leverage ratio. It is embedded in banks models, period full stop. Whether it's binding or not binding. And I think it's very important to note that the market is functioning very well in that construct because despite the fact that it's not a good risk reward on capital, it is part of the business model and the offering that needs to be provided in the services to underlying clients. The piece I think we need to focus on is that incremental support and intermediating not business as usual. Why are financial institutions not leaning in? Why are they not showing up? And in that construct, maybe there's opportunity there to think about if you're fully in excess, if you are compliant with every rule out there, is their ability to deploy then these, these excesses into the market without drawing yet more incremental capital. That may also be a way to facilitate that incremental piece of intermediation. Yeah.

MR. TARULO: So I know this could go on for another six hours, but I don't intend to spend six more hours on the repo market. But I, I do want to thank all the panelists. I thought this was a really good discussion of an important issue. One of our goals was to kind of try and get people together to talk about something for which there've been a lot of headlines, but I don't think there's been much understanding, and I hope we've at least advanced that a small way. So, I want to particularly thank

Nellie for helping me organize this and all the people who came to speak.

(Applause)

* * * * *

CERTIFICATE OF NOTARY PUBLIC

I, Carleton J. Anderson, III do hereby certify that the forgoing electronic file when originally transmitted was reduced to text at my direction; that said transcript is a true record of the proceedings therein referenced; that I am neither counsel for, related to, nor employed by any of the parties to the action in which these proceedings were taken; and, furthermore, that I am neither a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.

Carleton J. Anderson, III

(Signature and Seal on File)

Notary Public in and for the Commonwealth of Virginia

Commission No. 351998

Expires: November 30, 2020