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WEBINAR

COVID-19 AND THE FINANCIAL SYSTEM - HOW AND WHY WERE FINANCIAL MARKETS DISRUPTED?

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PROCEEDINGS

MR. WESSEL: Good afternoon, I'm David Wessel, director of the Hutchins Center on Fiscal and Monetary Policy at the Brookings Institution. Thank you for joining us today.

Unlike the global financial crisis of 2007, 8 and 9, the COVID-19 crisis did not originate in the financial system. In many ways, the COVID-19 crisis has been a stress test of the changes that were made by the government and by the private sector after that crisis.

The disfunction in financial markets was so severe that the Federal Reserve had to intervene with unprecedented force, particularly in the market for U.S. treasuries.

So today, the basic question we're going to address is whether the financial markets -- that is the markets for U.S. treasuries, corporate bonds, commercial paper, and so on -- amplified the COVID shock. And if so, what actions should we consider to reduce such amplification in the future.

In a session next week, the Hutchins Center will take a closer look at how the big banks were affected by, and responded, to the crisis, with a background paper by Jeremy Stein and some coauthors. That's June 4th and we invite you to join that.

Today we have a terrific panel. Today we're going to begin with a presentation of the background paper prepared by Darrell Duffie of the Stanford Business School on the surprising issues that arose in the market for U.S. treasuries, which is, after all, the deepest and most liquid financial market in the world.

Darrell's paper and his slides, as are all the other slides, are posted on our website.

Darrell will be followed by Itay Goldstein of Penn's Wharton School who will focus on the corporate bond market, and then we'll turn to a market perspective from Beth Hammock, Global Treasurer of Goldman Sachs.

And he'll be followed by my colleagues at Brookings, Nellie Lang, who is the founding director of the Fed's Financial Stability Division. She's going to comment on the lessons we've learned in the past several months.

And when they're done, we'll bring all the presenters back on the virtual stage for a discussion moderated by another of my Brookings colleagues, Don Kohn, the former chair of the Fed's Board of Governors.

If you've got questions, you can send them to events@brookings.edu, or post them on Twitter at #covid19economy, and we'll try to get to as many as we can.

So, with that, I'd like to turn the stage and the screen over to Darrell Duffie, who's at Stanford. Thank you.

MR. DUFFIE: Thank you so much, David. I'm going to set up my screen.

Okay, you should be able to see my title page now, and I have used the provocative title, "Still the World's Safe Haven." I'm talking about the U.S. Treasury market and how in March, when news of the COVID crisis struck financial markets, surprisingly the U.S. Treasury market was no longer the safe haven that it has been known to be in past crises, like the 2008 crisis.

Instead, the market wobbled quite badly and became relatively dysfunctional. And, as David mentioned in his introduction, The Fed had to step in and basically rescue the market.

I want to review briefly what happened, and going forward, what might need to be done in order to put this market on a sounder footing, in terms of its design.

So, first, a very quick review -- because time is short today -- of what happened, and then what to do.

First, as I mentioned, the COVID news generated very large liquidation of treasury positions. And my information is that that was coming mainly from large leverage hedge funds, and foreign investors, among whom -- I expect -- are foreign central banks who are managing their foreign exchange reserves. Everyone was going to cash.

The flows that were generated by the liquidation of these treasury positions had to get to new ultimate buyers of those treasuries through our current market intermediation system, which is a dealer-based market. And this March event was like pushing an elephant through a small door.

The dealer balance sheets -- the space for intermediating those flows -- just wasn't there, and I'll give you some evidence for that.

For example, the bid-ask spreads that dealers offered to their customers in the treasury market widened by a factor of more than 10. And in the inter-dealer market, where dealers trade with each other, and with special liquidity providers, the depth of that market dropped by more than a factor of 10. I'll show you a figure.

The U.S. Treasury yield curve -- the benchmark for the world's interest rates -- went out of joint. Measures showed that off-the-run securities became mispriced relative to on-the-runs, and even on-the-run securities had large mispricings.

There's a technical called the Treasury Cash Futures Basis, which became both a symptom of the problem and, in effect, a partial cause of the problem as cash futures basis traders unwound very large positions in that market. And I won't have time to review that today, but it is discussed in the paper that David mentioned, that goes with this talk.

What did the Fed do? Well, in the largest market operation ever conducted by a central bank -- and most aggressive -- in a matter of merely three weeks, the Fed bought a trillion dollars of treasury securities, and continued to buy treasuries at a fast pace.

The chair of the Fed said that the purpose of this was to return the market to liquidity. In effect, the Fed was taking supply away from the market so that the market could digest the remaining supply with the existing intermediation system -- again, a dealer-based market.

The Fed also provided unlimited financing for treasuries. It also exempted treasuries from a key, one of its key capital requirements.

Going forward, I'm going to show a diagram suggesting that the design of this market is not up to the task that it faces with a growing supply of treasuries. Now, this is a complicated diagram, please give me a minute to go through it.

On the vertical axis the scales show quantities in trillions of dollars. The timeline goes from 1998 to projected numbers for 2025.

In Blue, is the total marketable supply of U.S. treasuries securities. And in Light Blue, are projected amounts of treasury securities using forecasts of deficits coming from the Committee for

Responsible Federal Budget.

So basically, as you can see, the U.S. Government is spending money hand over fist and as the COVID crisis hit, its commitment to spend money this year -- $3.8 trillion in additional deficits -- are raising the supply of treasuries to a staggering level that I doubt the current market design is capable of handling without future wobbles like it had in March.

Why do I feel that way? The red bars in this diagram show the total balance sheets of the largest U.S. bank holding companies, whose names are indicated on the bottom of the slide.

As you can see, leading up to the 2008 financial crisis, in the absence of strong capital requirements and strong liquidity requirements, and under the presumption of being too big to fail, these banks expanded their balance sheets at a very rapid pace; tripling in the period shown up to 2008.

However, regulators through the Basel process mainly, after the financial crisis, put strong breaks on the appetite of these banks to increase their assets by adding appropriate stronger capital and liquidity requirements, removing a large part of the presumption of “too big to fail”, which raised bank funding costs.

As a result, as you can see in red, bank balance sheets did not grow commensurate with the supply of treasuries.

Going forward, unless we reduce the reliance on dealer-balance sheets for intermediation of this market, I expect more episodes during stress periods when the market will become relatively dysfunctional and The Fed will be forced to do what it did during the initial stages of the COVID crisis.

Let me briefly go through a couple of symptoms and then go to one design element and finish my remarks.

One of the symptoms of this, as I mentioned, is a widening of bid offer spreads. This diagram is from a speech of Lorie Logan who is the head of the Open Market Trading Desk of the Federal Reserve Bank of New York, that shows indexed to 100 at the beginning of the year, that bid offer spreads that dealers offer to investors soared in March on these large investor flows.

At the same time, in the inter-dealer market the depth of offers to purchase or sell securities plummeted from typically $175 million available at the inter-quotes on the order book, to merely $10 or $20 million.

Clearly, the dealers and other participants in the inter-dealer market were not making available very much in the way of liquidity to this market. And you can see similar plummeting of depth in London and Tokyo.

I'm going to skip the Cash Futures Treasury. I'm going to note the exceptionally large growth in flows -- that is, treasury transaction demands -- going into the March period. And it's a complicated diagram, but to make a long story short, the bars go up a lot in March, nearly doubling the total volume of trade.

So, it's not like the markets stopped intermediating. It just became overwhelmed and the additional amount that needed to be intermediated had to go onto the balance sheet of The Fed.

And as a general design principle, I would say that we should not rely on the central bank to step in merely because the private market is badly designed. We should fix the private market design and The Fed should purchase treasuries as needed for monetary policy reasons, and not because of market dysfunctionality.

Here briefly is one key element of a reform of this market that I think the Government should carefully consider and do a quantitative, cost-benefit analysis of. And it's an improvement of the current status of central clearing in this market.

So, let me explain briefly what that is, and then how this should be expanded.

This is a schematic showing the current system by which buyers and sellers in this market have their trades settled. The customers in blue settle their trades with the dealers shown in green.

The dealers, on the other hand, when they trade with each other, generally stop relying on each other for performance on the trade settlement, but instead, novate their positions to a central counterparty which becomes the buyer to each seller, and becomes the seller to each buyer.

This has multiple benefits that reduces counterparty settlement risks, but it also allows dealers to net down their purchases and sales, reducing the amount of balance sheets base, and reducing the amount of cash liquidity that they need to continue running this market.

Unfortunately, what's shown in this diagram wasn't enough. What I'm proposing -- and, by the way, the caption of the figure shows that of all treasury transactions, if you're in this market you are facing the central counterparty -- and only 22% of them -- you're facing a bilateral counterparty in a noncentrally cleared position on the remaining 77%, which is far too much, and has been recommended to be improved by a number of industry groups.

Here's what the recommendation is, and then I'll stop. The recommendation is that all active market participants in treasuries should centrally clear their treasuries trades. This has a number of benefits.

It improves the ability of the dealers to intermediate the market because the market then becomes less reliant on dealer balance sheets.

It becomes less reliant because more positions are netted purchases against sales, reducing balance sheets base for the dealers, and it also allows -- at least for the possibility going forward -- that nondealers could trade directly with each other; that is, let's say, an insurance company and a hedge fund in principle could trade with each other.

Now, that's not this proposal. That's a possibility that could become a reality if there existed a central counterparty and if all trades were mandated.

I do not think this is going to happen merely from private market participants getting together and making it happen on their own. I do think this is going to require an official sector mandate similar to the one that was brought into the interest rates swaps market after the last financial crisis in the Dodd Frank Act.

That mandate has now brought the vast majority of swaps into clearing houses improving transparency, lowering counterparty risk, and improving market pricing.

So, with that, I'm going to pass the baton, because I am now out of time, to Professor Goldstein.

MR. GOLDSTEIN: Okay, thank you very much Darrell and David. Let me now share my screen. Do you see my slides? Yeah, good.

So, what I will talk about is the corporate bond market and how it did during this COVID-19 crisis, in particular, what I think is a very important feature of the corporate bond market, and this is the investment funds while active in it and are prone to fragility.

So, let me give you some background. Investment funds, including mutual funds and ETFs became a dominant force in the corporate bond market since the global market since the global financial crisis of 2008/2009.

In previous papers, I've written about this and the fact that those funds have liquidity mismatch; they hold illiquid assets but they are offering investors the ability to redeem money on a frequent basis, and as a result, they offer high level of liquidity to their investors.

Because of this liquidity mismatch, they are prone to some type of run behavior. And over the last years this has been a focus of policy, it has been of major concerns among policymakers leading to changes in laws in recent years.

For example, a leading example is that the SCC here in the United States allowed swing pricing in the United States for mutual funds starting November 2018. I will come back to that at the end.

So, I think this is now a good opportunity, as David said in the beginning, to look at what happened in this market. In some sense, the COVID-19 crisis is a major stress test and we want to see how this market failed during this episode.

So, in the last few weeks I looked at some of the data, together with Antonio Falato, who has been working on related issues with Ali Otaksu. We have daily data on flows into mutual funds, and out of mutual funds, and we looked at what happened during this recent period. And we found some very interesting findings, and I will go through them quickly.

Let me just give you the highlights. Corporate bond markets in the United States suffered severe stress in March 2020. I think it’s very clear. It led to a dramatic increase in spread and a decrease in liquidity.

If you look at what happened to the investment funds in the corporate bond market, they experienced massive outflows which are far greater than anything we have seen in the last years. So, definitely far greater than anything we have seen since they became such a major player in the market.

The flows were unusual in many dimensions. They were sustained over a few weeks, persistent. There were some interesting things about the time regarding where it started, what type of funds it started with, and where it continued to, and I will briefly go over this.

What we see is that the thing that really helped alleviate the stress was policy intervention from The Fed. And I think this echoes some of what Darrell said, in a different context.

In particular, on March 23rd, The Fed announced through two facilities that they will start purchasing investment grade bonds on primary and secondary markets.

In April 9, they extended the amount substantially, and also announced that they will acquire some of the junk bonds -- so-called fallen angels -- those that were investment grade and were downgraded. And we think this went a long way towards alleviating the stress in this market.

So, let me briefly take you through some of the trends.

What you see here in this graph is the growing prominence of investment funds in corporate bond markets over the years, and you see the trend since 2010 until 2020.

You see that nowadays, if you take the total net asset value of mutual funds and ETFs investing in corporate bonds and divide it by the market size, it's almost .4; so, its almost 40% in size.

It was less than 20% in 2010, and it was even lower than that before the financial crisis. So, it's not something that we can ignore. This is a major player in the corporate bond market.

What you see in these two pictures is the major stress that this market experienced during the COVID-19 crisis with a spike in spreads, both high yield and investment grade.

Obviously, the levels are different between high yield and investment grade, but the overall spike is similar. And you can see how the spread increased before the announcement of Fed intervention, and then slowly decreased in both of them.

Here you can see a perspective, a long-run perspective of flows. These are monthly aggregate net flows for corporate bond funds and ETFs in the corporate bond market over the last decade.

And you see very quickly how the recent event, how extreme it is relative to anything we have seen in that market over the last decade. So, what you see here are basically aggregate outflows in March and April in 2020.

You know, the previous time where we saw something close to that was the taper tantrum here in 2013, but what we see here is much bigger.

Another perspective that shows you even more how extreme things were, is to look at how broad the shock was; how many funds experienced stress. And basically, what you can see here is the daily net fraction of funds with large top decile outflows. And you can see that this is really unprecedented, what we saw in the recent couple of months.

By the way, here, negatives will mean inflows, and positives will mean outflows. So, you can see the outflows are really extreme.

Another perspective is to think about persistence. You know, funds stop wooing when they see outflows over more than one day, two days, three days; so, we just picked looking at funds experiencing extreme outflows, top decile outflows, in two consecutive days. And again, you can see that what we saw in the last couple of months is truly unprecedented.

So, this is sort of an aggregate view of what happened in total in March and April. I think, to get a better understanding, what we want to do is we want to look at the evolution of flows over this period. And you can see here the evolution over this period.

Again, we highlight the March 23rd policy announcement and the April 9th policy announcement, to just give you a feel in what role they played in alleviating the stress.

But you can basically see major outflows during the month of March continuing after the first policy announcement. And basically, things stabilized slightly before the second policy announcement and continued to stabilize after that.

If you're interested in the different types of funds, you can see here a breakdown into high yield funds versus investment grade funds versus ETFs. And I think what is interesting to highlight here is we saw signs of stress first in the high yield funds, which is maybe what we should expect. They experienced severe outflows for a while.

The investment grade funds continued after that, even when things started reversing in the high yield funds. And again, things calm down after the second policy announcement.

Another interesting perspective is to compare the illiquid funds versus the liquid funds because of what I said in the beginning -- the liquidity mismatch, I think, is an important part of the story; something that we would like to look at.

And again, you can see here something that is rather similar to what I said with high yield versus investment grade whereby the illiquid funds started showing signs of stress first, and the liquid funds followed after that.

So, all in all, what do we take from it? I think we can see clearly that investment funds became a dominant player in corporate bond markets.

As I mentioned, I believe that they are prone to fragility. There has been other research on it; I worked on it before and it has been a focus of policies over the last few years.

The COVID-19 crisis imposed severe stress on them leading to massive outflows.

And from initial inspection of the trends over the last couple of months, I think it has fair to say that the massive intervention by the Federal Reserve was important in order to alleviate the problem.

Going forward, we probably should not count on such intervention every time there is stress in the market. So, we should probably ask, what should we do so that these fragilities in the system do not persist?

You know, possible, policies basically designed to reduce the liquidity mismatch. And this can be done either by improving the liquidity of the underlying corporate bond assets, for example, by trying to transfer those assets into centralized markets rather than decentralized markets.

But another way is to reduce the liquidity that is available to investors investing in corporate bond funds. One way to do it is via swing pricing. Essentially, when you have large outflows, this will be reflected in the net asset value that investors can get.

Swing pricing was introduced in the U.S. in 2018, but it's still very rarely adopted. I think funds are sort of still figuring their way around it. But from evidence we have from other countries, it has been effective in alleviating stress.

So, this is something to look for in the future; and thank you very much. I will move it over to Beth.

MS. HAMMACK: Thanks, Itay. So, again, a perspective from a market practitioner in terms of what happened from the banking systems perspective. And I think both Darrell and Itay spoke really well about some of the stresses we saw in the system in the financial markets, and how that played out.

But when I think about it from where we sit and what happened in the COVID-19 crisis, you know, we had a pretty tremendous amount of strain on the system, on the broad economy, in that you had global consumer spending fall very rapidly, and almost instantaneously with the shelter-in-place orders that happened throughout the country. And companies reacted very rationally by trying to draw on their credit facilities that they had lined up, furloughing employees, cutting expenses wherever possible, and that created a cash shortfall overall.

Now, typically I would say we think about drawing on these types of corporate facilities as having real negative stigma.

But certainly, in March there was a moment where if were a corporate treasurer you seemed to be almost negligent if you weren't drawing on those facilities. And so that put a strain on the banking system, as well as on the corporate bond markets.

We saw that through that period liquidity at the banks dropped. The low point in reserves in March was around $1.4 trillion, which is very similar to the lower bound of reserves that we'd seen last September when we saw a lot of strains come through in the repo markets.

You know, this lower access to intraday cash coincided with greater needs for cash by participants in the economy overall. And when cash is dear, you sell what you can which may not be necessarily be what you want.

And so, you did see a lot of selling in the treasury market, even though treasuries are -- I would still argue -- the safest and most liquid asset, because, when you have that type of strain, that's the thing for which you can still find a bid.

Now, it's important to note that the speed of this move was very rapid and highly compressed relative to what we saw in 2008. By some measures, you can see it almost being 10 times the speed of which some of the deterioration we saw in the market.

And you have to remember that for most of the financial market participants this was all happening as they were moving to running their operations from their homes, rather than large trading floors across the globe.

And so, you had a lot of frictions particularly in those couple of weeks in March. They were not just normal market frictions but were really logistical operational type frictions that were coming into being.

So, The Fed immediately implemented a significant number of programs; a lot of the programs that we saw in 2008. They put their balance sheet out there and they really helped to fix, I think, a lot of the strains that were going through the system.

And while we would agree that private markets should be able to operate without this type of support from the Federal Reserve Bank, extraordinary times do call for extraordinary measures, and we do applaud the efforts of The Fed put in place to help manage this.

You know, what I'll say is, coming out of the global financial crisis, I think a lot of the rules and regulations that were put in place, help to make this particular crisis a more muted one than what we saw in that episode.

And so, with the exception of the leverage rules, I'll say I think the rules that were put in place post the global financial crisis have largely worked.

I think there will continue to be some adjustments and some review of, if everything operated the way that policymakers would have expected. But I think the fact that the banking system entered this crisis with much deeper pulls of capital, and much more ample liquidity, has really allowed the banking system to help get the real economy back on its feet and to act as a bridge from the financial markets to the real economy markets.

I will say that I think one of the areas of regulation that I think will come under more scrutiny -- or certainly more review -- will certainly be the liquidity rules that were put in place.

The capital rules that exist -- and certainly, with the new capital regime from the stress capital buffer that The Fed just announced, do contemplate using buffers, and think about buffers being more explicit.

When you look at the liquidity rules, you really don't have that same concept of having a buffer than can be dipped into. And so, you end up having a lot of procyclicality in that banks need to enter a strain like this with a lot of liquidity, but they need to keep replenishing it through every step of the way.

So, I'll talk for a minute about, you know, our Treasury is a liquid asset, and yes, I still very much believer that treasuries are a very liquid asset. I think they are certainly a largely safe asset and safe haven.

But I think what we find is that in a liquidity crisis, funding and leverage becomes very scarce. And certainly, some of the regulatory reforms, particularly the leverage rules that were put in place, have really limited the banks and the dealers' capacity to provide their balance sheets, both to cash participation, as well as to funding. And so, you do see some more strains that come in the marketplace.

Now, you've seen those types of strains come in the market, and you've seen those leverage rules happen at the same time as you've seen treasury issuance explode.

So, it exploded coming out of 2008/2009. You had treasury outstandings triple since that period. And we're going through another period right now where you're going to see tremendous growth in treasuries outstanding.

I think what we've seen, and what Darrell talked about, is that the marginal buyer of treasuries, as we've seen, has largely been a levered buyer; someone who needs some financing attached to that.

And so, if you have more constraints on the banking system about their ability to provide that leverage, it’s going to make it more and more difficult for those buyers to find their ultimate home. And so, there are a couple of different ways that that can play through and resolve itself.

One is, I do think that central clearing of repo, rather than cash treasuries, is a possibility. And that may help alleviate some of these issues.

It’s important to note that we do have central clearing today, although it’s for a limited subset of the market participants; not for everyone.

Some of the regulatory relief, either on leverage or on holding of treasuries and possibly treasury repo as well, is another possibility that could help alleviate some of this issue. And you’ve seen The Fed move through the supplementary leverage relief -- both at the holding companies and at The Bank entities -- to provide some of that to help encourage broader holdings of treasuries.

And the last one is you could see treasury yields rise. You could see them priced higher through this period. And that would, I think, also help them to find more homes for longer term buyers.

And so, I will say that as we looked at what happened here, and as you saw reserves drop in the system initially, The Fed has really supplied the system with a tremendous amount of liquidity; both through their purchases, through the repo operations. And when we look at the various waves of liquidity that The Fed has put in place, I think you saw it, really, in three different steps.

One was the 2008 playbook, increasing the money supply but doing it for institutions that have sufficient liquidity and can really weather the storm. And so, you saw things like the purchases, like the term access to the discount window, the primary dealer credit facility, the money market liquidity facility, and commercial paper facilities. Those really helped to get the high-quality part of the market restarted.

The second wave was really around getting the broader credit market started. And so that was the primary market corporate credit facility, the secondary market corporate credit facility, and the use of ETF purchases to help start the economy there.

And then I think the third wave will hopefully get more at some of the real economy rather than just the financial economy and trying to get the velocity of money through the system restarted. And so that's things like the fit (phonetic) health, the mainstream lending facilities, and the paycheck protection program, and funding facilities for that. And that will help take that forward.

So, I think, you know, while it is good to see that we've made some repairs, I think there still is a bit of a disconnect -- as I look at it -- between what's happening in the financial economy and where you see markets and markets' forward-looking views, versus what we still have yet to play out in the real economy with unemployment rates skyrocketing and needing to get some repair really going back into that Main Street area.

So, I'll stop my comments there and turn it over to Nellie.

MS. LIANG: Okay. Thank you, Beth. I am going to put up a couple of slides just to illustrate.

So, there's actually already been a rich set of issues that have been introduced, and so I don't want to add too much more, but I do want to make a couple of comments about liquidity and financial markets.

I think the events that we've seen, and how the markets have played out, suggest the demand for liquidity is very real. It materializes in stress periods. And the provision of liquidity doesn't always show up when it's most needed.

So, let me just illustrate that with a couple of points.

Over the past couple of decades, there's always been a demand for liquidity, especially in stress periods. There aren't that many financial products that can actually offer immediate liquidity.

Cash is one. Treasuries -- at least until Darrell told me it wasn't -- I always thought was one (laughter). And I think, you know, the Securities and Exchange Commission and most regulators, would call treasuries a highly liquid asset. But the demand for liquidity has been increasing, and more products have been created to offer more liquidity on demand. And many of these products, I think, have gotten quite big relative to the kinds of backstops, or internal backstops, to provide this liquidity.

And I would also comment that many of them seem to be kind of, quite homogenous, so that when they run into liquidity problems they're going into correlated and crowded trades. And in some sense, this is where Darrell started us off in treasury markets, but I'm going to try to just illustrate quickly this point that the demand for liquidity is real in two points, money market funds, and then just one more point, on corporate bonds, building off of what Itay showed.

I think, in the end, what we want to do is tee-up the questions for future research and future events about, how do you create these products to offer liquidity? How should they be paid for ex-ante so that it’s not the Federal Reserve, or in this case, and the Treasury and the Government stepping in to be the backstop?

My first chart is from the Federal Reserve Board’s recent Financial Stability Report, and it’s just the chart of inflows, outflows, net flows to institutional prime money market funds. And you can see, as March’s fears about COVID-19 were increasing, the redemptions were starting to accelerate.

Now, market participants say that the reason these redemptions were accelerating is because there is now a 30% limit on liquid asset holdings. And this is a new 30% limit on liquid asset holdings that was not in place in 2008. It was part of the 2014 reforms.

And it’s basically, if a funds liquid assets -- which are basically cash and securities -- falls to 30%, the Board of Directors of The Fund have to make some decisions about either imposing a redemption fee of roughly 2%, or gating, which is basically suspending redemptions for up to 10 days.

Well, again, as market participants tell the story, as funds got closer to this 30% limit withdrawals accelerated. So, this is just the plain investor-run dynamic.

Now, there hasn’t been research that I have seen that has come out of the SCC, or The Fed, or other researchers yet, on whether the flows were the strongest at the funds that are closest to this 30%, but I expect that will come because these kinds of data do become available within a month or two after the events, and so, that will be important for reforms.

But it’s important to illustrate, one, the prime money funds no longer have the fixed NAV, which was one of the problems in the 2008 crisis where investors were concerned about whether these funds were break the buck. Now it's a gate.

It's a gate that threatens to close when redemptions are increasing, and liquid assets are falling. So, in some sense, it's an accelerant.

The point of this is the demand for liquidity is very real. And The Fed, as you know, stepped in here, which I'll mention in another minute.

The second chart that I want to use to illustrate is --

MR. WESSEL: Nellie, if I can interrupt, can you go to full screen?

MS. LIANG: Oh, am I not on full screen?

MR. WESSEL: No.

MS. LIANG: Sorry about that. Does that -- are you there?

MR. WESSEL: Yes, thanks.

MS. LIANG: Okay, sorry about that. So, the next point is this is just building off of Itay and Darrell's point that liquidity, in what are viewed as very liquid markets, can sometimes disappear.

So, this is investment grade corporate bonds. This is a recent paper put out by Hadid, Moreira, Muir; it's an NBER paper. And using TRACE data through the end of March -- which tracks the corporate bonds -- they were able to document a few interesting points that sort of will be part of discussions about what, if anything, needs to be done.

So, I'm going to start with the Panel A, which is on the right side, and this is just an ETF and a mutual fund offered by Vanguard, and the ETF tracks the same bonds as what are in the mutual fund.

But you can see the ETF price falls below the value of the mutual fund. And this is when the levered investors are selling treasuries, they're selling investment grade corporate bonds; they're also selling investment grade corporate ETFs.

So, you can see this discrepancy, this gap, between the NAV of The Fund and the price of the ETF is, historically, pretty large.

On the left side, this is a chart that looks at the change in the CDS spread along the horizontal axis, and the change in the bond spread on the vertical axis, for the same bond. So, these are bonds that are in traded ETF and the on-the-run CDS indexes, roughly 4 to 6-year maturity.

So, the Orange dots are the high yield sector. Normally, in investment grade corporates, if you think this is just a credit risk issue, the high yield sector is going to be the first to feel the stresses. And you can see the diagonal line is a 45-degree line.

And what happens here with the Orange dots is high yield bonds, the CDS rise, and the bonds spreads rise, and they kind of match the 45-degree line.

The Blue dots are the investment grade and CDS doesn't increase that much for many of them, but the increase in bonds spreads is pretty big. And again, this is reflecting sort of new liquidity premia and the need for cash in an unlevering. So, I am just adding to Itay's discussions.

Okay, so what did The Fed have to do here. I agree with Beth, extraordinary times require extraordinary actions. Federal Reserve system is lender of last resort.

First, they open the money market mutual fund liquidity facility, which lends to dealers based on the collateral that they purchased from money market funds. And this is including this time, commercial paper and short-term municipal Securities.

There is $10 billion of credit protection from the Treasury. Also, it is a 13 3 facility, and does need approval. It needs to be done in coordination with Treasury. So, The Fed can lend, but it does require sort of broad Government cooperation.

It did resolve the issues in the money fund sector, so, importantly supported the stability of the short-term funding markets.

The corporate credit facilities are very new and a very big step, and I think are brought on in part because of not just credit quality concerns, but liquidity demands. And that's what I wanted to make my point.

And I would also highlight the last bullet point: $75 billion of equity if required from Treasury here. So, this is not simple a Federal Reserve facility.

Now, the primary market and secondary market facilities are designed to work together to improve the provision of credit, ultimately, to companies. And the idea is that if secondary market yields are super high, that increases the borrowing costs to companies because seasoned bonds compete with the newly issued bonds.

So, the secondary market will buy shares in exchange traded ETFs, which can provide quick and broad support to the market. And one of the features of the ETF that help them is that ETFs are exempt from the CARES Act and the conflict of interest, and all the certification process. So, it's a quick way and it's a broad way to support the market.

I think, though, the lesson from this episode is not so much that ETFs are liquid and provide liquidity. I think we also want to think about the extent to which ETFs and they're dynamics affect the mutual funds and the underlying corporate bonds.

And then I would just make my last point where the PMCCF and SMCCF were expanded to companies that were downgraded recently.

I think in the investment management industry, there's a big gap, there's a big line between what is an investment grade and what is high yield. And when you fall, it's almost like a cliff effect. And I think they were trying to smooth some of that. And so that was an element of that, which again, is reflecting some of the market practices and so not much the underlying credit quality.

Okay, I will stop with that, and I'm going to turn it over to Don, who will lead us off in our next part. Thank you.

MR. KOHN: Thank you, Nellie, and all the other panelists. That was a really good and productive -- I think -- set of presentations that came out with several concrete suggestions: central clearing of treasuries, central clearing of repo, a little relief on the leverage ratio, reform of mutual funds, increasing bond liquidity in corporate bond markets.

I think one question that comes up -- and it comes up in the audience questions, too -- is how are we going to get this done?

So, we had a bad episode 10/11 years ago. Out of that came an act of Congress which gave the Federal Reserve and the regulators the opportunity -- or the instruction, really -- which they took to strengthen the banking system.

We've had another stress. It's manifested more, as Beth noted, it's manifested less in the banks and more in the securities markets. Do we need a Dodd Frank, or whoever the current -- Crapo, whatever, for the securities markets? How are we going to make these changes?

Clearly, the private sector doesn't seem to have the incentives to do it themselves. So, there are externalities from the behavior in the markets. How are we going to get the private sector to internalize them?

Can this be put together under current law? Does it new laws? In our fragmented, regulatory system, how are we going to implement the great suggestions we've heard made today? Anybody want to talk? Darrell?

MR. DUFFIE: Sure, don. I mean, you asked the $64 trillion question (laughter).

MR. KOHN: That's what they pay me for at Brookings (laughter) Darrell.

MR. DUFFIE: Well, I was talking this morning with Ken Garbade, who's probably the leading historian on treasury markets, and he said, you know, this has happened before on the treasury market.

It happened in 1939, it happened in 1958, and in 1970, and in each case, the treasury market became dysfunctional, The Fed came in and corrected it.

And so, we could not go to politicians and simply say The Fed can fix this every time it happens. That makes four times a century, if you count the one this March.

But, if you looked at that chart I showed on the growth of treasuries in the increasing U.S. indebtedness that the GDP weigh over 100%, you can almost think that the treasury market becomes a matter of national economic security, and that Congress will -- if prodded by regulators and the Administration -- eventually come to grips with what to do to make this market the foundation that it needs to be.

It is still the world's safe haven. It is still the world's most liquid financial instrument. But can we continue to rest on that and leave it up to market forces to figure it out?

As you said, there are a lot of vested interests, there's a lot of -- maybe everyone wants this to work better but no one has the incentive to spend the resources necessary to do it, and the official sector is going to need to come in and make it happen. It could happen in a supervisory manner, I suppose, but it’s complicated in the treasury market.

When the repo market was found to be in abysmal shape in the financial crisis, I remember meetings at the New York Fed in which leaning members of The Fed came in and said, “If you don’t fix this, we’re going to need to make it happen.” And the private sector was able to do it just on supervisory guidance, let's call it.

But I'm not sure with the treasury market. There are so many players. It’s so big and there are so many agencies that need to come to the table, and private sector market participants. I'm not sure it can be done without legislation.

I'd be really interested in your views. You’ve played between that. I remember your testimony in Congress when Congress asked about what The Fed was doing. What do you think, Don?

MR. KOHN: Well, I think that it seems difficult for the treasury market participants to agree on this. They discussed it; put out a white paper that said they couldn’t reach a consensus. So, it’s going to take some forcing action of some sort.

I'd like to ask Beth to react to this conversation as a major market participant, and also ask her about the central clearing of repo.

On the leverage ratio, I think everybody understands how that might happen. Now, whether it’s the right thing to do is another question.

But you suggest a central clearing of repo, how is that going to happen? And can you react to Darrell’s suggestion on central clearing of treasuries?

MS. HAMMACK: So, I think that the markets -- you know, we talk about markets as this monolith; this force in and of itself. But the markets are really just made up of a series of participants who are all acting with their own set of incentives and their own goals.

And I think what we've seen over the past 10 years is, as you put in place one series of regulations and rules, the activity in the market migrates to other parts. And so, it's really just a series of choices and tradeoffs, and pros and cons for where you want this activity to live; where you want it to be housed.

And so, as there were more and more regulations put on the banking system, you saw the asset manager community grow in tremendous size.

And so now your seeing -- when you think about things like ETFs or some of the mutual funds -- some of the implications of having things migrate to that sector.

I'm sure there will be a series of legislation and rules coming out of this crisis that will migrate, you know, that activity, to some other sector that we will then in the next crisis have to go and repair it. But I think it's really just a series of choices.

You know, when you look at central clearing for either repo or for cash treasuries there are some pros and cons. Again, it's all just tradeoffs.

For cash settlement of treasuries, the TMPG, the Treasury Markets Practices Group sponsored by the New York Fed had done an extensive white paper really looking at where some of the risks were in the system. And while it did tend to focus, I think, some of these risks around settlement and clearing, they're very, very short-dated risks. They're very finite and they're limited to hours to a day in terms of time frame.

I don't think what we saw happen in terms of liquidity issues in this crisis are related to those settlements. And so, to me, the force settlement, or forced clearing of cash treasuries, while it would create some more visibility in the system, would also add some expense to things like the mutual funds, pensions, and insurance companies who may or may not want to bear those initial costs in the system.

For the repo market, that is a place where we tended to see a lot more focus and a lot more fragility over time, and I do think a number of the rules -- some leverage, some capital, and other rules -- have really increased how much of that market is trading on a short-dated basis, so, on an overnight basis.

And I think moving that towards central clearing, while it will increase the risk at that central counterparty, will probably give better transparency, better visibility, and, I think, help increase the volume of repo that can be executed because you'll be able to offset it through that central clearing counterpart.

It won't eliminate the credit risk, but it will increase the ability to net down and grow the amount of capital dedicated to that activity.

MR. KOHN: So, do you agree with Darrell that the netting in central clearing will free a lot of dealer balance sheets space, both repo and treasury? It's that important?

MS. HAMMACK: I think it's more on the repo side that it would free things. I don't think it would free things necessarily on the cash side because I don't think that's a very large exposure -- that overnight or intraday exposure --is very significant for most of the banking system.

But I do think on the repo side, it would free it up.

MR. KOHN: Thank you. Itay, you've suggested mutual fund reforms. Can the SCC do that my itself? Does it take more impetus from the supervisory or the regulatory sector? Would it take some legislation?

And include in your answer -- and I'll turn it also to Nellie -- the money funds. So, would your recommendations for mutual funds, generally, help on the money fund thing?

They're -- twice in 11 years -- the same instrument coming back to bite the system. That's really, "fool me once, but fool me twice", right. So, what would you do about these mutual funds, and would it apply to the money funds?

MR. GOLDSTEIN: Yes, well, these are very good questions. Let me first echo what Beth said about one type of regulation creating migration of activities to somewhere else. And I think we have seen that now very clearly.

I see a clear link between the regulation that was imposed on banks after the 2008/2009 crisis, and now the fact the activities is mostly in security markets, and the growth of mutual funds and

ETFs; I think there is a direct link there.

So, when you ask should we expect the SCC to do this or that, one thing that I think we should think about more is the system as a whole and have collaboration in how things are regulated. And always take into account that if we create some restrictions in one part of the system, then activity is going to go elsewhere.

Regarding the mutual funds, you know, some actions have already been taken prior to this event. There was a lot of discussion, as I mentioned, since the 2008/2009 crisis as the growth in mutual funds in corporate bond markets, what was very opined (phonetic).

There was a lot of discussion and eventually some steps have been taken. So, there is some liquidity regulation and maybe most importantly is the swing pricing regulation that passed just recently. But it's still very new.

So, I think in some sense, maybe if this crisis happened two years down the road, we could see better what is the effect of this regulation. But since the swing pricing is so new, then I think we still can't really see what would be the effect.

But I think swing pricing can do a good job. And there is some evidence from other countries where swing pricing has been implemented, that it is effective in reducing the fragility of funds investing in fixed income markets. So, I'm optimistic that something like this could happen.

I would like to also say something about the liquidity of the underlying corporate bond market, which I think is also an important point to take into account.

There has been a lot of discussion about this. Corporate bond markets, to a large extent, are still outdated, not keeping up with a lot of what technology could offer. And taking this step forward could improve the liquidity and then reduce the liquidity mismatch between the underlying asset and what investors are getting. So, I think this is also -- I'm not sure, I think there are a lot of conflicts in the system that prevent this from happening, but it seems to me like a step that is quite natural to take.

MR. KOHN: And would the swing pricing help on the money funds? How would that work on the money funds?

MR. GOLDSTEIN: Yes. The idea behind swing pricing is that when you want to take your money out of the fund, and if you do this on a day where there are many other investors doing it, then the price is going to move against you.

So, in some sense, it kind of deters you from taking your money out when you think other people are going to do it. And this reduces this first move advantage that I think is behind the run problem.

You can implement something similar to that also in money market funds. Money market funds, if you think about how they evolved over time, there was the whole fixed NAV issue, which was thought to be the main source of fragility in the 2008/2009 crisis, and funds have moved away from this to some extent. I think swing pricing will be going further in the same direction.

MR. KOHN: Thank you, Itay. Nellie?

MS. LIANG: Yeah.

MR. KOHN: Would you react to what you've heard and, in part, as Itay just said, we need more cooperation, coordination among the regulators.

We have a federal agency, or a federal group, Financial Stability Oversight Council, FSOC, that was put forward in Dodd Frank exactly for that purpose. How well do you think that's working? Is it a vehicle that could be used in monitoring or in regulating things away from the banking system, which already have their set of regulators? Talk a little bit about these implementation problems we've been discussing.

MS. LIANG: Sure. I'm going to say just two things first on money funds and underlying corporate bond market liquidity.

On the money funds, I think this is an area the SCC itself could make changes, as they did in 2014. Perhaps a "gotta push" from some of the other regulators, including from FSOC, to go a certain direction, but where the prime institutional funds dropped the fixed NAV and went to floating, at the same time they added the 30% rule and the gates. And I think gates that threaten to close in stress tend to be accelerant.

So, in this case, getting rid of gates, simplifying regulations, may actually create what you need and something to think about.

As I mentioned, the data right now that is available for most of the analysis seems to be at an aggregate level. There should be people who are working on fund by fund analysis and making sure that the story everybody is saying is actually true. But I think this is a ripe area for reform.

The SCC could do this on their own. If they wanted FSOC help, I'm sure FSOC could support them and help, and other agencies along the way.

Corporate bond market liquidity, I think, is actually a much harder issue. Of course, it's a liquid, but there's just so many different corporate bonds out there.

This issue keeps coming up at multiple times. Decades ago, you know, whether companies could become benchmarks and issue five-year debt on a regulation basis and become a benchmark and presumably get a liquidity premium for that. There didn't seem to be very much take-up from corporations.

So, what regulators perceived as a benefit, the private corporations thought it might be too costly for them.

I don't know the answer, and I don't know central clearing would solve the particular problem. What I am concerned about is that there's a sort of set mount of products that keep getting built up on top of our securities that are fundamentally illiquid, but they continue to offer liquidity without sort of pricing it in ex-ante. And the Fed can help on the money funds, this time with treasury capital.

In the corporate sector, it really is a whole government effort. And so, maybe in terms of implementation there will be more consensus behind making some reforms because it does use up fund, taxpayer money. That would be a hopeful interpretation of one of the consequences of this.

So, what's the role of FSOC? I think this is an entity, after the financial crisis, created to help look at the system as a whole. It has pretty limited powers, as you know -- because you, being on the U.K. FPC with what appears from the U.S. side, unlimited powers in the U.S. very few -- they can designate. But it has limited applicability to many situations.

They can write annual reports and make recommendations. But those reports have to be signed by all 10 members of the Financial Stability Council, personal attestation. And when you write anything that requires 10 organizations or people to agree on, what gets written is going to be sort of a broad consensus. And so many of the issues that they may actually look at internally, won't kind of get serviced.

They seem to have a framework, though, that actually identifies. So, if you go back to their last annual report, they will talk about hedge funds, leverage that has been increasing pretty rapidly, and the concentration of hedge fund leverage.

They will also say, “Boy, we actually don’t have data at a timely basis. Our last data is June 2019.” And even The Fed’s annual report has June 2019; it's an annual, and it comes lagged.

They will actually also mention agency REITS, which had pretty big problems in this last crisis. They do repo on agency, RNBS, and CNBS, but evidently some other stuff. But when interest rates fall, they took a huge hit and there were margin calls and they had to sell. That was pretty disruptive.

These are identified in the Financial Stability Report as potential issues. So, you can identify vulnerabilities in the system. How you can play out the scenario and how it's all going to play out when some shock comes along -- totally unexpected, like COVID -- is hard.

But I think the mechanisms are in place to do the scenario analysis. The question is, what's the will and the proper incentives to actually follow through on more?

And, you know, there isn't sort of -- this migration of banks to nonbanks -- there isn't sort of this general sense of what's the appropriate amount of risk in the financial system we can live with, or want to live with.

And I think until you get such as something like that, a broader consensus, it's kind of hard, even when you identify problems, that you move in ex-ante and try to fix them all unless they're pretty egregious.

I would say even that’s true for banks. But somehow, we've figured out that there are certain capital ratios that are appropriate, and so you can measure them against these capital ratios. But it isn't true in almost any sector of the financial sector.

There are some pieces in place, but it's not quite operational all the time.

MR. KOHN: Thank you, great set of answers here. I want to continue on this migration issue. I think, as you mentioned, I'm on the Financial Policy Committee at the Bank of England, and we have looked around the regulatory perimeter every year. That’s part of our regular process.

It's hard to do stress tests on the nonbank system. You don’t have the information, things are different, and then what do you do abut it when you get the answers. So, I think partly this is spotting these things, and then figuring out what to do is a pretty big challenge.

Darrell, as an academic out there in Stanford, do you have any words of wisdom to the regulators about how they should track the migration and spot the problems before they require the Federal Reserve to intervene. I think you're muted, Darrell.

MR. DUFFIE: Thanks Don. Yeah, there's an increasing set of data available to regulators. I'll give you one example, which is called TRACE.

Prior to 2003, there was no data, there were no data on transactions in the corporate bond market. And now we know essentially every single transaction and the regulators have an enhanced version that tells them who is on each side of those transactions: the prices, the quantities, the exact moment of the day in which those trades occurred.

Now that those data are available, we can conduct studies in both the equity and the bond market. So, which prices are moving first, who’s trading on what information?

And in the treasuries market FINRA has been comprehensively collecting data on every single treasuries’ transaction. So, the cost benefit analysis that Beth mentioned about -- you know, is it cost effective for repo and not for cash treasury to be centrally cleared -- we could answer that question now without going to Congress for legislation by, let's say, the Treasury Department maybe seconding the Fed to take all those transactions data and do the cost benefit analysis.

And that’s much cheaper -- this is sort of hinted by Nellie’s comments -- much cheaper than leaping in, in one go, and just forcing the change on the market without the necessary study in hand showing the cost benefit analysis. So, I do think it's possible to do a lot of what we've discussed.

With respect to migration, everything that's exchanged, traded, or in the corporate bond market, or in the treasuries market, it's migrated away possibly from banks, but it's not migrated away from our ability to see what's happening.

MR. KOHN: And you would include in that the leverage in the REITS and in the hedge funds that Nellie was talking about.

So, the authority should have enough information to see rising leverage. Whether they have the authority to do anything about it is another question, right?

MR. DUFFIE: Well, sometimes the authority comes from being able to say that you know what you're talking about and being able to prove it (laughter).

MS. HAMMACK: I think the authority has some visibility, but I don't think we should overstate what they can see.

I mean, they have reporting on the treasuries' data, which is useful, but I don't think they have reporting on the leverage. And certainly, their visibility into the hedge fund community is not what it is for the banking sector. And I think that would go for the REITS as well.

To my point that it's tradeoffs and information, I think like Schrodinger's cat, you have to think about how the markets change when they're being observed.

And I think the TRACE data is a good example, where giving the information to regulators, but not necessarily the full public, as it's being done in the treasuries market, is different from what's happening in the corporate bond market.

And I think what we've seen in the corporate bond market is the publication of that data changed a bit of the behavior, so then you have to go back and reanalyze what some of those movements are.

But I think it's an excellent point that more of these types of cost benefit analyses, I think, need to be done because I do think that all of these crises will breed other issues. And I think, you know, Nellie referenced the 30% liquidity stores that the money funds now need to hold, because they're holding that, it's really valuable to them in the case of a crisis when they need to use it, but because it's publicly reported, they’ve been unwilling to use it or go below that 30% because that could create some of these procyclical effects.

And so, again, I think getting the balance right between observation and reporting and transparency is a fine line that needs to spend more time on.

MR. KOHN: Great. Thank you. Itay, could I ask you to reflect a little bit on the ETFs and the bond funds.

So this is a point that Nellie brought out, that the ETF prices really plunged much more than the net asset values of the bond funds, and could have provided some incentives for some of the redemptions from the bond funds; for first mover advantage to get out of those bond funds before the NAVs caught up with the thing.

So, the ETFs look like they were a source of information, maybe better reflected the underlying prices. Do you worry about ETFs as well as mutual funds and the dynamic between the two that Nellie was discussing?

MR. GOLDSTEIN: Yes, I think ETFs are very interesting and, to some extent, they don’t have the same underlying mechanism that creates the first mover advantage like mutual funds.

MR. KOHN: Right.

MR. GOLDSTEIN: Because when you take your money out of a mutual fund, your just being paid based on the current net asset value, and then essentially you impose all these transaction costs on the remaining investors, and this is what creates the first mover advantage.

In an ETF, when you are an investor, when you want to take your money out, you need to sell the share of the ETF in the market, and then the market price will fluctuate to reflect that. So, in some sense, you are billing (phonetic) some of the costs.

But the whole ETF mechanism is based on these authorized participants, Aps, who are then redeeming and creating shares to make sure that the price of the ETF will be the same as the net asset value.

And I think when you see the price of the ETF drops and this discount opens up, it's basically a sign that these authorized participants don't have the incentive to do it, because I think what happens is they are concerned about the illiquidity of the underlying bond market and they are concerned that eventually they will not be able to get the NAV as what it is stated right now, if they go and then sell in the underlying bond market.

So, in some sense, I think this liquidity mismatch shows up again, but just in a different from. And by looking at the discount, I think, it's probably where it manifests itself. I think we need to study it a bit more.

But at the end of the day, it seems to me that the same problem, that there is an underlying illiquid asset, and investors think that they have this liquid security that is attached to this asset, I think it's there also in ETF, it just shows up a bit differently.

MR. KOHN: Although the ETF has the swing price built into it basically.

MR. GOLDSTEIN: Right.

MS. LIANG: Mm-hmm.

MR. GOLDSTEIN: So, the fact that you have to sell it in the market, is kind of like a swing price in some sense.

I think, you know, I haven't seen sort of a vigorous study on this, but I would like to ask, to what extent those prices adjust in real time, and to what extent, indeed, they serve the purpose of a swing price?

MR. KOHN: Thank you. So, I'd like to turn a little bit to the Fed. A number of the questions that came in on email involve The Fed's actions, and were they appropriate, and what happens next. So, Nellie, you featured Fed actions on your last slide.

MS. LIANG: Mm-hmm.

MR. KOHN: Do you have any -- how do you think they did? Our old friends -- I won't say former friends, because they're still friends (laughter).

MS. LIANG: Yeah.

MR. KOHN: The Federal Reserve, how would you grade them? Did they do some stuff they didn't need to do? Are there things they should be thinking about doing next? How did The Fed do without our advice (laughter)?

MS. LIANG: I'm sure they'd have been better had you been there Don, but (laughter).

MR. KOHN: More you.

MS. LIANG: They were so very aggressive early; took decisive actions, I think, well warranted, especially in the short-term funds. They really did cut off what could become serious lack of funds in the short-term market and become credit problems, and perhaps solvency problems.

And they pulled out, as everyone has said, the 2008 playbook, sometimes with the exact same terms and spreads, and then adjusted them a week later to adjust the current situation.

But I think the stability of commercial paper, the stabilization of money market funds, their purchases of treasury, and their provision of repo -- actually starting back from last September -- they've done quite a bit.

So, I think the big changes that they've done, in part, they moved into munis, first in the short-term funding, the MMLF will take some short-term municipal because of the -- the tax exe money market funds, also, have gates; they're floating with gates -- and then corporates.

I think this is a big change. I think typically The Fed wants to provide credit to support corporations to make payroll and spend and invest, but the way to do that efficiently, in their view, was to go through first the secondary market.

So, they opened up in the secondary market, and a broad way to do it is through investment grade bond ETFs. And so far, actually, the announcement has had a big effect. They haven't done all that much yet. It wasn't even clear if they actually needed to do much. But my guess is they felt like they should, and maybe that's, you know, otherwise; it's not credible. But it has definitely helped.

But what I do hope is that it doesn't set up a view that The Fed, and the Government in this case, will always be there, and that that is the backstop, and that it doesn't sort of hold back possible reforms, or somehow liquidity is being paid for ex-ante through some mechanism. You know, whether it's central clearing, or fees, or better lines with dealers.

And then the next steps, of course -- and Beth outlined this -- is to get the recovery going and getting credit to businesses through TALF -- households and businesses -- through TALF and through Main Street.

This is a huge step for the Fed to be involved in loans, not market based finance. They'll try to use the banking sector, and the private sector to select the loans, and the securities. It's a big step.

But I think the broad view that this kind of shock didn't have sort of the moral hazard elements of it up front that the 2008 crisis did -- like, you're not helping those who got you here in the first place, that got you into this trouble in the first place -- gives them some freedom. But it doesn't ensure that the next time there won't be this.

So, overall, it's been, I think, super important. That, at least, the financial sector itself isn't going to cause any economic strains to get worse. So, you take that off the table and then you have fiscal and healthcare to help you manage the rest of the crisis and get the economy on track.

MR. KOHN: Let me turn to Beth, as a market participant, to pick up on Nellie's last points about, in effect, the moral hazard of The Fed stepping in twice in 11 years.

Do you think market participants will be less relaxed about risk because The Fed has been back there the last two crises, and that its being there will reduce the force behind their acceptance of the necessary reforms that our panelists have outlined here?

MS. HAMMACK: I don't think so. When we think about, and I can't speak for all market participants, for I am humbly just one, but when we think about our own risk management we certainly operate in a way that we want to continue to participate in markets and be able to sustain without expecting any sort of government facilities or intervention.

And there's a lot that's already written into the various regulations that would encourage, certainly, the banking system to not expect that type of participation, or exigent measures to come in place.

That said, I think the two crises we're looking at, 2008 and the COVID crisis, are quite different in nature for a variety of reasons. Certainly, in this crisis, it's in a lot of ways more akin to what happened in 9/11, than it is to what happened in 2008, in that it didn't start in the financial system, it was completely an outside shock to the system.

And frankly, I do think that a lot of the programs that have been set up have been with using the banking system in mind to help get those dollars and that stimulus to the real economy. And I think that for many of the market participants, you need to think about it in that frame.

That said, any time the Fed comes in as aggressively -- and again, appropriately aggressively -- as they did here, you do have to think about moral hazard, and you do have to think about what that's going to do down the line.

I do feel like the banking system, at least, is very well supervised and very well advised in terms of how it's going to be behaving here. But, I do think there are other areas like, potentially, some parts of the mutual funds -- the hedge funds, the rates, other sectors -- which maybe have less oversight, and certainly less regulation, and you want to find that balance between making sure your keeping the system overall safe, but allowing free markets to behave.

As a market participant, when I look at the full complexity of what the Fed has done and think about places where maybe more could still be needed, I think there are two areas that stand out to me.

One is, I do still think for the municipal market, the state and local governments, while they're included in some of the programs, I think the scale and scope of what's going to be needed there is still quite dramatic, and I think there could be more that may be needed there.

And then I think the second one is really in the real estate sectors. I think that we've seen some amount of support but not all parts, particularly in the commercial real estate markets, are going to necessarily make it through.

But again, I don't think the Fed, or Treasury -- as Nellie rightly points out -- should be in the business of picking the winners and losers.

Businesses need to operate and sustain themselves and make sure that they are robust enough, and The Fed and Treasury should help support where they can, when there are these exigent circumstances. But, again, not every company should or will make it through this crisis.

MR. KOHN: Great, thank you. Well, we're just about out of time. I think I would close it with a great almost summary of sort of where we got to and the Fed's role here.

I think I will close with a thought, which is, there is a role for the Federal Reserve in the banking system as a lender of last resort. That's what happened in 1913, so legislature decided that the private markets couldn't handle this, they needed a backup source of credit, but they also needed much greater supervision and regulation that was also in the Federal Reserve Act, in the preamble of the Federal Reserve Act.

So, I'm wondering, this is another panel we can do some time, whether there isn't a role for the Federal Reserve as the lender of last resort, market maker of last resort, once these private markets have been strengthened, and the oversight of the markets has been rationalized and made more comprehensive with a much greater overall financial stability emphasis. So, I guess, that's my wish for the regulatory process and the central bank process going forward.

These 13 3 facilities are unusual and exigent. They have to declare an emergency, etc. There must be other ways of doing that, but in the context of a much more robust market system, taking up the suggestions that our panel has so nicely made today.

So, thank you all very much. Thanks everybody for tuning in, and for sending in your questions. I think it's just about 4 o'clock, and the panel is over. Thank you.

MS. LIANG: Thank you.

MR. GOLDSTEIN: Thank you.

MS. HAMMACK: Thanks everyone.

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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.

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