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RESPONDING TO THE GLOBAL FINANCIAL CRISIS: WHAT WE DID AND WHY WE DID IT

Washington, D.C.
Tuesday, September 11, 2018

Welcome

BEN BERNANKE
Former Chairman, Federal Reserve
Distinguished Fellow in Residence, The Brookings Institution

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NELLIE LIANG
Miriam K. Carliner Senior Fellow, Hutchins Center on Fiscal and Monetary Policy
The Brookings Institution

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Moderator: BRIAN SACK
Director, Global Economics, The D.E. Shaw Group

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Professor, Columbia University

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Managing Director, Promontory Financial Group

NATHAN SHEETS
Chief Economist and Head of Global Macroeconomic Research
PGIM

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Miriam K. Carliner Senior Fellow, Hutchins Center on Fiscal and Monetary Policy
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LEE SACHS
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Former Federal Reserve

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Director, Federal Reserve Board

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TED TRUMAN
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BRIAN SACK
Director, Global Economics, The D.E. Shaw Group

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Moderator: ANDREW METRICK
Yale University

Presentation: MEG MCCONNELL
Federal Reserve Bank of New York

Panelists:

MATT KABACKER
Senior Managing Director, New York, Centerbridge

MICHELE DAVIS
Global Head of Corporate Affairs, Morgan Stanley

WILLIAM B. ENGLISH
Senior Lecturer, Yale School of Management

Brief Closing Observations and Thanks

HANK PAULSON
Chairman, Paulson Institute

TIM GEITHNER
President, Warburg Pincus

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P R O C E E D I N G S

MR. BERNANKE: I'm Ben Bernanke and on behalf of Hank Paulson, Tim Geithner, and myself, I want to welcome you to this symposium on the response to the financial crisis. This symposium is being co-sponsored by the Hutchins Center on Fiscal and Monetary Policy here at Brookings Institution, David Wessel, director**, a**nd by the Yale Program of Financial Stability, Andrew Metrick, director. I want to give special thanks to David and Andrew and their teams for the tremendous work they've done both on the logistics for these programs and the substance. In particular, we had a program, a preconference at Yale in March that was very good as well. So, again thanks very much to Brookings, Hutchins and to the Yale program.

When I first became chairman of the Federal Reserve in 2006, literally one of the first things I did was asked the staff to give me the handbook on what you do in the case of a financial crisis. They provided me a little notebook and the notebook was typed on a manual typewriter in mimeograph and had about four pages in it. It said open the discount window and that was about it.

Quite seriously, quite literally and I think Tim Geithner had a similar experience at the New York Fed. We went into one of the most complicated and consequential financial crises in human history with very little in the way of playbook for thinking about how to address the crisis. So, the question is can we do better and can we take, in particular, this ten-year anniversary that we're now marking. We could sit around and swap war stories or could we do something that would be constructive that would help future generations of firefighters be more effective in responding to whatever crisis they might face.

Tim has been particularly strong in this point. He has worked with the Yale program in setting up some educational programs to help train people, central bankers and others who would respond to the next crisis. We thought that for this conference, for this anniversary, we might create a new manual. A manual that would be useful, again, to future generations as they deal with whatever challenges that they will face.

So, what we did was we asked a lot of our senior colleagues from the time of the crisis and the various agencies, to write papers on the issues that they faced, the programs they constructed, the details of how they thought about those programs. And, in particular, to tell us not only what they did and why but what they thought about and didn't do and why so that we could have a better understanding of these things and to do all this while the institutional memory is still fresh. It was a big project but we got tremendous response. Virtually everyone we asked to write a paper agreed to write a paper. Many of these people actually have jobs and nevertheless, they agreed to write these substantive papers.

We had some very outstanding assistants, Nellie Liang, my former colleague from the Fed was a master editor. WE had Deborah McClellan and other editors and RA's working. In general, the authors did a great job. We have created a series of papers on various aspects of the response to the crisis. Those are now online and those papers plus some additional papers will eventually become a book that again, we hope will be useful to future generations. Let me just say now and I'll say it again later, thanks to the authors, thanks to those who contributed, to the editors and to those who helped organize the presentations.

Now we could, of course, had a seminar type conference where each paper was presented, we have discussions et cetera but that would take three or four days. So, we thought instead what we would do today is have a series of panels where the authors and others would talk about some of the major themes that these presentations and chapters have risen. We'll turn to that in just a moment.

I do want to note that, of course, today is September 11th. I'm sure like me, all of you remember where you were 17 years ago when we heard the news. It was, of course, a traumatic moment that in some ways, began a very difficult decade for

America. I hope that you will join me for a short moment of silence to remember those who died on September 11th. Thank you.

What I'd like to do now is turn over the program to Nellie Liang and to Andrew Metrick who will set the stage by talking about the arc of the crisis and some of the outcomes and then they will introduce some of the panels. So, Nellie, Andrew, thank you.

MR. METRICK: Good morning, I'm Andrew Metrick, very pleased in this audience to say that I am the Janet L. Yellen professor of finance and management at the Yale School of Management. I'm going to give a little introduction. I'll give a very short introduction and then Nellie is going to give a short introduction and then we will get a full day of details about this particular project. My job is to talk about the arc of the crisis, just a couple of slides on that. Before I do that, I'm going to talk about the arc of knowledge about the crisis, the arc of knowledge about crises in general.

Because what we saw happen over the last ten years is very similar to the pattern for the arc of knowledge in past crises. First, we get the first thing that happens after a crisis begins is we get detailed journalistic accounts and we got those here, some of them were excellent, I would say. And then following that, the economists start to look at the data, build their models and that has been going on now for almost ten years and will continue to go on, I'm sure, for as long as we have economists.

After the economists do their work, as the principles from the crisis retire from public life, we get their memoirs. We get to hear what the generals saw from the war. That period has happened now and now ten years after, we're starting to see finally, the historians come out. There are some wonderful new books of history that are starting to come out about the crisis where we're seeing not just what happened during it but how it made the world afterwards.

But there is one thing that's missing that's very, very important which is what not just the generals thought but what the lieutenants thought and what they did.

The people who were in charge of implementing a strategy and coming up with the tactics along the way to actually fight the crisis. In the past, we've never had that. I would love to read a book similar to the book that's going to be produced here were it written about the Great Depression. Or even about things like the Asian financial crisis, we don't have it for recent times either.

Because we don't have that, the picture is missing for historians, for economists, for everybody who tries to understand what happened in the crisis. We're missing part of it. And that part of it that we're missing, prevents us from making the same kinds of mistakes over and over and again for not learning the lessons of history because we don't have them written down. We never looked at them carefully enough to do that.

So, this is a unique project in the arc of crisis knowledge, in my view as a crisis buff and aspiring scholar. Which is that what we're going to know now is why many of these decisions were taken. What, as Ben said, why people did what they did and didn't do other things. A lot of the people who are writing these chapters, the lieutenants, as Ben said, they have jobs, they have lives. Many of them, I think, from the beginning never really wanted to think about this again. Some of them were willing to but not all but they all came back which is, I think, a testament to the respect they have for who their leaders were at the time and for their just flat out patriotism. This is really important that we learn these lessons. I hope that over the next two days, you'll get a small glimpse of that and that everybody will read the whole book later when it comes out finally. It will come out at some point I'm sure.

I want to talk about the world that these generals and lieutenants were looking at just a little bit. Now what we have here is the world that was inherited by this group which is a world that was very different than the past crises that had been fought. Which is, here you're just seeing these various colors are telling you as a fraction of GDP, how big were these different sectors. The bottom being traditional banking and then the lighter blue being a variety of flavors of non-bank finance. There are many ways to tell this story and the key idea is just look how big the light blue get by the time we get to 2008 compared to where it was in 1980, 1970.

The United States had moved away from a traditional banking system, traditional bank finance to a place where more than half the credit in the economy was being provided by non-bank financial intermediaries. Yet the tools that we had to fight crises were very much tools of a different era, tools that were just from a bank centered era. On the left-hand column are the tools that were available at that time going into the crisis for the main crisis authorities, the FDIC and the Federal Reserve. The FDIC had resolution authority for banks. So, they couldn't do anything, as you can see over in the right-hand column, they couldn't do anything for a non-bank except let it go into bankruptcy or pray for a bailout. There was nothing that was in between. They had deposit insurance for banks.

The Federal Reserve had discount window lending for banks and an extremist for other institutions but had some pretty strict rules around that lending. They also had swap lines that they could provide also lending for foreign central banks. It's really something to say that the advice, so Ben's only a little bit joking when he says that it was open the discount window, because the advice that we could give and what we all quoted going into the crisis, was something written by a journalist from the 19th century, Walter Bagehot, who told us to lend freely against good collateral at a penalty rate. That was our, apple a day keeps the doctor away and it was pretty much going into the crisis.

So, what are we going to do next? Well, what we're going to hear from today, everybody is talking about the various different stages and the decisions that were made. Which were largely decisions that were using creative use of authority to expand into more and more of the non-bank financial system, some of the tools that were available and actual statutory authority by going to Congress and getting the ability to do other things. The phases of the crisis here are separated in this graph into increasing stress, early escalation and breaking the panic in resolution. Interestingly, each of these three phases starts with something happening in the non-bank sector.

So, the increasing stress which we see in the summer of 2007 with a pop in the (inaudible) IS spread and bank CDS spreads to really around all of the sudden the realization that subprime was not going to be a limited problem. That perhaps, there were places on balance sheets and in markets around the world that were infected with this disease that we didn't know about. Early escalation, this begins in early 2008 and this is after the purchase of Bear Stearns by JP Morgan out of what was almost certainly going to be the inevitable failure of Bear Stearns where the Fed first invokes section 13(3) and lends outside of the banking system.

And finally, what we're here today to commemorate, not celebrate but commemorate, is ten years after the bankruptcy of Lehman Brothers, another non-bank financial institution in September 2008 where the panic finally breaks. What you see happening over the spring of 2009 is coincident with the release of the stress tests in the United States. That was interestingly about banks. At least at this point, Goldman Sachs and Morgan Stanley were now banks so it was all banks at this point. So, while it was non-banks that got us into it, it was the fear of what was going to happen broadly to the core of the financial system that had to be a laid towards the end of the crisis to finally break it. So, with that, I'm turning it over to Nellie.

MS. LIANG: Okay with that introduction, I'm going to get to, so what was the U.S. government response. I'm going to start with this slide which is in the chart book which was distributed to the authors and is available online now. So, I think this chart is meant to illustrate key characteristics of the U.S. government response in 2007 to 2009. I'd say it was big and broad. It was cross agency. It was cross political and administrations and it was innovative and it was bold. All of these characteristics really were necessary to break the panic that took hold ten years ago and get the economy back on track.

And so, the way to read this slide is to say, the response started with a mix of traditional macro policies, monetary policy, cutting the federal funds target and fiscal stimulus. And then it includes traditional systemic policies, those that are designed to restore the functioning of the financial system. And these include the feds lender of last resort function for commercial banks and currency swap lines with other central banks.

After the panic broke out and Congress provided new emergency authority, policies escalated. You can see the mass of bars there. It includes broader liquidity to firms and markets. It includes government capital and government guarantees of debt and more aggressive monetary and fiscal policies. And combined, these policies were successful to get private sector capital back to the financial sector.

So, this slide is in your chart book. It's a great reference. It gives you timing, it gives you some of the policy initiations. I'm going to run through a few more. I'm not going to give nearly enough justice to some of the other responses. But it's to provide an overview, a way to sort of, where do all these things fit together and then the panels today will get into more detail.

I'm going to start with Fed. This is the basic four-page crisis handbook. Fed as lender of last resort. Initially, it provides liquidity to the banking system, domestic and foreign banks. Discount window is the smaller amount and then it initiated something called TAF which was used in much larger amounts. And its concerns about housing and the economy deepened, the Fed escalated from traditional to more novel and created some additional programs to support broader funding and they used the unusual and exigent circumstances.

In addition, with housing at the center of losses, the Treasury was working to get legislative authority to reduce the probability that weaknesses would bring down Fannie Mae and Freddie Mac in a highly disruptive way. So, they worked to get legislation to also support the mortgage availability. You can see that private label mortgage backed issuance was falling and Fannie Freddie issuance is what supported the housing market. The two mortgage giants were put into conservatorship in early September and government conservatorship helped to support this market.

After the bankruptcy of Lehman, short term funding markets were especially disrupted with a prime money market fund breaking the book. Treasury provided a temporary guarantee to the money market funds to stem investor flows. This is a chart of commercial paper maturities. Stress often shows up where everything turns very short and overnight. The money market fund guarantees stemmed investor outflows. It worked with two additional fed liquidity programs, AMLF, CPFF, to stabilize the commercial paper market.

Then when Congress passes legislation and TARP capital becomes available policymakers can take on and implement some new actions. So, turning to capital, and this is, of course, one of the keystones people think about capital all the time. Write downs of assets at banks had been at banks. This is commercial banks and investment banks had risen really sharply in late 2007 and early 2008. Policymakers had been encouraging institutions to raise private capital. And you can see in this chart, 2008, the dark blue bars, the U.S. firms had raised some private capital. But this capital raising wasn't nearly sufficient and the slowing economy and still falling house prices meant that expected losses at financial firms will still increasing.

So, the government responds to recapitalizing the financial system is somewhat familiar to you. It went in multiple stages. The capital injections into the nine largest firms on Columbus Day. It also offered capital to other banks to support lending. Then there was additional capital and asset ring fences for some of the more troubled banks. And then, of course, there were the stress tests in early 2009 on the 19 largest banking firms which were conducted with backstop government capital. I mentioned the required capital was based, not just on solvency but the need to keep lending during this downturn to keep making loans.

So, the stress test, with their extensive disclosures, led to private capital returning to the banking sector. And this dark blue bar in 2009 shows that banks raised $120 billion of private capital, more than enough to repay their TARP loans. And all but one bank repaid before the end of 2009. So, I think this at the same time, I should say, we had with capital, efforts to restart the securitization markets and credit flows and to leverage private capital to do so with TELF and PPIP.

And finally, a huge critical component of the overall strategy were guarantees. These were needed to prevent investor runs. The FDIC's debt guarantee program ensured new debt of traditional banks, bank holding companies and some non-banks. And combined, these with the capital led to sharp declines in bank CDS on Columbus Day weekend.

Turning to macro policies, the Federal Reserve began to cut its policy rate in the fall of 2007. And when panic took hold in a show of concerted force, central banks around the world orchestrated a coordinated interest rate cut on October 8th. Shortly after, the Fed purchased agency MBS and debt in QE 1 and lowered the rate to the zero-lower bound. On the fiscal side, Treasury passed early a stimulus package in 2008 shown by the light blue bars followed by a larger package a year later, the Recovery Act of 2009, the dark blue bars. And then there were a number of other measures, the very light blue bars that provided some additional stimulus, especially as the effect of the Recovery Act started to wane.

So, summing up, with TARP capital, the combined actions of capital injections, debt guarantees, lending to restart capital markets, credit markets and the bank stress test with a government backstop, were able to stop the panic and bring back investors into the financial markets. And beyond 2009, the fiscal stimulus, new QE policies and expansions and programs to reduce homeowners mortgage payments continued to support the economy and spending.

So how do we put this all together? In terms of outcomes, ultimately the financial sector is to support the real economy. So, one way is to look at GDP growth and employment growth. This shows, this is a chart of government commitments in dollars to the systemic programs. This does not include the monetary and fiscal. So, the Fed liquidity facilities are the dark blue and the start early. Other include something like Fed lending to AIG, the commitments to Fannie Freddie. There is the TARP capital and then there's the guarantees which are the big light blue. So, these are maximum commitments.

And the two lines in the chart show real GDP growth, that's the black line, and then employment growth, the blue line, which are estimated monthly year over year. And both fell very rapidly in late 2008. But you can start to see the benefits of the totality of the systemic policy responses, all the programs and their interactions. Real GDP growth starts to turn in mid to late 2009 with employment growth following the turnaround several months later.

We know this recession was severe. It is useful to put it into some perspective. What we've done is to compare this recent recession to those from previous crises using Reinhart and Rogoff. So, using real GDP per capita basis, the darker blue bars show that on a real GDP per capita basis the U.S. decline was -5.25 percent from peak to trough. It lasted about one and a half years and it took about five and a half years to return to its previous peak. So, in contrast, for a typical financial crisis in the Reinhart Rogoff world, the recession is deeper, it lasts longer and the recovery takes more time.

In another paper, Romer and Romer which is a different R&R, they look at just the OECD countries since 1970. And they have a study that indicates that given the degree of credit disruptions, in the U.S. it was very severe. The economy performed better than would have been predicted by their model.

So, we believe these policy actions in totality prevented a second depression. And the recession was shorter, less steep, and the recovery more rapid than might have been expected based on past financial crises. And then there is a building body of research which many of us document in the papers which shows that the individual policy actions worked in the sense that they moved some desired objective in the right direction. That said, we still had a very severe recession and a weak recovery which had substantial economic costs.

So, these outcomes indicate to us that there are important lessons to take from these responses individually or combined and for us to try to extract. Beginning with, why couldn't the private sector solve these problems, why did the government need to intervene and how could the government intervene. Policymakers clearly had to operate within their legal authorities and their constraints. As Andrew said, the tools they had were better designed for a financial system dominated by commercial banks.

But policymakers had other constraints they operated under. There was uncertainty in real time about what was happening, great uncertainty. Concerns that the actions you might take might actually cause the panic you're trying to avoid and concerns about creating incentives for future risk taking, sort of the moral hazard. So, there are a lot of different constraints that policymakers had to operate under.

So that's the goal of this project. To document how policymakers responded, whether there are lessons for future responders so that we can do better next time. I think at this point, I think we want to turn to the panelists who again, thank you so much for all the work. As Ben says, everyone has a day job and it was hard to get these papers done. They are terrific. They going to be able through the panels today give you much more insight about what they did, not just what they did but why they did and why they didn't do other things. So, thank you.

MR. WESSEL: Thank you Andrew and Nellie. I'm David Wessel, director of the Hutchins Center. If I could just explain a little bit the logistics for today. So, we have first of all, those slides are an excerpt of something that we're calling the Graphic Novel. I was on a conference call about this and one of my cousins' kids who is a graphic artist says, you're working on a Graphic Novel. I said, this isn't quite what you think of as a graphic novel. An enormous amount of work went into this. There are 86 slides and because they were finished at the last minute, the printed versions will arrive sometime before lunch so you can have your own copy of the Graphic Novel suitable for autographing by the principles that are in the room.

We have a series of six panels and the panels have been asked to give highlights and illustrative examples from the papers. You can't summarize the papers in the time we have allotted so we're going to ask people to be disciplined on the time. We've decided if you want to ask questions, to write them on these cards that are at your seats and some of the staff at Brookings will come around and collect them and I'll pass them to the moderators. We'll have a buffet lunch, about an hour break, and we have a coffee break and then we'll end around 4:45 with some closing remarks from Tim Geithner and Hank Paulson. With that, can I call up the first panel. The moderator will be Brian Sack who is with D.E. Shaw, formerly of the Federal Reserve. Trish Mosser is going to be the lead speaker. She is now at Columbia formerly with the Federal Reserve. Pat Parkinson is now at Promontory, formerly with the Federal Reserve but also spent some time at the Treasury. And Nathan Sheets of PGIM who was also an international director at the Federal Reserve.

MR. SACK: Thank you. As Nellie highlighted, fighting the financial crisis took extraordinary policy efforts across a number of fronts. I think the provision of liquidity to the markets and to market participants by central banks, the Federal Reserve and other central banks was obviously a very critical step in that process in terms of reacting to runs, preventing runs from turning into solvency issues and if nothing else, creating more time for more comprehensive solutions. The Lender of Last Resort function is a traditional function of central banks. But, of course, the efforts that they undertook during the crisis were beyond the traditional in terms of the reach of those facilities and it required a lot of innovation and creativity. Both to figure out what the liquidity needs were and what the right response was.

So, it's a pleasure to introduce this panel, this set of lieutenants. They were all senior fed officials at the time who were really at the center of putting together these facilities and the center of that effort to respond. On the panel we have Pat Parkinson who is Deputy Director of the Research and Statistics Division at the Federal Reserve Board and involved with a number of financial market issues. Later moved on to become the Director of Banking Supervision at the Board. We have Nathan Sheets who is the Director of the International Finance Division at the Board, hence frontline with many of the international efforts. We have Trish Mosser who was a senior official in the markets group at the New York Fed and actually at the height of the crisis served as the interim Soma manager with responsibilities for implementing a lot of these facilities. We'll start off with Trish giving some introductory remarks.

MS. MOSSER: Thank you, Brian, good morning everybody. So central bank liquidity provision, lender of last resort, is nearly always the first line of defense in a financial crisis and 11 years ago was no exception to that. The timeline we've already done this morning, everybody knows it starting in August 2007. The U.S. and global financial system started on a massive and very perilous deleveraging process that played out as a series of runs in wholesale funding markets. Then a full blown global financial panic and finally causing the largest recession since the Great Depression. As the crisis progressed, the Fed created a series of innovative lender of last resort facilities for banks, for non-banks and to provide dollar liquidity to the rest of the world. The development of those programs mirror very much the arc of the crisis that Nellie and Andrew were speaking about just a few minutes ago.

The Fed started with very traditional tools, the discount window and repo operations to provide liquidity. They didn't work. Repo operations were necessarily limited by the need to control the Fed funds rate and the size of the Fed's balance sheet. The discount window is heavily stigmatized and it is not used by banks, even when market funding is scarce and very expensive. Instead, banks reduce their lending and funding of customers, non-banks and notably lending dollars abroad. It was not until

December 2007 when the Fed, in coordination with several foreign central banks, introduced two new facilities. The term auction facility or the TAF and the central bank swap lines. Later they would be massively expanded and they were, in fact, the two largest lending programs that the Fed introduced.

The TAF was designed very specifically to overcome discount window stigma by auctioning discount window loans. By having all the banks bid together, there was safety in anonymity and numbers and a signal that this was a system wide problem, not a problem with a specific institution. Importantly, the TAF facility was tied both in policy announcement and even in operations to the swap lines through which foreign central banks distributed dollars in their jurisdiction.

The coordinated action by multiple central banks in December 2007 sent a really clear message that the financial crisis was a global phenomenon. It would be jointly addressed. That practice had a pretty powerful impact and it was a practice that was continued throughout the crisis. And it worked, at least for a while. The funding strains in U.S. and Europe actually eased somewhat but they weren't enough. As Andrew pointed out earlier, two-thirds of the financial system didn't have access to central bank liquidity.

A systemic crisis calls for a central bank lending to the broad financial system basically temporarily substituting for the breakdown in private lending relationships until the system can stabilize itself. But that absolutely can't happen if the lending facility actually excludes most of the financial system. So, distress at non-banks continued and accelerated particularly in repo markets and as we all know, by March, there was a run-in repo, the failure of Bear Stearns. And for the first time since the Great Depression, the Fed invoked its emergency authority under section 13(3) of The Federal Reserve Act to lend to non-banks. The non-banks they lent to were the largest security dealers who were the counterparties of the open market desk.

The first two 13(3) facilities, TSLF and PDCF, The Term Securities Lending Facility and the Primary Dealer Credit Facility both went to the primary dealers against riskier collateral but they were structured very, very differently. The TSLF was a term facility security for security, it was also an auction. The PDCF was a discount window, effectively. As a result, the PDCF almost immediately came quite stigmatized and the TSLF did not. Partly because of its auction format and also because it was similar to existing securities lending operations. It also had an additional advantage that it didn't increase the size of the Fed's balance sheet.

The programs TSLF, in particular, were successful in temporarily stabilizing the repo markets into the summer at least. Again, the complete meltdown in global capital and funding markets after the failure of Lehman Brothers made clear that the existing lending facilities were not just going to be enough to stop the runs. This, by the way, was just by massive expansion of the Fed's lending program, unlimited swap lines, effectively unlimited TAF and the abandonment of any sense of controlling the size of the Fed's balance sheet. I have not bothered to put a line up there for the failure of Lehman Brothers because it's really obvious when it happened.

In response, particularly in response to the run on money funds and the collapse of the commercial paper market, they added two additional particularly novel facilities. The ABCP money from lending facility and the commercial paper funding facility. They were specifically designed to backstop commercial paper markets. The AMLF lent to finance purchases of asset backed CP bought from money funds. In contrast, the CPFF sort of let indirectly via special purchase vehicle directly to issuers. Both were very novel in structure, both were effectively non-recourse lending and they were riskier than previous facilities. That said, they both helped to stabilize the CP market and they certainly provided a large quantity of funding to the wholesale markets.

Two words about the TELF. Only two words, it was really not a liquidity facility it was the term asset backed security funding facility. It was long term lending basically to restart the asset backed securities market. The reason I want to mention TELF though is it was the first, and I think only, market wide lending facility that had an explicit treasury credit backstop. The Feds liquidity provision peaked at the end of 2008 as the panics and runs began to subside and they rolled off quite quickly in 2009. The general consensus, not universal but general consensus is that they helped reduce the funding strains and slow down runs but they certainly weren't enough to stop them. And one of the most important lessons to take away from all of this is in an all-out financial panic, lender of last resort is not going to be enough. It is always going to be trumped by credible government guarantees and in that sort of a situation they are almost certainly going to be needed.

A few lessons from the experience of ten years ago. First, be prepared. Many of these facilities had the luxury of being created over weeks. Most were created in days and a couple in hours. They were as a result, not surprisingly, substantially revised and adjusted over time. Much more advanced preparation in normal times and calm times and testing of facilities is called for. The Fed, by the way, already does testing of monetary policy operations, it should do it for lender of last resort facilities as well. This will also, by the way, allow for earlier implementation, particularly for traditional authority facilities assuming that they're warranted by the circumstances.

Now, there is an important caveat here. Every financial crisis is different and the facilities, particularly the novel facilities that are going to be most effective in the next crisis are not going to necessarily be the ones that were used this last time. But the financial crisis do rhyme though. And planning, thinking about the future of lender of last resort is focus on the markets that are most runnable where you are most likely to end up having to backstop a market and think about how a lender of last resort might be designed there.

Lesson number two, plan internationally. In addition to the swap lines, the foreign banks borrowed more than two-thirds of the dollars lent through domestic conventional lender of last resort here in the U.S. The dollar is even more dominant as the global currency than it was ten years ago. Its role is particularly larger in emerging markets. In the next crisis, the Fed will almost certainly face decisions about how to provide dollar liquidity to the rest of world. The permanent swap lines are certainly an important step in that direction but I think they are only one component of a plan.

Three, plan to lend to non-banks. Traditional lender of last resort authority is never going to be enough to handle a systemic crisis in a market based financial system like the United States. So, consider now in times of calm, think how would want to expand counterparties, how one would want to expand collateral, how much risk is the Fed willing to take and in what form. When and how to do non-recourse lending. How to coordinate, really important with the fiscal authorities and, as needed, how to address the regulatory structure.

There are, of course, two ongoing challenges always with lender of last resort. One is to manage moral hazard and the other is to manage stigma. With moral hazard, regulatory structure is always the first line of defense there. Managing moral hazard is an ex ante problem more than an ex post problem. But moral hazard is also impacted by the structure of programs, by their pricing and by collateral. So, more thinking about consistency, and there wasn't complete consistency to be clear, across those dimensions is important to do in advance.

Stigma, of course, is a major problem for the United States in terms of lender of last resort. The lesson of the crisis is use auctions and tenders when you can. Use familiar operations, have everyone come in at the same time, it seems to work. That said, stigma is very likely to be an even bigger issue in the next crisis because of the Dodd Frank requirements that borrowers be identified. I'm quite sure I'm over time so I'm going to stop and turn it over to Brian. Thank you.

MR. SACK: I think it would be useful to start by digging in a bit into the breadth of the funding needs and what we might expect in the future. I'll start with Nathan and ask, why were the dollar funding needs so extensive abroad? Is that something we should assume in a future crisis? More importantly, does the Fed have a responsibility to meet those dollar funding needs if they reside outside the United States.

MR. SHEETS: So, thanks for that question. It is a pleasure to be here. I think it is useful for us to be thinking about these issues again, even though as Andrew said, it's a bit painful. I think that the key element in thinking about this foreign demand for dollar liquidity is the key role that the dollar plays as an international currency. And as the crisis erupted, there were foreign institutions that had extensive dollar-based operations both in the United States and in their own jurisdictions. There was extensive holding of dollar denominated assets and these folks needed dollar funding in order to have a match book.

At the same time, given that they were foreign institutions, they didn't have a large network of dollar denominated retail deposits and were very dependent on the wholesale funding markets like the FX swap market. These were the markets that at the height of the crisis really got crunched. As a result of that, foreign institutions turned to other sources. This is when the Fed's liquidity facilities, particular the swap lines stepped in to allow a smooth mechanism to respond to this dollar liquidity shock.

In terms of the question as to whether the Fed has a responsibility to do this, I think that is a very tough question. What I would say and what we argued in the paper is that the Fed has a strong interest in doing so. I think this is the word that Tim Geithner used in one of the FOMC discussions. That disruptions abroad spill back into the United States. That was true ten years ago and I think it's even more true today. So pretty much in our interest to respond to that shock given that the Federal Reserve is the institution that can create dollar liquidity.

MR. SACK: Of course, the other dimension through which the breadth of these facilities took place was support for the non-bank sector. It has been noted a couple of times already that non-banks account for something like two-thirds of the credit creation in the U.S. financial system. So, in some ways, it is not surprising to me to have funding needs that reside outside the banking sector. I guess I would ask Pat, I mean, were you surprised by the extent of those needs and when we look forward, given a financial system that is always changing, how well can policymakers actually anticipate where in the non-bank sector these pressures might emerge and be prepared for that.

MR. PARKINSON: Well, I think essentially it was not only so much of the credit that the U.S. economy depends on as being provided by the non-bank sector but that a substantial portion of the funding of those credit extensions was through short term wholesale funding. Particularly secured financing where they were borrowing through instruments that provided collateral to the investors. Whether that was ABCP, repos, or other instruments that the investors had regarded as relatively risk free such as shares and prime mutual funds.

But when investors lost confidence in the risk qualities of those instruments, they ran on them. In each case, the size and speed and severity of the loans was a surprise to me and I think others at the Fed. I think we believed that compared to the kind of unsecured funding's that many banks raise in the CD markets and whatnot, that investors would stick with them. Because they feel even if the institution was troubled, they still had the collateral as long as they had the confidence and the value of the collateral and their ability to liquidity it properly they'd stick with them but that didn't prove to be the case. There were runs on repo, ABCP et cetera. I would say that was certainly a surprise to and I'm guessing others or we would have taken more regulatory measures to require better liquidity risk management by people that relied on those types of funding vehicles. And we would have been better prepared and wouldn't have had to scramble as much to come up with programs to address the problems once they occurred.

MR. SACK: Let me turn a bit to the speed of the response. I mean, I think the big picture here is there was a lot of innovation, things happened in a remarkably timely way given the innovation required. But if we dig a little deeper and just ask, were things a little too slow in some areas. Like one example that is mentioned in your paper is that the TAF and the liquidity swap lines weren't implemented until

December. Whereas the funding needs really began to emerge in August. So, there was a pretty meaningful gap there. So broad question actually for anyone on the panel. Was the speed fast enough, the speed of response, could it have been more timely, would that have made a meaningful difference.

MS. MOSSER: Since you brought up TAF and the swap lines which sort of traditional authority tools, I'll start and then everybody else can leap in. My personal view was that it was slow. My view at the time was that it was slow. Now there were good reasons for that. First of all, TAF existed on a piece of paper in August 2007. The swap lines had been used exactly once after 9/11, 17 years ago. They were not the sorts of tools that you did easily or lightly and it was pretty clear that is you introduced them that they were going to have to be around for a while.

So, a certain amount of operational and justifiable, I think, policymaker caution about jumping in to provide liquidity unless you're absolutely sure with facilities that were pretty much untested, at least in the way they were going to be used. And that's completely sensible, it's one of the reasons that I think one of the lessons of this is testing traditional authority facilities in the way that monetary policy operations are tested would be very helpful. Because then the decision for the policymaker is okay, we have a facility that we know will probably work, is this the right time to implement it or not. But the delay over the fall was a combination of all of this and not just at the Fed.

I think there was certainly reluctance at the other central banks as well to think about how quickly they needed to start these facilities. But the reality was over the course of the fall the funding maturity shortened up and the walk in wholesale funding markets got worse. It wasn't until December that things were done.

MR. SHEETS: So, I think it's clear ex post that we should have moved more quickly. Ex ante trying to put myself back in those circumstances there was real uncertainty about the extent of the shock. And there was also real uncertainty about the nature of these responses and the risks associated with these responses. As part of this project, I spent a fair amount of time reading some of the FOMC discussions and the transcripts. Even in early December when the (inaudible) OIS credits spiked and there was substantial tension in markets, the FOMC was broadly supportive but there was a descent and other members of the FOMC had certain reservations. So even at that retrospectively late date it still was not obvious to every reasonable man and woman around that table that this was a necessary response.

I think having learned what we've learned, we'll respond better in the future. For example, in May 2011 when the (inaudible) crisis erupted, immediately the ECB turned to the Federal Reserve and proposed swap lines and the Federal Reserve brought the swap lines back in full force. So, you compare the speed of the response in that instance to the earlier instance in 2007, it was much stronger.

So, I do think there has been learning and now the swap lines are standing and available. Part of it is, we haven't seen anything like this for many years, maybe since the Great Depression and there was a lot of real time uncertainty about the nature of what we were dealing with and the responses.

MS. MOSSER: So, I don't disagree with Nathan that there was a lot of uncertainty but introducing the 13(3) facilities, that's a high bar. It is always going to have to be a very significant disruption before, just for the legal standard, before those sorts of facilities are introduced. So, I think another argument, if you like for erring on this side, if you think you have a systemic liquidity problem of erring on this side of having the traditional authority facilities ready to go is that because you know it is going to be a gap before you can expand beyond it.

MR. PARKINSON: I mean, so does that mean the 13(3) facilities are just always going to be responsive. Is there anything to note about the speed with which they were stood up?

MR. SHEETS: I think one thing that we learned is depending on the nature of the problem you're trying to solve. You may have to create a lot of new market infrastructure to be able to carry out the programs that operationally can be quite complex. Both simply setting up the account relationships to actually lend money and take collateral from individual parties and then all the risk management that has to go around it in terms of valuing the collateral making sure you have it, et cetera et cetera.

I think the interesting contrast is between the AMLF where we didn't have to set up the infrastructure, we used the discount window and we got that up and running within a week. The other facilities, I was most closely involved with the CPFF and the TAF took weeks in the case of CPFF and many months in the case of the TAF. Again, it was more or less the same people working on things so it wasn't working harder but rather just the amount of work that had to be done to safely launch some of those programs was quite large. I think there is a point that Trish made, even if you are not yet convinced that you need to launch a particular program, I think it would behoove the Fed to ask themselves, all right suppose in another month we decide to pull the trigger. What can we do now to be able to shorten the period between the decision to launch and the time at which the credit actually reaches the system?

MR. PARKINSON: I think another important conditioning factor in thinking about this issue and the speed and it also applies to the 13(3) facilities is the political environment. Through 2007 and 2008 as the Federal Reserve was putting in place these facilities which were necessary to respond to the crisis, I hate to think what it would have looked like without this response. When Ben would go to The Hill, he was literally greeted with hallelujahs. And even ex post in Dodd Frank, Congress trimmed the 13(3) authority. So, it is less flexible than it was before. We've learned some lessons but there are other folks out there who have looked at it and have learned different lessons. From my perspective, that means we've got a little less ammo than we had before but that's the political realities that are another factor that we need to think about and were at least something of a constraint through this period.

MR. SACK: We actually have a question from the audience that I think is relevant for the timing question. The question is, wasn't the monetary policy framework a significant constraint on the implementation of these facilities.

MS. MOSSER: Yes, is the short answer. The Fed did not have the ability to pay interest on reserves at that time and the federal funds rate was positive, significantly positive, I believe five and something. It didn't get to 0 to 25 until December. So, until the Lehman Brothers failure, every dollar that was lent out had to be matched by shrinkage in the Fed's balance sheet. You can see the sell off and roll off of U.S. Treasury securities that came out of the Fed's portfolio. So, if you like, the Fed sold or allowed to roll off Treasury securities from the balance sheet as the lending programs grew.

That actually constrained the size of the growth and how quickly certain facilities were stood up. They were rolled out slowly and then grown over time. That was partly, of course, because the crisis deepened but part of it was how quickly can we roll this off so the Fed's fund rate doesn't collapse. It happened with PDCF, it happened with TAF and after Lehman Brothers, of course, there was no attempt at that point to try to control the balance sheet. The federal funds rate traded well below its target for most of the rest of the year until the target fell basically to where it was trading. I'm exaggerating slightly but not a lot. It was also one of the reasons, of course, that the TARP legislation included the speeding up of the authority of the Fed to pay interest on reserves. So, that it could in fact have both a large balance sheet and controlled interest rates at the same time. Which, in the last couple of years, it has shown it can.

MR. SACK: Maybe I should have read the rest of the question which says, doesn't this imply that a floor system is preferable. In the interest of time I'll answer and say, I think so, yes. I think a floor system allows these decisions about liquidity support and also decisions about asset purchases to be made independent of the decisions about the short rate which seems advantageous.

Let me turn to risk. These facilities differed a lot in terms of the type of risk they assumed or how they mitigated that risk. We have the TAF that used traditional collateral that was already posted at a discount window and used counterparties for which the Fed had a lot of regulatory oversight. And then we had other facilities that were new markets, CPFF, TALF, others where the Fed was dealing with other types of counterparties and the collateral questions were more challenging.

I guess the question is in your view, did the risk vary meaningfully across the different facilities and did the Fed end up kind of at the right point. In some ways, if you're lending and you have very little risk then you're serving at pure liquidity function and it mitigates a lot of the concerns. In practice, you never have that situation so I'm just trying to get a sense of where you think the Fed ended up in practice.

MR. SHEETS: I think actually with respect to the 13(3) facilities I think the risk did vary a lot across the facilities. We have differences of view on that among people who are actually involved in it. The ones I was most involved with especially the EMLF and the CPFF I think those were pretty risky. I don't regret having launched the facilities because I think the alternative was a much more severe contraction of credit. In the end, we didn't lose money on these otherwise I worry if one concluded they weren't risky because we didn't lose any money. I think that is another case of what was called, I guess, after the crisis, a failure of imagination. It is not hard for me to imagine how things could have gone badly and I probably would have held accountable to some extent.

Some of that was simply, again, a structural problem. The ABCP market, 50 percent of the ABCP was sponsored by five banks. So, I think we had a lot of concentration in those programs by virtue of that. I think it would have been a mistake to rely on the fact that they were A1/P1 rated. I don't think the rating agencies nor the people that were investing that paper had a particular good idea of exactly what the collateral was back then. That's why when it started all those concerns about subprime collateral or mortgage collateral in general, it ended up running on all the ABCP programs even though many of them structurally were not allowed to invest in mortgage assets.

Again, I think a key thing is you have to ask yourself, any time you see large amounts of short-term wholesale funding in the financial system, ask yourself, is that stuff runnable and if it did run how would the Fed respond. Could the Fed address the run in a way that didn't pose significant risk to the Fed. If the answer is, yes, it is runnable and I can't think of a way the Fed can do it without taking some risk, it is time to ex ante regulatory measures to shrink the size of those vehicles that could give rise to the problem.

That's the right way to do it because once you get into the crisis, the problem is, if the Fed is unwilling to lend then the balance sheets to the financial institutions are going to shrink and that's what takes the crisis from being a Wall Street crisis into being a mainstream crisis. That's what we were trying to head off and at the end of the day, I think the programs were successful in that regard.

MR. SACK: I mean, on this topic of risk, I wanted to circle back to the swap lines. The swap lines were extended to 14 countries including a number of emerging market economies. I think what is one aspect of that that's interesting is there are standing institutions that serve to combat crises in emerging markets such as the IMF. So, one question is does this responsibility fall to the central bank or should it fall to those other institutions. There is a broader that actually came from the audience about how receptive the other central banks were to the swap arrangements.

MR. PARKINSON: So, in response to the first part of your question, I think that the size of the flows, the financial flows and other flows between the advanced economies means that backstopping those providing liquidity in those spaces has been and is likely to always be the unique jurisdiction of the central banks. The main alternative international institution being the IMF simply doesn't have the resources to be able to provide a credible backstop. It does broad surveillance of advanced economies but historically for decades at least has not lent to them.

For the emerging markets, in contrast, my feeling is and has always been that the IMF should be the first port of call for these emerging markets during times of crisis. Now that said, I would also quickly add that there were some truly extraordinary circumstances that existed during the peak of the financial crisis that prompted the FOMC to make the decision on these swap lines. First of all, the crisis itself was exceptional as has been articulated by a number of speakers already. Second, the resources of the IMF were significantly smaller than they are now. With the global stresses, there is a reasonable expectation that those resources would be stretched.

And then finally, the IMF had not yet developed a rapidly dispersing liquidity facility that would be appropriate for the very, very top tier of emerging market economies. So, under these circumstances, the Federal Reserve felt it exceptional and approved these swap lines with four important emerging market economies. I thought at the time and I very much think in retrospect that it was exactly the right thing to do. Given the evolution of IMF funding and the IMF suite of facilities, will those circumstances ever repeat themselves in the future, I think that the bar for it to happen, my personal view is it is exceptionally high. But if we ever see another global conflagration, hopefully it won't happen in our lifetimes, that will be a decision for some future set of policymakers.

MR. SACK: This question says, can Tim Geithner say something. I'll answer that, yes.

MR. GEITHNER: I'm biased and can't claim any wisdom in hindsight. My tendency is to think that these 13(3) facilities, I think, were very cool and very consequential and very important. I think it would be better for us to run a system where this stuff was in place as a standing piece of the broader safety net for the financial system. That would help avoid mismatch between the scope of these protections and the structure of the financial system in the future. You guys all wave at that in your papers but I think you should be for that.

The authority is not well designed, probably because as Trish said, things have to be pretty terrible before you can act. Things have to be pretty far past the point of no return before we can act. The stigma and the new law and the constraints are designed to make it less effective than it should be. I think that is something we should lament and fix. Let's ask the harder question.

If you look back, there is no unpolluted experiment in this case but if you look back at the outcomes from these programs, they were programs when enacted were like a light switch. Spreads came down, issuance restarted, CDS compressed. There were programs where stuff kept eroding. In a simple way, we would say that all the fancy lending against collateral stuff the Fed did to the non-bank system, not all of it, but because that is sort of a very weak backstop, stuff eroded and kept eroding. So, although I would be for the general perspective, this is valuable stuff, important to have there in place. Earlier recourse to it is probably valuable, particularly in a situation where you have the fire sale that's going to pollute prices and raise concerns about solvency. I think there is a very good argument for doing that.

I think you can look back also at this point and say it is another example of the lesson that many of you have already said which is that in a severe crisis it is only the guarantee or the capital injection and the broader fiscal stuff that stops a run. So, we tend to attribute a lot of coolness in consequence to this stuff but I wonder whether you look back on this and say the lesson you should take is, yeah sure, more sooner. But it is evidence of a weakness of that part of the central bank and that it's another example of why if you want to protect yourself against these things you need to have a better standing financial resource as an authority to put in place tougher guarantees.

You can't answer the question, what if you had lent more freely, aggressively against broader collateral with thinner haircuts much earlier. You can't answer that question really, you don't really know. But you know that when you did it, it didn't have much effect.

MS. MOSSER: I'll just repeat what I said earlier. I agree with you that ultimately in an all-out financial panic, guarantees are always going to. It's the reason within traditional commercial banking that deposit insurance trumps lender of last resort but it is very useful to have both. I think that's the case as well here.

I will say that you don't know what the counterfactual is, you don't know whether you might have bought more time or maybe that you have simply, you might have still needed the guarantees but would there have had to done as much, that's the question. This particular crisis was severe, the idea that you weren't going to need government backstops seemed probably naïve to me but we didn't know that going in. It was very hard to tell in the moment. It was pretty clear that it was very systemic and global from the get go. Having a response that policymakers to say yes, let's do this and let's do it in force, could it have made the pain a bit less and the need for guarantees a little smaller, perhaps so the system could heal itself a little bit more.

You don't know that it would have helped but I doubt it would have been hurtful. I think if it were well planned and well executed the moral hazard implications of it would have been pretty small. That's my personal view.

MR. SACK: So, in an ideal world you have standing facilities or agreements by which you can respond to a financial crisis on a number of fronts with well-defined rules and immediate availability. Obviously, that's never going to happen and, if anything, we've probably gone several steps in the other direction. I guess the related question I wanted to ask is do increasing constraints on the ability to give guarantees or other support effect the way central banks should operate. Should it effect their willingness to provide liquidity? I'm not sure in which direction that goes so I'm just going to throw that to you guys as a question.

MR. SHEETS: Sure. So, I think if you have less powerful tools to fight a severe crisis, that means you need to be all the more aggressive up front doing the kinds of things that Trish has articulated. Even also recognizing the reality of what Tim was saying that as the crisis proliferates it is not going to be the lender of last resort that solves the problem, it is more likely to be the fiscal and the guarantees. But then that also opens up a central tension in all of this in that you're only going to get that fiscal on the guarantee from the political establishment once there is enough pain in the economy. Unless Congress writes a big check and provides a lot of fiscal authority to the technocratic establishment, which I don't see happening any time soon, we're kind of stuck in a way. Where in order for it to be bad enough for Congress to act it is going to be at a point where all of us are shaking our heads and saying why did it get this bad.

I don't know how to resolve that and I think the "reforms" to the 13(3) facility have accentuated exactly this catch 22 is you can't do 13(3) facility for a single firm you've got to show it's a class of firms. The only way to get a class of firms in a way that is likely to be persuasive is to let the thing proliferate and cascade for a while. This is a tension and the only thing I can think of going back to your initial question, is this going to be all the more aggressive on the front end and hope that somehow the Bagehot style lending is sufficient. But it may not be in response to some shocks.

MR. SACK: One question that came in which, I think, is straightforward is whether all these facilities would be possible going forward under Dodd Frank. I assume we think yes.

MR. PARKINSON: Well, at least I think are all what were called broad based facilities, I mean clearly the legislation prescribed the narrow facilities. There are other provisions of it having to do with collateralization and other things that, I think, are intended to make it more stringent. I don't think interpreting that is straightforward. I think at previous conferences that I've been at; various former Federal Reserve officials and both generals and lieutenants have expressed different views as to whether certain programs that we actually used during the crisis would be permissible under the new authority. Unfortunately, it's not straightforward.

MR. SACK: So, we can talk about future crises and not knowing their exact nature and what the liquidity needs will be. There was one area that you raised in your paper and other Fed officials have raised which is, should there be a standing facility for broker dealers, something like a PDCF. Is that a recommendation you would make?

MR. SHEETS: I think with the one significant caveat or provisal it is a recommendation we made in the paper. That was that broker dealers that are subject to bank-like regulation with respect to liquidity capital et cetera, that they should have access to some sort of standing facility. The traditional reluctance, I think, for providing a standing facility to someone that's a non-bank is that it is the moral hazard, it's competitive equity issues.

The fact of the matter is, if you look at the composition of even the primary dealer of community today I think all but two are bank affiliated dealers and all but a couple of those bank affiliated dealers, the legal entity that is the primary dealer is a broker dealer entity. And through a number of changes and the facts on the ground since the crisis, all of those are at least subject. They either are parts of bank holding companies or in cases of the FBOs, they are now form to form forced to form an intermediate holding company of which the broker dealer is a sub and the Fed, I don't think it has done it completely, but it certainly could impose the very same capital restraints on those holding companies as on others.

If one then worries, as some do, a step further well what about the broker dealer entity, the sub itself. I think about through the resolution planning process and these requirements for prepositioning capital and liquidity you pretty much get the same places you get to with an insured depository institution. So, if that's the case then it seems yes, moral hazard is an issue but you can deal with it in precisely the same way that you deal with depository institutions and that's through ex ante prudential regulation.

MR. SACK: Okay so this may be a broad summary type question. So here we are, we've been through the drill once presumably that is helpful in number of ways. I think, understanding the runnable nature of firms outside of banks. I think we're all Fed staff and the rest of us are probably better at thinking about financial stability risks and what measures, what warning signals to look for. You've all implemented this wide array of facilities and hammered out a number of specific issues on that implementation. We just have experience doing this.

So, that all seems like we're better off. On the other hand, as has been discussed, we know this was only a part of a response and it is hard to anticipate the complete response in the future. There was a lot of backlash, not just to this but to other Federal Reserve actions. We have additional restrictions now, legislative restrictions on the ability of the Fed to serve the lender as last resort role and other government efforts. So, on that, where does this leave us? I doubt it leaves us confident but are we better prepared for the next financial crisis.

MS. MOSSER: Yes, but not so much because of lender of last resort. Which, I think, for most of the facilities here, one way or another that we're discussing about broadly, there would certainly be constraints but I don't think it would make most of them impossible. The reason the financial system is safer though is because there is just lots more capital and less maturity transformation, particularly at the core of the system.

But we know how this story goes. You don't have a financial crisis every five to ten years. If you're fortunate like the United States, you have one about every 75 years. The degree of innovation and change in the financial system between now and then, particularly if there are small regulatory changes which is kind of what happened before this crisis for 75 years, then you end up in a not very safe place. Because this system sort of innovates around and that I think is the danger both from the regulatory structure standpoint as well as potentially from the lender of last resort side.

You need, I think, lender of last resort is used so seldom in the United States that we did not, as Ben mentioned at the very beginning, think about this enough beforehand in detailed ways about what we would do even though we knew the financial system was changing in structure. So, that I think is one of the biggest lessons and where I'm worried that the system by the time we get to the next crisis may not be much safer than it was in 2006 and 2007. So, that's my fear now versus the future.

MR. PARKINSON: So, I think the system is stronger is a broad statement but particularly with respect to liquidity which our session here has focused on. We now have greatly enhanced liquidity regulation. In addition, I think over and above the regulatory requirements, I think major financial institutions realize that they need more liquidity on their balance sheet than they thought was the case a decade ago. In addition, I think policymakers have learned important lessons from the crisis. Many of them we've discussed over the last 40 minutes or so.

Now that said, I agree with Trish that for both the increased strength of the financial system and its increased liquidity and the recollection of the lessons that were learned during the financial crisis there is a rate of decay. I think that's one reason why projects like this one are constructive. Hopefully, what we can do by writing these papers and by having a conference like this is remind ourselves and other policymakers and help slow that rate of decay but there is a rate of decay.

And then the final point that I would make that is very relevant to this particular panel is we do have, as I indicated earlier, standing swap lines. So, they are there and ready to go and all of these other facilities that we've discussed, they're on the shelf. Every crisis will certainly be different but the extensive liquidity facilities in so many different dimensions addressing so many different markets, it seems to me that couldn't help but be useful for a crisis any time in the next few decades. If it's 75 years out then it could be a completely different financial system yet again. But for the remainder of our lifetimes, it seems like the blueprints that we establish in weeks, days or hours, depending on the facility, they're there and they're helpful and they're instructive.

MR. SHEETS: I think in that regard it's not just the blueprints but it's fine to create a blueprint and it is mainly senior policy people that create the blueprints but then you have to execute it. One of the things, I think, that for a good long time was going to make was stronger is the fact that particularly people at New York Fed that stood up all these programs so quickly. As long as they're around, I suspect that our ability to get things stood up quickly will be better than it was.

MR. SACK: Okay so extension of retirement age for New York Fed staff. That's the recommendation. I think we'll leave it there. Thank you very much to the panelists.

MR. BERNANKE: Thank you all. I'd like to call up the next panel which is going to turn to the question of capital and guarantees to the banks. Nellie Liang will be the moderator. The lead speakers are Dan Jester and Lee Sachs. Other panelists are Jim Wigand and Tim Clark. For the people who are standing in the back, if you want to continue to stand you're welcome too, there is actually plenty of seats. I should have noted earlier, if you haven't figured it out by now, this is being live webcast so be careful about falling asleep because you might find yourself on camera.

MR. BERNANKE: I'm Bernanke and behalf of Hank Paulson, Tim Geithner and myself I want to welcome you to this symposium on the response to the financial crisis. This symposium is being co-sponsored by the Hutchins Center on Fiscal and Monetary Policy here at Brookings Institution, David Wessel, Director. And by the Yale Program of Financial Stability, Andrew Metrick, Director. I want to give special thanks to David and Andrew and their teams for the tremendous work they've done both on the logistics for these programs and the substance. In particular, we had a program, a preconference at Yale in March that was very good as well. So, again thanks very much to Brookings, Hutchins and to the Yale program.

When I first became chairman of the Federal Reserve in 2006, literally one of the first things I did was asked the staff to give me the handbook on what you do in the case of a financial crisis. They provided me a little notebook and the notebook was typed on a manual typewriter in mimeograph and had about four pages in it. It said open the discount window and that was about it.

Quite seriously, quite literally and I think Tim Geithner had a similar experience at the New York Fed. We went into one of the most complicated and consequential financial crises in human history with very little in the way of playbook for thinking about how to address the crisis. So, the question is can we do better and can we take, in particular, this ten-year anniversary that we're now marking. We could sit around and swap war stories or could we do something that would be constructive that would help future generations of firefighters be more effective in responding to whatever crisis they might face.

Tim has been particularly strong in this point. He has worked with the Yale program in setting up some educational programs to help train people, central bankers and others who would respond to the next crisis. We thought that for this conference, for this anniversary, we might create a new manual. A manual that would be useful, again, to future generations as they deal with whatever challenges that they will face.

So, what we did was we asked a lot of our senior colleagues from the time of the crisis and the various agencies, to write papers on the issues that they faced, the programs they constructed, the details of how they thought about those programs. And, in particular, to tell us not only what they did and why but what they thought about and didn't do and why so that we could have a better understanding of these things and to do all this while the institutional memory is still fresh. It was a big project but we got tremendous response. Virtually everyone we asked to write a paper agreed to write a paper. Many of these people actually have jobs and nevertheless, they agreed to write these substantive papers.

We had some very outstanding assistants, Nellie Liang, my former colleague from the Fed was a master editor. WE had Deborah McClellan and other editors and RA's working. In general, the authors did a great job. We have created a series of papers on various aspects of the response to the crisis. Those are now online and those papers plus some additional papers will eventually become a book that again, we hope will be useful to future generations. Let me just say now and I'll say it again later, thanks to the authors, thanks to those who contributed, to the editors and to those who helped organize the presentations.

Now we could, of course, had a seminar type conference where each paper was presented, we have discussions et cetera but that would take three or four days. So, we thought instead what we would do today is have a series of panels where the authors and others would talk about some of the major themes that these presentations and chapters have risen. We'll turn to that in just a moment.

I do want to note that, of course, today is September 11th. I'm sure like me, all of you remember where you were 17 years ago when we heard the news. It was, of course, a traumatic moment that in some ways, began a very difficult decade for America. I hope that you will join me for a short moment of silence to remember those who died on September 11th. Thank you.

What I'd like to do now is turn over the program to Nellie Liang and to Andrew Metrick who will set the stage by talking about the arc of the crisis and some of the outcomes and then they will introduce some of the panels. So, Nellie, Andrew, thank you.

MR. METRICK: Good morning, I'm Andrew Metrick, very pleased in this audience to say that I am the Janet L. Yellen professor of finance and management at the Yale School of Management. I'm going to give a little introduction. I'll give a very short introduction and then Nellie is going to give a short introduction and then we will get a full day of details about this particular project. My job is to talk about the arc of the crisis, just a couple of slides on that. Before I do that, I'm going to talk about the arc of knowledge about the crisis, the arc of knowledge about crises in general.

Because what we saw happen over the last ten years is very similar to the pattern for the arc of knowledge in past crises. First, we get the first thing that happens after a crisis begins is we get detailed journalistic accounts and we got those here, some of them were excellent, I would say. And then following that, the economists start to look at the data, build their models and that has been going on now for almost ten years and will continue to go on, I'm sure, for as long as we have economists.

After the economists do their work, as the principles from the crisis retire from public life, we get their memoirs. We get to hear what the generals saw from the war. That period has happened now and now ten years after, we're starting to see finally, the historians come out. There are some wonderful new books of history that are starting to come out about the crisis where we're seeing not just what happened during it but how it made the world afterwards.

But there is one thing that's missing that's very, very important which is what not just the generals thought but what the lieutenants thought and what they did. The people who were in charge of implementing a strategy and coming up with the tactics along the way to actually fight the crisis. In the past, we've never had that. I would love to read a book similar to the book that's going to be produced here were it written about the Great Depression. Or even about things like the Asian financial crisis, we don't have it for recent times either.

Because we don't have that, the picture is missing for historians, for economists, for everybody who tries to understand what happened in the crisis. We're missing part of it. And that part of it that we're missing, prevents us from making the same kinds of mistakes over and over and again for not learning the lessons of history because we don't have them written down. We never looked at them carefully enough to do that.

So, this is a unique project in the arc of crisis knowledge, in my view as a crisis buff and aspiring scholar. Which is that what we're going to know now is why many of these decisions were taken. What, as Ben said, why people did what they did and didn't do other things. A lot of the people who are writing these chapters, the lieutenants, as Ben said, they have jobs, they have lives. Many of them, I think, from the beginning never really wanted to think about this again. Some of them were willing to but not all but they all came back which is, I think, a testament to the respect they have for who their leaders were at the time and for their just flat out patriotism. This is really important that we learn these lessons. I hope that over the next two days, you'll get a small glimpse of that and that everybody will read the whole book later when it comes out finally. It will come out at some point I'm sure.

I want to talk about the world that these generals and lieutenants were looking at just a little bit. Now what we have here is the world that was inherited by this group which is a world that was very different than the past crises that had been fought. Which is, here you're just seeing these various colors are telling you as a fraction of GDP, how big were these different sectors. The bottom being traditional banking and then the lighter blue being a variety of flavors of non-bank finance. There are many ways to tell this story and the key idea is just look how big the light blue get by the time we get to 2008 compared to where it was in 1980, 1970.

The United States had moved away from a traditional banking system, traditional bank finance to a place where more than half the credit in the economy was being provided by non-bank financial intermediaries. Yet the tools that we had to fight crises were very much tools of a different era, tools that were just from a bank centered era. On the left-hand column are the tools that were available at that time going into the crisis for the main crisis authorities, the FDIC and the Federal Reserve. The FDIC had resolution authority for banks. So, they couldn't do anything, as you can see over in the right-hand column, they couldn't do anything for a non-bank except let it go into bankruptcy or pray for a bailout. There was nothing that was in between. They had deposit insurance for banks.

The Federal Reserve had discount window lending for banks and an extremist for other institutions but had some pretty strict rules around that lending. They also had swap lines that they could provide also lending for foreign central banks. It's really something to say that the advice, so Ben's only a little bit joking when he says that it was open the discount window, because the advice that we could give and what we all quoted going into the crisis, was something written by a journalist from the 19th century, Walter Bagehot, who told us to lend freely against good collateral at a penalty rate. That was our, apple a day keeps the doctor away and it was pretty much going into the crisis.

So, what are we going to do next. Well, what we're going to hear from today, everybody is talking about the various different stages and the decisions that were made. Which were largely decisions that were using creative use of authority to expand into more and more of the non-bank financial system, some of the tools that were available and actual statutory authority by going to Congress and getting the ability to do other things. The phases of the crisis here are separated in this graph into increasing stress, early escalation and breaking the panic in resolution. Interestingly, each of these three phases starts with something happening in the non-bank sector.

So, the increasing stress which we see in the summer of 2007 with a pop in the (inaudible) IS spread and bank CDS spreads to really around all of the sudden the realization that subprime was not going to be a limited problem. That perhaps, there were places on balance sheets and in markets around the world that were infected with this disease that we didn't know about. Early escalation, this begins in early 2008 and this is after the purchase of Bear Stearns by JP Morgan out of what was almost certainly going to be the inevitable failure of Bear Stearns where the Fed first invokes section 13(3) and lends outside of the banking system.

And finally, what we're here today to commemorate, not celebrate but commemorate, is ten years after the bankruptcy of Lehman Brothers, another non-bank financial institution in September 2008 where the panic finally breaks. What you see happening over the spring of 2009 is coincident with the release of the stress tests in the United States. That was interestingly about banks. At least at this point, Goldman Sachs and Morgan Stanley were now banks so it was all banks at this point. So, while it was non-banks that got us into it, it was the fear of what was going to happen broadly to the core of the financial system that had to be a laid towards the end of the crisis to finally break it. So, with that, I'm turning it over to Nellie.

MS. LIANG: Okay with that introduction, I'm going to get to, so what was the U.S. government response. I'm going to start with this slide which is in the chart book which was distributed to the authors and is available online now. So, I think this chart is meant to illustrate key characteristics of the U.S. government response in 2007 to 2009. I'd say it was big and broad. It was cross agency. It was cross political and administrations and it was innovative and it was bold. All of these characteristics really were necessary to break the panic that took hold ten years ago and get the economy back on track.

And so, the way to read this slide is to say, the response started with a mix of traditional macro policies, monetary policy, cutting the federal funds target and fiscal stimulus. And then it includes traditional systemic policies, those that are designed to restore the functioning of the financial system. And these include the feds lender of last resort function for commercial banks and currency swap lines with other central banks.

After the panic broke out and Congress provided new emergency authority, policies escalated. You can see the mass of bars there. It includes broader liquidity to firms and markets. It includes government capital and government guarantees of debt and more aggressive monetary and fiscal policies. And combined, these policies were successful to get private sector capital back to the financial sector.

So, this slide is in your chart book. It's a great reference. It gives you timing, it gives you some of the policy initiations. I'm going to run through a few more. I'm not going to give nearly enough justice to some of the other responses. But it's to provide an overview, a way to sort of, where do all these things fit together and then the panels today will get into more detail.

I'm going to start with Fed. This is the basic four-page crisis handbook. Fed as lender of last resort. Initially, it provides liquidity to the banking system, domestic and foreign banks. Discount window is the smaller amount and then it initiated something called TAF which was used in much larger amounts. And its concerns about housing and the economy deepened, the Fed escalated from traditional to more novel and created some additional programs to support broader funding and they used the unusual and exigent circumstances.

In addition, with housing at the center of losses, the Treasury was working to get legislative authority to reduce the probability that weaknesses would bring down Fannie Mae and Freddie Mac in a highly disruptive way. So, they worked to get legislation to also support the mortgage availability. You can see that private label mortgage backed issuance was falling and Fannie Freddie issuance is what supported the housing market. The two mortgage giants were put into conservatorship in early September and government conservatorship helped to support this market.

After the bankruptcy of Lehman, short term funding markets were especially disrupted with a prime money market fund breaking the book. Treasury provided a temporary guarantee to the money market funds to stem investor flows. This is a chart of commercial paper maturities. Stress often shows up where everything turns very short and overnight. The money market fund guarantees stemmed investor outflows. It worked with two additional fed liquidity programs, AMLF, CPFF, to stabilize the commercial paper market.

Then when Congress passes legislation and TARP capital becomes available policymakers can take on and implement some new actions. So, turning to capital, and this is, of course, one of the keystones people think about capital all the time. Write downs of assets at banks had been at banks. This is commercial banks and investment banks had risen really sharply in late 2007 and early 2008. Policymakers had been encouraging institutions to raise private capital. And you can see in this chart, 2008, the dark blue bars, the U.S. firms had raised some private capital. But this capital raising wasn't nearly sufficient and the slowing economy and still falling house prices meant that expected losses at financial firms will still increasing.

So, the government responds to recapitalizing the financial system is somewhat familiar to you. It went in multiple stages. The capital injections into the nine largest firms on Columbus Day. It also offered capital to other banks to support lending. Then there was additional capital and asset ring fences for some of the more troubled banks. And then, of course, there were the stress tests in early 2009 on the 19 largest banking firms which were conducted with backstop government capital. I mentioned the required capital was based, not just on solvency but the need to keep lending during this downturn to keep making loans.

So, the stress test, with their extensive disclosures, led to private capital returning to the banking sector. And this dark blue bar in 2009 shows that banks raised $120 billion of private capital, more than enough to repay their TARP loans. And all but one bank repaid before the end of 2009. So, I think this at the same time, I should say, we had with capital, efforts to restart the securitization markets and credit flows and to leverage private capital to do so with TELF and PPIP.

And finally, a huge critical component of the overall strategy were guarantees. These were needed to prevent investor runs. The FDIC's debt guarantee program ensured new debt of traditional banks, bank holding companies and some non-banks. And combined, these with the capital led to sharp declines in bank CDS on Columbus Day weekend.

Turning to macro policies, the Federal Reserve began to cut its policy rate in the fall of 2007. And when panic took hold in a show of concerted force, central banks around the world orchestrated a coordinated interest rate cut on October 8th. Shortly after, the Fed purchased agency MBS and debt in QE 1 and lowered the rate to the zero-lower bound. On the fiscal side, Treasury passed early a stimulus package in 2008 shown by the light blue bars followed by a larger package a year later, the Recovery Act of 2009, the dark blue bars. And then there were a number of other measures, the very light blue bars that provided some additional stimulus, especially as the effect of the Recovery Act started to wane.

So, summing up, with TARP capital, the combined actions of capital injections, debt guarantees, lending to restart capital markets, credit markets and the bank stress test with a government backstop, were able to stop the panic and bring back investors into the financial markets. And beyond 2009, the fiscal stimulus, new QE policies and expansions and programs to reduce homeowners mortgage payments continued to support the economy and spending.

So how do we put this all together. In terms of outcomes, ultimately the financial sector is to support the real economy. So, one way is to look at GDP growth and employment growth. This shows, this is a chart of government commitments in dollars to the systemic programs. This does not include the monetary and fiscal. So, the Fed liquidity facilities are the dark blue and the start early. Other include something like Fed lending to AIG, the commitments to Fannie Freddie. There is the TARP capital and then there's the guarantees which are the big light blue. So, these are maximum commitments.

And the two lines in the chart show real GDP growth, that's the black line, and then employment growth, the blue line, which are estimated monthly year over year. And both fell very rapidly in late 2008. But you can start to see the benefits of the totality of the systemic policy responses, all the programs and their interactions. Real GDP growth starts to turn in mid to late 2009 with employment growth following the turnaround several months later.

We know this recession was severe. It is useful to put it into some perspective. What we've done is to compare this recent recession to those from previous crises using Reinhart and Rogoff. So, using real GDP per capita basis, the darker blue bars show that on a real GDP per capita basis the U.S. decline was -5.25 percent from peak to trough. It lasted about one and a half years and it took about five and a half years to return to its previous peak. So, in contrast, for a typical financial crisis in the Reinhart Rogoff world, the recession is deeper, it lasts longer and the recovery takes more time.

In another paper, Romer and Romer which is a different R&R, they look at just the OECD countries since 1970. And they have a study that indicates that given the degree of credit disruptions, in the U.S. it was very severe. The economy performed better than would have been predicted by their model.

So, we believe these policy actions in totality prevented a second depression. And the recession was shorter, less steep, and the recovery more rapid than might have been expected based on past financial crises. And then there is a building body of research which many of us document in the papers which shows that the individual policy actions worked in the sense that they moved some desired objective in the right direction. That said, we still had a very severe recession and a weak recovery which had substantial economic costs.

So, these outcomes indicate to us that there are important lessons to take from these responses individually or combined and for us to try to extract. Beginning with, why couldn't the private sector solve these problems, why did the government need to intervene and how could the government intervene. Policymakers clearly had to operate within their legal authorities and their constraints. As Andrew said, the tools they had were better designed for a financial system dominated by commercial banks.

But policymakers had other constraints they operated under. There was uncertainty in real time about what was happening, great uncertainty. Concerns that the actions you might take might actually cause the panic you're trying to avoid and concerns about creating incentives for future risk taking, sort of the moral hazard. So, there are a lot of different constraints that policymakers had to operate under.

So that's the goal of this project. To document how policymakers responded, whether there are lessons for future responders so that we can do better next time. I think at this point, I think we want to turn to the panelists who again, thank you so much for all the work. As Ben says, everyone has a day job and it was hard to get these papers done. They are terrific. They going to be able through the panels today give you much more insight about what they did, not just what they did but why they did and why they didn't do other things. So, thank you.

MR. WESSEL: Thank you Andrew and Nellie. I'm David Wessel, director of the Hutchins Center. If I could just explain a little bit the logistics for today. So, we have first of all, those slides are an excerpt of something that we're calling the Graphic Novel. I was on a conference call about this and one of my cousins' kids who is a graphic artist says, you're working on a Graphic Novel. I said, this isn't quite what you think of as a graphic novel. An enormous amount of work went into this. There are 86 slides and because they were finished at the last minute, the printed versions will arrive sometime before lunch so you can have your own copy of the Graphic Novel suitable for autographing by the principles that are in the room.

We have a series of six panels and the panels have been asked to give highlights and illustrative examples from the papers. You can't summarize the papers in the time we have allotted so we're going to ask people to be disciplined on the time. We've decided if you want to ask questions, to write them on these cards that are at your seats and some of the staff at Brookings will come around and collect them and I'll pass them to the moderators. We'll have a buffet lunch, about an hour break, and we have a coffee break and then we'll end around 4:45 with some closing remarks from Tim Geithner and Hank Paulson. With that, can I call up the first panel. The moderator will be Brian Sack who is with D.E. Shaw, formerly of the Federal Reserve. Trish Mosser is going to be the lead speaker. She is now at Columbia formerly with the Federal Reserve. Pat Parkinson is now at Promontory, formerly with the Federal Reserve but also spent some time at the Treasury. And Nathan Sheets of PGIM who was also an international director at the Federal Reserve.

MR. SACK: Thank you. As Nellie highlighted, fighting the financial crisis took extraordinary policy efforts across a number of fronts. I think the provision of liquidity to the markets and to market participants by central banks, the Federal Reserve and other central banks was obviously a very critical step in that process in terms of reacting to runs, preventing runs from turning into solvency issues and if nothing else, creating more time for more comprehensive solutions. The Lender of Last Resort function is a traditional function of central banks. But, of course, the efforts that they undertook during the crisis were beyond the traditional in terms of the reach of those facilities and it required a lot of innovation and creativity. Both to figure out what the liquidity needs were and what the right response was.

So, it's a pleasure to introduce this panel, this set of lieutenants. They were all senior fed officials at the time who were really at the center of putting together these facilities and the center of that effort to respond. On the panel we have Pat Parkinson who is Deputy Director of the Research and Statistics Division at the Federal Reserve Board and involved with a number of financial market issues. Later moved on to become the Director of Banking Supervision at the Board. We have Nathan Sheets who is the Director of the International Finance Division at the Board, hence frontline with many of the international efforts. We have Trish Mosser who was a senior official in the markets group at the New York Fed and actually at the height of the crisis served as the interim Soma manager with responsibilities for implementing a lot of these facilities. We'll start off with Trish giving some introductory remarks.

MS. MOSSER: Thank you, Brian, good morning everybody. So central bank liquidity provision, lender of last resort, is nearly always the first line of defense in a financial crisis and 11 years ago was no exception to that. The timeline we've already done this morning, everybody knows it starting in August 2007. The U.S. and global financial system started on a massive and very perilous deleveraging process that played out as a series of runs in wholesale funding markets. Then a full blown global financial panic and finally causing the largest recession since the Great Depression. As the crisis progressed, the Fed created a series of innovative lender of last resort facilities for banks, for non-banks and to provide dollar liquidity to the rest of the world. The development of those programs mirror very much the arc of the crisis that Nellie and Andrew were speaking about just a few minutes ago.

The Fed started with very traditional tools, the discount window and repo operations to provide liquidity. They didn't work. Repo operations were necessarily limited by the need to control the Fed funds rate and the size of the Fed's balance sheet. The discount window is heavily stigmatized and it is not used by banks, even when market funding is scarce and very expensive. Instead, banks reduce their lending and funding of customers, non-banks and notably lending dollars abroad. It was not until December 2007 when the Fed, in coordination with several foreign central banks, introduced two new facilities. The term auction facility or the TAF and the central bank swap lines. Later they would be massively expanded and they were, in fact, the two largest lending programs that the Fed introduced.

The TAF was designed very specifically to overcome discount window stigma by auctioning discount window loans. By having all the banks bid together, there was safety in anonymity and numbers and a signal that this was a system wide problem, not a problem with a specific institution. Importantly, the TAF facility was tied both in policy announcement and even in operations to the swap lines through which foreign central banks distributed dollars in their jurisdiction.

The coordinated action by multiple central banks in December 2007 sent a really clear message that the financial crisis was a global phenomenon. It would be jointly addressed. That practice had a pretty powerful impact and it was a practice that was continued throughout the crisis. And it worked, at least for a while. The funding strains in U.S. and Europe actually eased somewhat but they weren't enough. As Andrew pointed out earlier, two-thirds of the financial system didn't have access to central bank liquidity.

A systemic crisis calls for a central bank lending to the broad financial system basically temporarily substituting for the breakdown in private lending relationships until the system can stabilize itself. But that absolutely can't happen if the lending facility actually excludes most of the financial system. So, distress at non-banks continued and accelerated particularly in repo markets and as we all know, by March, there was a run-in repo, the failure of Bear Stearns. And for the first time since the Great Depression, the Fed invoked its emergency authority under section 13(3) of The Federal Reserve Act to lend to non-banks. The non-banks they lent to were the largest security dealers who were the counterparties of the open market desk.

The first two 13(3) facilities, TSLF and PDCF, The Term Securities Lending Facility and the Primary Dealer Credit Facility both went to the primary dealers against riskier collateral but they were structured very, very differently. The TSLF was a term facility security for security, it was also an auction. The PDCF was a discount window, effectively. As a result, the PDCF almost immediately came quite stigmatized and the TSLF did not. Partly because of its auction format and also because it was similar to existing securities lending operations. It also had an additional advantage that it didn't increase the size of the Fed's balance sheet.

The programs TSLF, in particular, were successful in temporarily stabilizing the repo markets into the summer at least. Again, the complete meltdown in global capital and funding markets after the failure of Lehman Brothers made clear that the existing lending facilities were not just going to be enough to stop the runs. This, by the way, was just by massive expansion of the Fed's lending program, unlimited swap lines, effectively unlimited TAF and the abandonment of any sense of controlling the size of the Fed's balance sheet. I have not bothered to put a line up there for the failure of Lehman Brothers because it's really obvious when it happened.

In response, particularly in response to the run on money funds and the collapse of the commercial paper market, they added two additional particularly novel facilities. The ABCP money from lending facility and the commercial paper funding facility. They were specifically designed to backstop commercial paper markets. The AMLF lent to finance purchases of asset backed CP bought from money funds. In contrast, the CPFF sort of let indirectly via special purchase vehicle directly to issuers. Both were very novel in structure, both were effectively non-recourse lending and they were riskier than previous facilities. That said, they both helped to stabilize the CP market and they certainly provided a large quantity of funding to the wholesale markets.

Two words about the TELF. Only two words, it was really not a liquidity facility it was the term asset backed security funding facility. It was long term lending basically to restart the asset backed securities market. The reason I want to mention TELF though is it was the first, and I think only, market wide lending facility that had an explicit treasury credit backstop. The Feds liquidity provision peaked at the end of 2008 as the panics and runs began to subside and they rolled off quite quickly in 2009. The general consensus, not universal but general consensus is that they helped reduce the funding strains and slow down runs but they certainly weren't enough to stop them. And one of the most important lessons to take away from all of this is in an all-out financial panic, lender of last resort is not going to be enough. It is always going to be trumped by credible government guarantees and in that sort of a situation they are almost certainly going to be needed.

A few lessons from the experience of ten years ago. First, be prepared. Many of these facilities had the luxury of being created over weeks. Most were created in days and a couple in hours. They were as a result, not surprisingly, substantially revised and adjusted over time. Much more advanced preparation in normal times and calm times and testing of facilities is called for. The Fed, by the way, already does testing of monetary policy operations, it should do it for lender of last resort facilities as well. This will also, by the way, allow for earlier implementation, particularly for traditional authority facilities assuming that they're warranted by the circumstances.

Now, there is an important caveat here. Every financial crisis is different and the facilities, particularly the novel facilities that are going to be most effective in the next crisis are not going to necessarily be the ones that were used this last time. But the financial crisis do rhyme though. And planning, thinking about the future of lender of last resort is focus on the markets that are most runnable where you are most likely to end up having to backstop a market and think about how a lender of last resort might be designed there.

Lesson number two, plan internationally. In addition to the swap lines, the foreign banks borrowed more than two-thirds of the dollars lent through domestic conventional lender of last resort here in the U.S. The dollar is even more dominant as the global currency than it was ten years ago. Its role is particularly larger in emerging markets. In the next crisis, the Fed will almost certainly face decisions about how to provide dollar liquidity to the rest of world. The permanent swap lines are certainly an important step in that direction but I think they are only one component of a plan.

Three, plan to lend to non-banks. Traditional lender of last resort authority is never going to be enough to handle a systemic crisis in a market based financial system like the United States. So, consider now in times of calm, think how would want to expand counterparties, how one would want to expand collateral, how much risk is the Fed willing to take and in what form. When and how to do non-recourse lending. How to coordinate, really important with the fiscal authorities and, as needed, how to address the regulatory structure.

There are, of course, two ongoing challenges always with lender of last resort. One is to manage moral hazard and the other is to manage stigma. With moral hazard, regulatory structure is always the first line of defense there. Managing moral hazard is an ex ante problem more than an ex post problem. But moral hazard is also impacted by the structure of programs, by their pricing and by collateral. So, more thinking about consistency, and there wasn't complete consistency to be clear, across those dimensions is important to do in advance.

Stigma, of course, is a major problem for the United States in terms of lender of last resort. The lesson of the crisis is use auctions and tenders when you can. Use familiar operations, have everyone come in at the same time, it seems to work. That said, stigma is very likely to be an even bigger issue in the next crisis because of the Dodd Frank requirements that borrowers be identified. I'm quite sure I'm over time so I'm going to stop and turn it over to Brian. Thank you.

MR. SACK: I think it would be useful to start by digging in a bit into the breadth of the funding needs and what we might expect in the future. I'll start with Nathan and ask, why were the dollar funding needs so extensive abroad? Is that something we should assume in a future crisis? More importantly, does the Fed have a responsibility to meet those dollar funding needs if they reside outside the United States.

MR. SHEETS: So, thanks for that question. It is a pleasure to be here. I think it is useful for us to be thinking about these issues again, even though as Andrew said, it's a bit painful. I think that the key element in thinking about this foreign demand for dollar liquidity is the key role that the dollar plays as an international currency. And as the crisis erupted, there were foreign institutions that had extensive dollar-based operations both in the United States and in their own jurisdictions. There was extensive holding of dollar denominated assets and these folks needed dollar funding in order to have a match book.

At the same time, given that they were foreign institutions, they didn't have a large network of dollar denominated retail deposits and were very dependent on the wholesale funding markets like the FX swap market. These were the markets that at the height of the crisis really got crunched. As a result of that, foreign institutions turned to other sources. This is when the Fed's liquidity facilities, particular the swap lines stepped in to allow a smooth mechanism to respond to this dollar liquidity shock.

In terms of the question as to whether the Fed has a responsibility to do this, I think that is a very tough question. What I would say and what we argued in the paper is that the Fed has a strong interest in doing so. I think this is the word that Tim Geithner used in one of the FOMC discussions. That disruptions abroad spill back into the United States. That was true ten years ago and I think it's even more true today. So pretty much in our interest to respond to that shock given that the Federal Reserve is the institution that can create dollar liquidity.

MR. SACK: Of course, the other dimension through which the breadth of these facilities took place was support for the non-bank sector. It has been noted a couple of times already that non-banks account for something like two-thirds of the credit creation in the U.S. financial system. So, in some ways, it is not surprising to me to have funding needs that reside outside the banking sector. I guess I would ask Pat, I mean, were you surprised by the extent of those needs and when we look forward, given a financial system that is always changing, how well can policymakers actually anticipate where in the non-bank sector these pressures might emerge and be prepared for that.

MR. PARKINSON: Well, I think essentially it was not only so much of the credit that the U.S. economy depends on as being provided by the non-bank sector but that a substantial portion of the funding of those credit extensions was through short term wholesale funding. Particularly secured financing where they were borrowing through instruments that provided collateral to the investors. Whether that was ABCP, repos, or other instruments that the investors had regarded as relatively risk free such as shares and prime mutual funds.

But when investors lost confidence in the risk qualities of those instruments, they ran on them. In each case, the size and speed and severity of the loans was a surprise to me and I think others at the Fed. I think we believed that compared to the kind of unsecured funding's that many banks raise in the CD markets and whatnot, that investors would stick with them. Because they feel even if the institution was troubled, they still had the collateral as long as they had the confidence and the value of the collateral and their ability to liquidity it properly they'd stick with them but that didn't prove to be the case. There were runs on repo, ABCP et cetera. I would say that was certainly a surprise to and I'm guessing others or we would have taken more regulatory measures to require better liquidity risk management by people that relied on those types of funding vehicles. And we would have been better prepared and wouldn't have had to scramble as much to come up with programs to address the problems once they occurred.

MR. SACK: Let me turn a bit to the speed of the response. I mean, I think the big picture here is there was a lot of innovation, things happened in a remarkably timely way given the innovation required. But if we dig a little deeper and just ask, were things a little too slow in some areas. Like one example that is mentioned in your paper is that the TAF and the liquidity swap lines weren't implemented until December. Whereas the funding needs really began to emerge in August. So, there was a pretty meaningful gap there. So broad question actually for anyone on the panel. Was the speed fast enough, the speed of response, could it have been more timely, would that have made a meaningful difference.

MS. MOSSER: Since you brought up TAF and the swap lines which sort of traditional authority tools, I'll start and then everybody else can leap in. My personal view was that it was slow. My view at the time was that it was slow. Now there were good reasons for that. First of all, TAF existed on a piece of paper in August 2007. The swap lines had been used exactly once after 9/11, 17 years ago. They were not the sorts of tools that you did easily or lightly and it was pretty clear that is you introduced them that they were going to have to be around for a while.

So, a certain amount of operational and justifiable, I think, policymaker caution about jumping in to provide liquidity unless you're absolutely sure with facilities that were pretty much untested, at least in the way they were going to be used. And that's completely sensible, it's one of the reasons that I think one of the lessons of this is testing traditional authority facilities in the way that monetary policy operations are tested would be very helpful. Because then the decision for the policymaker is okay, we have a facility that we know will probably work, is this the right time to implement it or not. But the delay over the fall was a combination of all of this and not just at the Fed.

I think there was certainly reluctance at the other central banks as well to think about how quickly they needed to start these facilities. But the reality was over the course of the fall the funding maturity shortened up and the walk in wholesale funding markets got worse. It wasn't until December that things were done.

MR. SHEETS: So, I think it's clear ex post that we should have moved more quickly. Ex ante trying to put myself back in those circumstances there was real uncertainty about the extent of the shock. And there was also real uncertainty about the nature of these responses and the risks associated with these responses. As part of this project, I spent a fair amount of time reading some of the FOMC discussions and the transcripts. Even in early December when the (inaudible) OIS credits spiked and there was substantial tension in markets, the FOMC was broadly supportive but there was a descent and other members of the FOMC had certain reservations. So even at that retrospectively late date it still was not obvious to every reasonable man and woman around that table that this was a necessary response.

I think having learned what we've learned, we'll respond better in the future. For example, in May 2011 when the (inaudible) crisis erupted, immediately the ECB turned to the Federal Reserve and proposed swap lines and the Federal Reserve brought the swap lines back in full force. So, you compare the speed of the response in that instance to the earlier instance in 2007, it was much stronger.

So, I do think there has been learning and now the swap lines are standing and available. Part of it is, we haven't seen anything like this for many years, maybe since the Great Depression and there was a lot of real time uncertainty about the nature of what we were dealing with and the responses.

MS. MOSSER: So, I don't disagree with Nathan that there was a lot of uncertainty but introducing the 13(3) facilities, that's a high bar. It is always going to have to be a very significant disruption before, just for the legal standard, before those sorts of facilities are introduced. So, I think another argument, if you like for erring on this side, if you think you have a systemic liquidity problem of erring on this side of having the traditional authority facilities ready to go is that because you know it is going to be a gap before you can expand beyond it.

MR. PARKINSON: I mean, so does that mean the 13(3) facilities are just always going to be responsive. Is there anything to note about the speed with which they were stood up?

MR. SHEETS: I think one thing that we learned is depending on the nature of the problem you're trying to solve. You may have to create a lot of new market infrastructure to be able to carry out the programs that operationally can be quite complex. Both simply setting up the account relationships to actually lend money and take collateral from individual parties and then all the risk management that has to go around it in terms of valuing the collateral making sure you have it, et cetera et cetera.

I think the interesting contrast is between the AMLF where we didn't have to set up the infrastructure, we used the discount window and we got that up and running within a week. The other facilities, I was most closely involved with the CPFF and the TAF took weeks in the case of CPFF and many months in the case of the TAF. Again, it was more or less the same people working on things so it wasn't working harder but rather just the amount of work that had to be done to safely launch some of those programs was quite large. I think there is a point that Trish made, even if you are not yet convinced that you need to launch a particular program, I think it would behoove the Fed to ask themselves, all right suppose in another month we decide to pull the trigger. What can we do now to be able to shorten the period between the decision to launch and the time at which the credit actually reaches the system?

MR. PARKINSON: I think another important conditioning factor in thinking about this issue and the speed and it also applies to the 13(3) facilities is the political environment. Through 2007 and 2008 as the Federal Reserve was putting in place these facilities which were necessary to respond to the crisis, I hate to think what it would have looked like without this response. When Ben would go to The Hill, he was literally greeted with hallelujahs. And even ex post in Dodd Frank, Congress trimmed the 13(3) authority. So, it is less flexible than it was before. We've learned some lessons but there are other folks out there who have looked at it and have learned different lessons. From my perspective, that means we've got a little less ammo than we had before but that's the political realities that are another factor that we need to think about and were at least something of a constraint through this period.

MR. SACK: We actually have a question from the audience that I think is relevant for the timing question. The question is, wasn't the monetary policy framework a significant constraint on the implementation of these facilities.

MS. MOSSER: Yes, is the short answer. The Fed did not have the ability to pay interest on reserves at that time and the federal funds rate was positive, significantly positive, I believe five and something. It didn't get to 0 to 25 until December. So, until the Lehman Brothers failure, every dollar that was lent out had to be matched by shrinkage in the Fed's balance sheet. You can see the sell off and roll off of U.S. Treasury securities that came out of the Fed's portfolio. So, if you like, the Fed sold or allowed to roll off Treasury securities from the balance sheet as the lending programs grew.

That actually constrained the size of the growth and how quickly certain facilities were stood up. They were rolled out slowly and then grown over time. That was partly, of course, because the crisis deepened but part of it was how quickly can we roll this off so the Fed's fund rate doesn't collapse. It happened with PDCF, it happened with TAF and after Lehman Brothers, of course, there was no attempt at that point to try to control the balance sheet. The federal funds rate traded well below its target for most of the rest of the year until the target fell basically to where it was trading. I'm exaggerating slightly but not a lot. It was also one of the reasons, of course, that the TARP legislation included the speeding up of the authority of the Fed to pay interest on reserves. So, that it could in fact have both a large balance sheet and controlled interest rates at the same time. Which, in the last couple of years, it has shown it can.

MR. SACK: Maybe I should have read the rest of the question which says, doesn't this imply that a floor system is preferable. In the interest of time I'll answer and say, I think so, yes. I think a floor system allows these decisions about liquidity support and also decisions about asset purchases to be made independent of the decisions about the short rate which seems advantageous.

Let me turn to risk. These facilities differed a lot in terms of the type of risk they assumed or how they mitigated that risk. We have the TAF that used traditional collateral that was already posted at a discount window and used counterparties for which the Fed had a lot of regulatory oversight. And then we had other facilities that were new markets, CPFF, TALF, others where the Fed was dealing with other types of counterparties and the collateral questions were more challenging.

I guess the question is in your view, did the risk vary meaningfully across the different facilities and did the Fed end up kind of at the right point. In some ways, if you're lending and you have very little risk then you're serving at pure liquidity function and it mitigates a lot of the concerns. In practice, you never have that situation so I'm just trying to get a sense of where you think the Fed ended up in practice.

MR. SHEETS: I think actually with respect to the 13(3) facilities I think the risk did vary a lot across the facilities. We have differences of view on that among people who are actually involved in it. The ones I was most involved with especially the EMLF and the CPFF I think those were pretty risky. I don't regret having launched the facilities because I think the alternative was a much more severe contraction of credit. In the end, we didn't lose money on these otherwise I worry if one concluded they weren't risky because we didn't lose any money. I think that is another case of what was called, I guess, after the crisis, a failure of imagination. It is not hard for me to imagine how things could have gone badly and I probably would have held accountable to some extent.

Some of that was simply, again, a structural problem. The ABCP market, 50 percent of the ABCP was sponsored by five banks. So, I think we had a lot of concentration in those programs by virtue of that. I think it would have been a mistake to rely on the fact that they were A1/P1 rated. I don't think the rating agencies nor the people that were investing that paper had a particular good idea of exactly what the collateral was back then. That's why when it started all those concerns about subprime collateral or mortgage collateral in general, it ended up running on all the ABCP programs even though many of them structurally were not allowed to invest in mortgage assets.

Again, I think a key thing is you have to ask yourself, any time you see large amounts of short-term wholesale funding in the financial system, ask yourself, is that stuff runnable and if it did run how would the Fed respond. Could the Fed address the run in a way that didn't pose significant risk to the Fed. If the answer is, yes, it is runnable and I can't think of a way the Fed can do it without taking some risk, it is time to ex ante regulatory measures to shrink the size of those vehicles that could give rise to the problem.

That's the right way to do it because once you get into the crisis, the problem is, if the Fed is unwilling to lend then the balance sheets to the financial institutions are going to shrink and that's what takes the crisis from being a Wall Street crisis into being a mainstream crisis. That's what we were trying to head off and at the end of the day, I think the programs were successful in that regard.

MR. SACK: I mean, on this topic of risk, I wanted to circle back to the swap lines. The swap lines were extended to 14 countries including a number of emerging market economies. I think what is one aspect of that that's interesting is there are standing institutions that serve to combat crises in emerging markets such as the IMF. So, one question is does this responsibility fall to the central bank or should it fall to those other institutions. There is a broader that actually came from the audience about how receptive the other central banks were to the swap arrangements.

MR. PARKINSON: So, in response to the first part of your question, I think that the size of the flows, the financial flows and other flows between the advanced economies means that backstopping those providing liquidity in those spaces has been and is likely to always be the unique jurisdiction of the central banks. The main alternative international institution being the IMF simply doesn't have the resources to be able to provide a credible backstop. It does broad surveillance of advanced economies but historically for decades at least has not lent to them.

For the emerging markets, in contrast, my feeling is and has always been that the IMF should be the first port of call for these emerging markets during times of crisis. Now that said, I would also quickly add that there were some truly extraordinary circumstances that existed during the peak of the financial crisis that prompted the FOMC to make the decision on these swap lines. First of all, the crisis itself was exceptional as has been articulated by a number of speakers already. Second, the resources of the IMF were significantly smaller than they are now. With the global stresses, there is a reasonable expectation that those resources would be stretched.

And then finally, the IMF had not yet developed a rapidly dispersing liquidity facility that would be appropriate for the very, very top tier of emerging market economies. So, under these circumstances, the Federal Reserve felt it exceptional and approved these swap lines with four important emerging market economies. I thought at the time and I very much think in retrospect that it was exactly the right thing to do. Given the evolution of IMF funding and the IMF suite of facilities, will those circumstances ever repeat themselves in the future, I think that the bar for it to happen, my personal view is it is exceptionally high. But if we ever see another global conflagration, hopefully it won't happen in our lifetimes, that will be a decision for some future set of policymakers.

MR. SACK: This question says, can Tim Geithner say something. I'll answer that, yes.

MR. GEITHNER: I'm biased and can't claim any wisdom in hindsight. My tendency is to think that these 13(3) facilities, I think, were very cool and very consequential and very important. I think it would be better for us to run a system where this stuff was in place as a standing piece of the broader safety net for the financial system. That would help avoid mismatch between the scope of these protections and the structure of the financial system in the future. You guys all wave at that in your papers but I think you should be for that.

The authority is not well designed, probably because as Trish said, things have to be pretty terrible before you can act. Things have to be pretty far past the point of no return before we can act. The stigma and the new law and the constraints are designed to make it less effective than it should be. I think that is something we should lament and fix. Let's ask the harder question.

If you look back, there is no unpolluted experiment in this case but if you look back at the outcomes from these programs, they were programs when enacted were like a light switch. Spreads came down, issuance restarted, CDS compressed. There were programs where stuff kept eroding. In a simple way, we would say that all the fancy lending against collateral stuff the Fed did to the non-bank system, not all of it, but because that is sort of a very weak backstop, stuff eroded and kept eroding. So, although I would be for the general perspective, this is valuable stuff, important to have there in place. Earlier recourse to it is probably valuable, particularly in a situation where you have the fire sale that's going to pollute prices and raise concerns about solvency. I think there is a very good argument for doing that.

I think you can look back also at this point and say it is another example of the lesson that many of you have already said which is that in a severe crisis it is only the guarantee or the capital injection and the broader fiscal stuff that stops a run. So, we tend to attribute a lot of coolness in consequence to this stuff but I wonder whether you look back on this and say the lesson you should take is, yeah sure, more sooner. But it is evidence of a weakness of that part of the central bank and that it's another example of why if you want to protect yourself against these things you need to have a better standing financial resource as an authority to put in place tougher guarantees.

You can't answer the question, what if you had lent more freely, aggressively against broader collateral with thinner haircuts much earlier. You can't answer that question really, you don't really know. But you know that when you did it, it didn't have much effect.

MS. MOSSER: I'll just repeat what I said earlier. I agree with you that ultimately in an all-out financial panic, guarantees are always going to. It's the reason within traditional commercial banking that deposit insurance trumps lender of last resort but it is very useful to have both. I think that's the case as well here.

I will say that you don't know what the counterfactual is, you don't know whether you might have bought more time or maybe that you have simply, you might have still needed the guarantees but would there have had to done as much, that's the question. This particular crisis was severe, the idea that you weren't going to need government backstops seemed probably naïve to me but we didn't know that going in. It was very hard to tell in the moment. It was pretty clear that it was very systemic and global from the get go. Having a response that policymakers to say yes, let's do this and let's do it in force, could it have made the pain a bit less and the need for guarantees a little smaller, perhaps so the system could heal itself a little bit more.

You don't know that it would have helped but I doubt it would have been hurtful. I think if it were well planned and well executed the moral hazard implications of it would have been pretty small. That's my personal view.

MR. SACK: So, in an ideal world you have standing facilities or agreements by which you can respond to a financial crisis on a number of fronts with well-defined rules and immediate availability. Obviously, that's never going to happen and, if anything, we've probably gone several steps in the other direction. I guess the related question I wanted to ask is do increasing constraints on the ability to give guarantees or other support effect the way central banks should operate. Should it effect their willingness to provide liquidity? I'm not sure in which direction that goes so I'm just going to throw that to you guys as a question.

MR. SHEETS: Sure. So, I think if you have less powerful tools to fight a severe crisis, that means you need to be all the more aggressive up front doing the kinds of things that Trish has articulated. Even also recognizing the reality of what Tim was saying that as the crisis proliferates it is not going to be the lender of last resort that solves the problem, it is more likely to be the fiscal and the guarantees. But then that also opens up a central tension in all of this in that you're only going to get that fiscal on the guarantee from the political establishment once there is enough pain in the economy. Unless Congress writes a big check and provides a lot of fiscal authority to the technocratic establishment, which I don't see happening any time soon, we're kind of stuck in a way. Where in order for it to be bad enough for Congress to act it is going to be at a point where all of us are shaking our heads and saying why did it get this bad.

I don't know how to resolve that and I think the "reforms" to the 13(3) facility have accentuated exactly this catch 22 is you can't do 13(3) facility for a single firm you've got to show it's a class of firms. The only way to get a class of firms in a way that is likely to be persuasive is to let the thing proliferate and cascade for a while. This is a tension and the only thing I can think of going back to your initial question, is this going to be all the more aggressive on the front end and hope that somehow the Bagehot style lending is sufficient. But it may not be in response to some shocks.

MR. SACK: One question that came in which, I think, is straightforward is whether all these facilities would be possible going forward under Dodd Frank. I assume we think yes.

MR. PARKINSON: Well, at least I think are all what were called broad based facilities, I mean clearly the legislation prescribed the narrow facilities. There are other provisions of it having to do with collateralization and other things that, I think, are intended to make it more stringent. I don't think interpreting that is straightforward. I think at previous conferences that I've been at; various former Federal Reserve officials and both generals and lieutenants have expressed different views as to whether certain programs that we actually used during the crisis would be permissible under the new authority. Unfortunately, it's not straightforward.

MR. SACK: So, we can talk about future crises and not knowing their exact nature and what the liquidity needs will be. There was one area that you raised in your paper and other Fed officials have raised which is, should there be a standing facility for broker dealers, something like a PDCF. Is that a recommendation you would make?

MR. SHEETS: I think with the one significant caveat or provisal it is a recommendation we made in the paper. That was that broker dealers that are subject to bank-like regulation with respect to liquidity capital et cetera, that they should have access to some sort of standing facility. The traditional reluctance, I think, for providing a standing facility to someone that's a non-bank is that it is the moral hazard, it's competitive equity issues.

The fact of the matter is, if you look at the composition of even the primary dealer of community today I think all but two are bank affiliated dealers and all but a couple of those bank affiliated dealers, the legal entity that is the primary dealer is a broker dealer entity. And through a number of changes and the facts on the ground since the crisis, all of those are at least subject. They either are parts of bank holding companies or in cases of the FBOs, they are now form to form forced to form an intermediate holding company of which the broker dealer is a sub and the Fed, I don't think it has done it completely, but it certainly could impose the very same capital restraints on those holding companies as on others.

If one then worries, as some do, a step further well what about the broker dealer entity, the sub itself. I think about through the resolution planning process and these requirements for prepositioning capital and liquidity you pretty much get the same places you get to with an insured depository institution. So, if that's the case then it seems yes, moral hazard is an issue but you can deal with it in precisely the same way that you deal with depository institutions and that's through ex ante prudential regulation.

MR. SACK: Okay so this may be a broad summary type question. So here we are, we've been through the drill once presumably that is helpful in number of ways. I think, understanding the runnable nature of firms outside of banks. I think we're all Fed staff and the rest of us are probably better at thinking about financial stability risks and what measures, what warning signals to look for. You've all implemented this wide array of facilities and hammered out a number of specific issues on that implementation. We just have experience doing this.

So, that all seems like we're better off. On the other hand, as has been discussed, we know this was only a part of a response and it is hard to anticipate the complete response in the future. There was a lot of backlash, not just to this but to other Federal Reserve actions. We have additional restrictions now, legislative restrictions on the ability of the Fed to serve the lender as last resort role and other government efforts. So, on that, where does this leave us? I doubt it leaves us confident but are we better prepared for the next financial crisis.

MS. MOSSER: Yes, but not so much because of lender of last resort. Which, I think, for most of the facilities here, one way or another that we're discussing about broadly, there would certainly be constraints but I don't think it would make most of them impossible. The reason the financial system is safer though is because there is just lots more capital and less maturity transformation, particularly at the core of the system.

But we know how this story goes. You don't have a financial crisis every five to ten years. If you're fortunate like the United States, you have one about every 75 years. The degree of innovation and change in the financial system between now and then, particularly if there are small regulatory changes which is kind of what happened before this crisis for 75 years, then you end up in a not very safe place. Because this system sort of innovates around and that I think is the danger both from the regulatory structure standpoint as well as potentially from the lender of last resort side.

You need, I think, lender of last resort is used so seldom in the United States that we did not, as Ben mentioned at the very beginning, think about this enough beforehand in detailed ways about what we would do even though we knew the financial system was changing in structure. So, that I think is one of the biggest lessons and where I'm worried that the system by the time we get to the next crisis may not be much safer than it was in 2006 and 2007. So, that's my fear now versus the future.

MR. PARKINSON: So, I think the system is stronger is a broad statement but particularly with respect to liquidity which our session here has focused on. We now have greatly enhanced liquidity regulation. In addition, I think over and above the regulatory requirements, I think major financial institutions realize that they need more liquidity on their balance sheet than they thought was the case a decade ago. In addition, I think policymakers have learned important lessons from the crisis. Many of them we've discussed over the last 40 minutes or so.

Now that said, I agree with Trish that for both the increased strength of the financial system and its increased liquidity and the recollection of the lessons that were learned during the financial crisis there is a rate of decay. I think that's one reason why projects like this one are constructive. Hopefully, what we can do by writing these papers and by having a conference like this is remind ourselves and other policymakers and help slow that rate of decay but there is a rate of decay.

And then the final point that I would make that is very relevant to this particular panel is we do have, as I indicated earlier, standing swap lines. So, they are there and ready to go and all of these other facilities that we've discussed, they're on the shelf. Every crisis will certainly be different but the extensive liquidity facilities in so many different dimensions addressing so many different markets, it seems to me that couldn't help but be useful for a crisis any time in the next few decades. If it's 75 years out then it could be a completely different financial system yet again. But for the remainder of our lifetimes, it seems like the blueprints that we establish in weeks, days or hours, depending on the facility, they're there and they're helpful and they're instructive.

MR. SHEETS: I think in that regard it's not just the blueprints but it's fine to create a blueprint and it is mainly senior policy people that create the blueprints but then you have to execute it. One of the things, I think, that for a good long time was going to make was stronger is the fact that particularly people at New York Fed that stood up all these programs so quickly. As long as they're around, I suspect that our ability to get things stood up quickly will be better than it was.

MR. SACK: Okay so extension of retirement age for New York Fed staff. That's the recommendation. I think we'll leave it there. Thank you very much to the panelists.

MR. BERNANKE: Thank you all. I'd like to call up the next panel which is going to turn to the question of capital and guarantees to the banks. Nellie Liang will be the moderator. The lead speakers are Dan Jester and Lee Sachs. Other panelists are Jim Wigand and Tim Clark. For the people who are standing in the back, if you want to continue to stand you're welcome too, there is actually plenty of seats. I should have noted earlier, if you haven't figured it out by now, this is being live webcast so be careful about falling asleep because you might find yourself on camera.

MR. WESSEL: (in progress) is broadly defined as Non-Banks, or Beyond the Banks. The groupings of these things is a little bit arbitrary. So Non-Banks includes Bear-Sterns, Lehman Brothers, AIG, money market funds, and the auto companies, for some reason. Because they had to go somewhere and we didn't want to leave them out.

We have a particular good panel to discuss what was some of the most consequential decisions of the crisis and ones that may be with us for some time.

Our lead speaker is going to be Bill Dudley, who is the former President of the Federal Reserve Bank of New York. And then I'm joined by Scott Alvarez, who was the General Counsel at the Federal Reserve Board, I think forever until recently; is that right?

MR. ALVAREZ: Right, I was born at the Foundation.

MR. WESSEL: And Steve Shafran, who is one of those people who was in the private sector and had the misfortunate to have Hank Paulsen know his phone number, so was instrumental -- you were in both administrations, right? In both the Bush and Obama Administrations.

Bill's going to kick this off and then we'll turn to questions.

MR. DUDLEY: Okay. Thank you. So first of all I want to thank Nelly Lang and Scott Alvarez for all the work they did on this paper. They deserve the credit for the paper on the Non-Bank Financial Sector. That said is, I have to issue my usual disclaimer, my comments, they reflect my own views and not those of the Federal Reserve System. I'm on Garden Leave so I still have a few weeks.

And I'm also going to apologize, I'm only going to speak for a couple minutes so there's a lot of stuff I'm going to leave out. So if you don't hear it mentioned, it's not my fault. I'm going to focus my remarks on answering three questions.

First, why was the Non-Bank sector so important as part of the Financial Crisis.

Second, what were the primary factors that drove the Feds and the US Treasury decisions with respect to Bear Sterns, Lehman, and AIG.

And then third, what lessons should we take away from the Financial Crisis with respect to the Non-Banks sector. In particular, are we in a better place today than we were 10 years ago with respect to regulatory oversight and the tools we have available to use for the next time when we encounter a period of financial instability.

So turning to the first question, I think what's different about the Financial Crisis was that the Non-Bank sector really played a key role. And the question is why was that? As I see it, there were four important factors behind that.

The first is that the securities industry, mortgage banking, finance companies, and the GSEs all grew very, very rapidly, starting in the 1980s, and they grew to play a very significant role in the issuance of credit in the US economy. And that was due to many factors, but I think the most important one was the development of securitization and structured finance. That really facilitated the originate and distribute model. And that led to the development of global capital markets in which the security firms were really able to compete effectively with commercial banks.

So prior to the 1990s we had investment banks that tended to be private partnerships with very small balance sheets. And during that period a major investment bank could fail, think of Drexel Burnham failure in 1990. But the failure would typically not be systemic.

In contrast, by the time of the Financial Crisis we had very large investment banks who were global, very leveraged, and were dependent on wholesale funding to fund assets that were often either hard to value, think CDOs, or liquid, think commercial real estate.

The second thing that was important was the regulatory regime did not keep pace with these changes in the structure of the financial system. The focus of security regulators, both Federal and state, was primarily on investor protection, not on financial stability or the safety and soundness of the firms that they regulated. In particular the potential standards with respect to liquidity and capital for securities firms were either very weak or nonexistent.

The third issue was that the Central Bank's authority to provide a lender of last resort backstop to Non-Banks was very limited. We talked a lot already about Section 13.3 can only be used in unusual and exigent circumstances, credit can only be extended if it's determined that credit's not available from another source. So that means that the credit from a Central Bank to the Non-Bank Financial Sector can only be forthcoming only after circumstances have become very dire.

So as a result of that, counterparties to securities firms could have very little confidence about when or whether a Central Bank was actually going to be willing to provide liquidity, which made runs much more likely.

And then finally, there was no good resolution regime in place for large systemic non-banking firms. As we saw in the case of Lehman, the bankruptcy path turned out to be particularly problematic because it spurred a run on the money market mutual funds, which we'll touch on. And it led to the abrupt closeout of trillions of dollars of OTC derivative contracts, which turned out to be very damaging. And it also raised questions about the viability of the other global securities firms that were still in business.

So as we stood on the eve of the Financial Crisis, the Non-Bank sector was very fragile. And so when the housing bubble burst and home prices declined, we knew that the stress on this sector was going to increase. And as it increased there was very little in the tool kit that the regulatory authorities had to respond as circumstances deteriorated. And I think that made it just much more difficult to arrest the downward dynamic and to restore confidence.

So in 2008 when we were faced with the eminent failures of Bear Sterns, Lehman and AIG in short order, policy makers were faced with an important question. How far could they go in stretching the available tools, which were clearly inadequate, to limit contagion and constrain an ever- broadening Financial Crisis.

So let's turn to the second set of issues. So in determining whether to intervene, I think policy makers wrestled mainly with three major questions.

The first was would the failure of the institution likely cause material harm to the core of the financial system and to the overall economy? So if the firm failed, what would be the consequences?

The second is would a broader provision of liquidity to markets and other firms likely be sufficient to mitigate the effects of such a firm's failure? Could you provide broad based liquidity, the firm fails, life goes on, it's not systemic.

And the third is could lending to the firm be sufficient to prevent its failure?

Now these are all questions that require judgment and certainly depend on the particular set of circumstances in place at the time that the judgment needs to be made. Suffice to say, in the case of Bear Sterns and AIG, the answer to all three questions was judged to be yes. A failure would likely damage the core financial system and the economy. Provision of liquidity to the rest of the financial system would unlikely be powerful enough by itself to sufficiently limit the damage. And the firms were judged as still likely to be viable.

Bear Sterns had a willing acquisition partner in the form of J.P. Morgan. And AIG, as we know, had major insurance subsidiaries that could be sold or that would, over time, provide support to the parent holding company.

In contrast, for Lehman the answer to the third question was judged to be no. Although Lehman might possibly have been judged as solvent on a book value basis in September 2008, the fact is that many of its assets were carried on the books at inflated valuations and the firm's franchise was rapidly eroding. Moreover I think it's important to recognize that Lehman failed an important market test. It was unable to raise capital on its own and no acquirer was able to step forward on a timely basis and acquire Lehman, even with a large chunk of its more liquid impaired assets being removed from its balance sheet.

So this brings us to the third question. So where do we stand today with respect to the Non-Bank Financial Sector, and what are the lessons we should have learned from the Financial Crisis?

So as I look at it, today there's both positives and negatives. On the positive side of the ledger, all the major investment banks now are either part of bank holding companies or foreign banking organizations and thus are subject to capital and liquidity regulation and they're subject to supervision that focuses on good governance, risk management, and safety and soundness. So that's a very different situation than we were in in 2007.

On the positive side, the Dodd Frank Act does provide the authority for the Financial Stability Oversight Council to designate firms and activities to a more limited extent as systemic and subject to prudential regulation. So in principle, if new firms and activities were to merge that were systemic, the regulatory perimeter could be adjusted as needed. So there's potentially the ability. However I am very skeptical about whether this will actually be ever used in a timely way. I think it's always going to be late.

The third thing that's good is the Dodd Frank Act does provide a means for a resolution of a complex systemic financial institution outside a bankruptcy. And that's contained in the Orderly Liquidation Authority of Title II of Dodd Frank.

And some of the more major structural weaknesses that I think made the securities industry even more vulnerable have been addressed. And that includes reforms to the money market mutual fund industry and the reforms that we've done to the tri-party repo system.

On the negative side, well there's this issue of will the FSEC act in a timely way. But there's also the issue of the fact that there's no lender of last resort available for non-bank financial firms except in extremis. And the fact that the Feds Section 13.3 authority has been constrained as the Fed can no longer lend to a single firm under Section 13.3. That basically rules out the type of interventions that were undertaken in the case of Bear Sterns and AIG.

I, like I think many other people who've worked on these papers, would like to move in the opposite direction to have a system similar to what we actually have for commercial banks. Have a lender of last resort available as a normal course of business, not an extremist, to systemic Non-Bank Financial firms with an explicit quid pro quo. To get this you have to be subject to appropriate prudential regulation and supervision. I have to say I'm disappointed that not only do we not have this, it's not even being seriously debated.

So what are the lessons learned? Well the most important lesson, from my perspective by far, is that the regulatory regime has to keep up with the evolving financial system. And that's really going to be the challenge for the next generation. I don't know, I think this is one where you're probably going to fail again and again, but that's the challenge.

Other key lessons include that in a crisis you have to have the ability to act aggressively to get in front of the crisis, to contain panics and limit contagion. So to do that the authorities need the legal tools to be able to implement such actions in a timely way.

The second lesson I think is that regulators do have to practice how they would coordinate their actions during time of crisis, who's responsible for what, and is there a common understanding concerning responsibilities both nationally and on a cross-border basis. I think one area that isn't buttoned up enough is how we handle things when a global firm goes under.

And third lesson is when asset qualities deteriorating there is no good substitute for capital. Liquidity in a lender of last resort backstop are necessary but they're not sufficient. When the private sector is unwilling or unable to supply capital the government may have to step forward. In my opinion in the fall of 2008, the public capital brought forth by the TARP legislation was an essential ingredient for ending the crisis. But as we saw, the situation first had to get really, really bad for Congress to be willing to enact that legislation.

And I think this underscores an important point that we may want to debate further. Even if Lehman had somehow been saved, the crisis would have continued. Other parts of the financial system would have broken until Congress acted, and the public capital necessary to bolster the financial system become available. You can lend this notion that somehow the Lehman had been saved everything would have been fine. No, the stress level would have continued, other things would have broken, until Congress acted and enacted TARP.

Thank you.

MR. WESSEL: Thank you, Bill. Maybe Steve and Scott, I have some specific questions. But can I ask your reactions to the big question that Bill posed, which is essentially in what ways are we better off and in what ways are we not better off when you think about the growth of the finance outside of banks.

MR. ALVAREZ: So I think that there are definitely, as Bill pointed out, some ways that we are better off. We have a resolution regime for not large financial firms that we did not have before. And I think that's a very powerful tool. It's in some ways meant to be a substitute for the constraints on 13.3 so the Fed can't lend to those firms but we can put them in resolution. That's a way to punish shareholders a little bit more, punish management a little bit more, but also keep an eye on financial stability in the process of resolving the firm. I think while that's a powerful tool and I think in some ways the liquidity and capital that might be needed for a large financial firm could come out of a resolution, it's a pretty unwieldy tool as well. So I wonder how that would work if Bear Sterns, Lehman Brothers, AIG, Wachovia, were all failing at the same time. Would the government be able to put all of them in resolution and manage that at the same time? So in that respect, I think the loss of Fed lender of last resort authority is perhaps a mistake because it is quicker and easier to provide some liquidity in an emergency than to stand up and manage a resolution.

So I think the two tools would work better if they were both in place. We have the one, we've better off with having resolution, but there's a minus in losing the Fed lending authority.

One place where I think we're better off is the Fed lending authority continues to exist and is sort of been extenuated in lending to Central Clearing, you know, financial market utilities. And I think that is actually going to turn out to be useful in the future. We've designed our system now in a way where there's going to be more clearing and there's going to be interconnection between the largest firms in derivatives and swaps and other kinds of instruments. And so those central counter parties become a note of risk and potential contagion. And I think the fact that Congress has preserved the authority of the Fed to lend to them is a really useful tool.

Obviously losing, you know, the ESF is not a plus.

MR. WESSEL: The Exchange Stabilization Fund that was used for the money market funds.

MR. ALVAREZ: Department of the Treasury, that's right. Because that had such a potential for use by the Treasury, and so that leaves the Treasury, I think, with two arms tied behind their back instead of just one.

So one other tool that I think is very useful is not so much a post-crisis tool, but a pre-crisis tool. I think the additions to resilience, supervisory authority, the focus on financial stability as focus for regulators, is a really important thing. We've had a lot of discussion today about the need for capital and to the extent that the regulators are in better position to both supervisor and require capital on a broader range to the financial system, including non-banks, I think that's a positive.

MR. WESSEL: Are you confident that if the authorities lent to a Central Clearing House that Congress wouldn't react in horror and close that off?

MR. ALVAREZ: So, you know, it worries me that, you know, the Federal Reserve lent and was repaid fully, with interest, on all of its loans, and Congress rewarded the Fed by taking away their authority. I think that's always a risk. On the other hand, it's an important tool and we're better off with that tool and you have to use the tools that you have and deal with the consequences later on.

MR. WESSEL: Steve.

MR. SHAFRAN: I came in this as a fixer not as a policy maker, so I'll sort of stay in my lane.

I look at the world I've participated in the last 10 years and I can't help but think about are we fighting the last war element of this whole conversation. What we see in the economy and what's happening in sort of the forefront of our industry is essentially the, I don't know if it's the last act, but a major ongoing act in the disintermediation of what banks do. And we look at all these really cool companies that interface with consumers and take deposits now, that aren't banks. And we look at all these really cool companies that make loans to individuals and corporations, that aren't banks. And if we roll that clock forward five, 10, 15 years, the trend lines we're on, two things come out of that phenomenon.

One is that I think those institutions get bigger, more powerful, more important. And two, they lesson the importance and significance of the banks that we've spent so much time thinking about and creating a regulatory environment for. So when we wake up in the world the next time that there's a problem, these non-bank institutions that are essential intermediating savings into investment and so forth, none of the things that we did will be -- I don't know if they'll be effective in assisting those institutions, and I do think those institutions are going to really hollow out our traditional banks that we spend so much time regulating and worrying about.

The other thing that sort of depresses me a bit is somehow or another we participated -- there was never any confidence, not a lot of confidence, in us as decision makers, on the part of the people who have the money on the Hill. And that feels more true today than it did 10 years ago, and it was pretty tough 10 years ago.

And so I think about the need -- again, the money market fund guarantee, which we can talk about, but the ability to use the SF on the turn of a dime and do that and affect positive change. Clearly that was a bad thing because we said we shouldn't do that again. And so our successors will just that many fewer tools and I think be that much hampered and we will all be in that much more danger.

Which turns me to my last point, which is after I left the government and spent some time teaching at Georgetown, I sort of learned what everybody who's been doing this for a living knew, which is whenever you have deposit taking institutions and they don't have access to a lender of last resort, bad things will happen. It's just that simple.

And the money market funds were, I think, the best somebody calls them the dry tender on the forest floor. They continue to be effectively that. And the fact that we went through the crisis we went through, and we saw how much danger and how close they brought us to really serious problems and we've effectively left them as they were, more or less, just startles me. And I would expect more trouble from this sector in the future when there's a liquidity run.

MR. WESSEL: I was feeling pretty optimistic this morning when I heard that we've only had financial crisis every 75 years and I'm 64 years old, so I figured I was safe. Unfortunately my optimism has been completely dispelled in the last 20 minutes. So the bar will be open soon.

So in this regulatory perimeter thing, so I thought the idea was that the FSOC was going to have the power to decide when institutions that might not seem systemically important today become systemically important that they could be designated. That was clearly the idea.

It seems to me that that's been basically completely gutted. The combination of the lawsuits from the insurance companies and the current attitude of the FSOC, it seems to me that we basically have defanged that tool. Do you agree or not?

MR. SHAFRAN: Well it comes back to what I said originally, we have the tool. The question is will that tool be actually used in a timely way.

MR. WESSEL: Then the answer is?

MR. SHAFRAN: And I think the answer's probably not. I mean, you know, one thing that's been a thread going through all these conversations is the political economy is much worse today than it was 10 years ago in terms of what you can actually do. Like could you do TARP legislation again? If you did TARP legislation again could you actually put the capital into the banks? Would the banks actually be willing to take the capital?

I mean there's a lot of political economy elements that I think have gone very much in the wrong direction. And I think an interesting question is what can we do to sort of push against that?

MR. WESSEL: The only thing was the FSOC was designed again, to fight the last war. There were institutions that weren't in the system, we could name them, we had one or two hands to get them all. Well, okay, those institutions aren't there or they may not be the problem. What if it's an entire industry?

MR. SHAFRAN: That's not what the FSOC is set up to do. And I say that, you know, when we think about private ending or private depositing, and the FSOC is not a tool. It's a take that on.

MR. WESSEL: Steve, you suggested that we haven't done enough on the money market funds. What is it that -- well let me start. Did you anticipate, did anybody anticipate the money market fund problem would follow Lehman? Scott, did you want to weigh in, I'm sorry?

MR. ALVAREZ: I wanted to weigh in on the last crisis.

MR. WESSEL: Please.

MR. ALVAREZ: Last.

MR. WESSEL: Last crisis. That's what we're doing today, weighting in on the last crisis.

MR. ALVAREZ: So I think there is one really cool aspect of FSOC, and that's that I think in the 1930s Congress couldn't have predicted what the next part of the financial system would be that would cause trouble. And the idea of the FSOC was, you know, you've got an agency that's keeping a broader eye on the market developments and can be nimble and can move the regulatory framework as it needs to handle the development in the market. And I think that's actually cooler than having Congress try to do that all the time because it's very difficult to get new laws passed.

On the other hand, for the reasons Bill mentioned, I think it's unlikely that it's going to work soon enough to make it useful because it doesn't help to designate someone right before a crisis, you have to designate them far enough in advance that you can do something about it. And so I actually really like, or at least would want to think more about Bill's idea that another way to approach this is to have some emergency tools like a discount window facility that's open to financial institutions but on conditions they agree to some supervisory framework. And that, you know, that provides an incentive for firms to think about where they might be in a crisis and what kind of help they might need in a crisis and prepare for it in advance.

So there are other ideas out there that add the nimbleness of FSOC. I don't want to be entirely negative so that you don't have to rush off to the bar. I think there are other solutions to think about.

MR. WESSEL: So I can see that Geithner's clearly having influence here. The former General Counsel of the Federal Reserve used the word "cooler" twice in reference to an element --

MR. ALVAREZ: I've been using it a lot longer.

MR. WESSEL: Steve, so on the money market fund, first of all, was this a surprise that Lehman was followed by breaking the buck at the Primary Reserve Fund or the Reserve Primary Fund, whatever it is, and then -- so let's start with that. Was this one of those unforeseen?

MR. SHAFRAN: Unforeseen.

MR. WESSEL: It's kind of alarming.

MR. SHAFRAN: Yes.

MR. WESSEL: Okay.

MR. SHAFRAN: I mean the check around sort of the markets knowing best, you know, I think we spent much of the summer after Bear assuring ourselves that “Well, everybody knows Lehman’s next. Everybody knows they’re in trouble. Surely all their trading partners are buttoned up, everybody’s adequately collateralized, there’s no way anything bad could happen.” But we thought that the markets had sort of self-corrected and were taking things into account over the course of the summer. That turned out to be less true than we thought.

MR. ALVAREZ: I think we knew it was going to be bad, I mean it was just worse than that.

MR. WESSEL: Right. I mean I thought, for people who haven’t read it, Tim Geithner and Andrew Metrick have a kind of sarcastic dialogue on the Yale website about Leman Brothers, and I thought one of the most useful admissions that Geithner makes is “We knew it would be bad, but it was worse than we expected.” Which as the ring of honesty to it.

But, Steve, we haven’t done enough for money market funds? Like there’s been a number of -- with a great deal of struggle the FSOC and the SEC put some new rules in place, there’s now less money in the prime fund which invest more in corporate paper and more money in the funds that invest in government securities, but you’re not satisfied?

MR. SHAFRAN: I just think the concept of having deposit taking institutions not having access to a lender of last resort is profoundly risky. And with all due respect to the wisdom of the institutions and their desire to mitigate risk and to do the right thing, you know, in the middle of the Financial Crisis the vast majority of the money market fund owners told us “We don’t want insurance. We don’t need it, you’re ruining our industry.” And so the idea that they are going to before the fact sign up to some sort of government insurance program with attendant regulation on a voluntary basis, I think is fanciful.

The behavior in the middle of the crisis I think is really instructive. I think the money market funds, the industry itself, was convinced that they brought no danger to the system, that they were prudently managed, that they had done everything they were supposed to do, and weren't a risk. And I think we were 24/48 hours from Armageddon because of that position.

And so I think this is again one of those cases where the FSOC, it's not that there was any one particular money market fund that was a problem, it was having a patch of real estate occupied by a series of industry participants that collectively created this risk.

MALE SPEAKER: So we're basically --

MR. WESSEL: Still at risk.

MR. SHAFRAN: Yes.

MR. WESSEL: You guys agree?

MR. ALVAREZ: I think still at risk and probably a little bit less risk in the sense that you know you have a floating NAV for the institutional prime funds, which I think is an important difference because you don't have the incentive to get there first and the fact that the prime funds are much smaller. So it's still a risk, but I think at least we moved in the right direction.

MR. WESSEL: Scott, I don't want to litigate the entire Lehman thing in the time we have. Well actually I'd like to but I'm not going to.

But there are two things that have been raised and I'm sort of curious because they're both legal issues or in part legal issues. One is -- and, Bill, to you as well. What difference does it make if somebody becomes a bank holding company? In your paper you say you considered making investment banks bank holding companies in June, decided not to do it. After Lehman fails, you allow Goldman Sachs and Morgan

Stanley to become bank holding companies.

A, what difference does it make, and B, what are the criteria that the Fed used? Is it judgment or legal to decide whether a firm can become a bank holding company?

MR. DUDLEY: So let me take sort of the market sense and I'll turn it to Scott for the legal aspect of it.

I think our judgment was that it wouldn't really do very much substantively because you still have all the 23a restrictions on lending. You can't lend to the securities sub of a bank holding company, so Morgan Stanley and Goldman Sachs were still going to have these very large securities firms that the Fed couldn't lend to. But it would be in some way an endorsement of the firms that the Fed is thinking that they are viable, that's why they're letting them become bank holding companies. And coupled with the fact that we wanted Goldman Sachs and Morgan Stanley to go out and raise private capital. It's the combination of those two things that we thought were successful, would be helpful.

So it's not that we thought that making them bank holding companies is all of a sudden going to save the day, but if they became bank holding companies and they went out and raised outside capital, which both Morgan Stanley and Goldman Sachs did, we thought in combination that would make people in the marketplace feel that they had a viable business model and that they would be able to survive. And even that said, it was a very close thing, especially for Morgan Stanley, it was a very close thing.

MR. WESSEL: Scott?

MR. ALVAREZ: Yeah. So Bill's got it exactly right. From a legal side there was no difference. They got no greater access to the discount window by becoming a bank holding company, they got no special privileges by being a bank holding company. It was, I think, as Bill said, the imprimatur of the Federal Reserve had some value to it. Somebody in the middle of the crisis, when nobody knew what the real strength of an organization was, some independent group with quality analysis and standards, evaluated the balance sheet and the financial resources from the government and then from the private sector. And both of them agreed that these are companies that met some minimum standards at the time when everybody was uncertain about it. I think that was the best value that it had.

But clearly without the private capital, I don't know that it would have worked as a device.

MR. WESSEL: But 23a, this rule that you in effect can't lend to the broker, you waived that for Morgan Stanley, Morgan Sachs. So that can't have been --

MR. ALVAREZ: So not exactly. So 23a limits the funding that can come from the bank to the non-bank side. What the Fed waived was -- so it applies not just to loans or funding that goes through, but purchase of assets. And what the Fed did was allow the bank to purchase assets from the non-banking side of Goldman and Morgan Stanley that could have been originated by the banks to start with. So, you know, it was a way of getting some funding through. But if you were looking for a door to provide strong amount of liquidity to the broker/dealer, it would be tough.

MR. WESSEL: Okay. In the paper you say that you refer to become a bank holding company you have to demonstrate sufficient financial and managerial resources to meet regulatory and supervisory requirements and to safely and soundly continue operations. Is that a legal standard, or is that just what the practice of the Federal Reserve is?

MR. ALVAREZ: No, that's the statutory standard.

MR. WESSEL: I see. Okay. All right. Second question for you, Scott and Bill. I'll get to you in a minute, I'm not going to let you off the hook.

So a lot of the question about Lehman has to do with collateral, and the 13.3 Section of the Federal Reserve Act says that a loan has to be secured to the satisfaction of the Reserve Bank. How did you go about defining what "secured to the satisfaction" meant, given that this hadn't been used very much in the last 75 years.

MR. DUDLEY: Well, so there was a lot of soul searching about that, and we finally decided in the end that the best way to figure it out is just to go ask the Rolling Stones what would make them satisfied.

MALE SPEAKER: And what was that?

MR. DUDLEY: Yeah. So, you know, "secured to satisfaction" is obviously a bit a morphis. But 13.3 and 10b, the two authorities we used most for lending both have that standard. And they both are in exclusively lending authority. So, you know, the Fed had a long history of lending, and I think it always understood that as lender of last resort it was not to provide capital, it was not providing grants, it was providing funds with the expectation of repayment of those funds. So looking at collateral then becomes an exercise in deciding whether you feel secure enough that you are going to be repaid for the funds that you've lent to the organization.

And we had through the discount window a long tradition of lending and evaluating collateral and applying haircuts to the valuations to decide what amount of collateral would be appropriate for that kind of credit, and we've applied a similar kind of standard to the non-banking side. So were we reasonably expecting to be repaid in the credit review?

MR. SHAFRAN: I think that's the right standard. I think what's different for securities firms compared to commercial banks in terms of discount window lending is if you're an insured depository institution you probably have plenty of collateral. Because a whole portion of your balance sheet doesn't have to be collateralized, that's the part that's insured by the deposit insurance. So for security firms it's a lot different, the collateral actually can be quite scarce. And one thing that, you know, happened in the crisis that wasn't counted on very much and the valuation of the collateral oftentimes was in the wrong place and it wasn't often easy to move the collateral to the right place or to get an appropriate claim on that collateral.

And a lot of this was the fact that the firms themselves had very, very poor data systems. They were very complex in terms of corporate form. And so it wasn't just a question of did the firm have enough collateral or not have enough collateral, it's also could they move the collateral to the places where they needed to move the collateral to actually secure the loans.

MR. ALVAREZ: I think that's actually a really important point because when you look at a balance sheet of a bank you can get a sense of how much it can borrow from looking at its assets because the deposits are not secured by those assets. But for the broker/dealer, since they're using their assets actively to raise funding all the time, they aren't going to have the level of collateral that's unencumbered. They have plenty of assets perhaps, but they're using them actively.

MR. WESSEL: From a problem if you get your dream here and then we can lender of last resort to broker/dealers, right?

MR. ALVAREZ: Maybe, maybe not. It depends on the regulatory scheme that goes along with having access to the discount window. You could require certain amounts of liquidity, capital, and unencumbered assets.

MR. WESSEL: Right.

MR. SHAFRAN: And you could require further supervisory practice that they actually know what --

MR. WESSEL: Know where it is.

MR. SHAFRAN: Know where the collateral is and have the ability to mobilize the collateral in a timely basis.

MR. ALVAREZ: Over the final weekend that the Fed, when we were parsing through Lehman's balance sheet, it was a roughly six hundred billion dollar balance sheet, the hole that we were sort of assigning to Wall Street to fill was some $30 billion. And the idea was that the assets that were left, that were free to be pledged, were, I guess one standard to think about was were they worth or more less than the amount that you were trying to borrow against them.

And in the case of Lehman, there were assets that at one point had been worth $50 billion that were now, arguably the market was saying, was worth $30 billion. And would send $30 billion, or $20 billion against them, and certainly not 50. So this notion of what's enough collateral sometimes just a function of what's the value of the collateral.

But that was the left over toxic assets on Lehman's balance sheet that ultimately we couldn't find some other party to lend to.

MR. WESSEL: Steve, is there any -- I know autos is a bit awkward to put into this conversation, and it began in the Bush Administration, was finished by the Obama Administration. But are there any lessons about the auto industry bailout that we should take away? What criteria do we use to judge whether that was a success or not?

MR. SHAFRAN: That's a tough one. I think of the auto bailout as sort of there were three pieces to it that I guess I would just organize my thoughts around.

First there was assisting the auto finance companies, which were central to the car makers but looked at as a finance person, they're just like any other financial institution. And so once the decision was made, their balance sheets resembled that of more like a bank than a car company. And so there was a decision taken to include them in the sort of the CCP like assistance that we gave to other financial institutions.

As far as the government's decision to aid an industrial business, whether it's a car maker, a steel maker, or something like that, down the road, I think that's really outside the purview of what we saw as our central mission. I can't help but note that it was probably the most popular thing that happened in the eyes of the public.

MR. WESSEL: Even though it lost money, not like the banks.

MR. SHAFRAN: So maybe there's some logic in that. Maybe if they lost --

MR. WESSEL: Maybe if they've lost more money on the banks they'd be more popular.

MR. SHAFRAN: Yeah. Good thinking. No. And I think the other thing that was unique that I, just a small footnote. Chrysler Financial was a particularly odd thing because it was owned by a private equity firm. And the interplay that the Obama Administration dealt with, you know, whether to save Chrysler or not. We didn't have the time to have those debates, but we were trying to sort through in order to keep the car companies alive for the next administration, Chrysler Financial was there and SERBUS was negotiating hard for their own economy interest, and it was kind of an odd situation to be a government servant in what felt like any other commercial negotiation dealing with them. But it's a footnote I think to the larger public policy issues.

MR. WESSEL: There's a question from the audience. The Exchange Stabilization Fund was created by Congress expressly for the purpose of, as the name implies, foreign exchange and US dollar stability. So while it's nice that the Treasury Secretary has this slush fund he can use for whatever purpose he wants, is it really legit to say "Oh, this was for the money market funds and it's a tragedy that that power was taken away."

MR. ALVAREZ: Well I'm looking at Bob Hoyt, who rendered the judgment to us that it could be used for such a thing. I think the rules are the rules, they were drafted the way they were drafted and the stability of -- I look at Exchange Stabilization stabilizing the dollar as a central to anything we were trying to do it. So I don't see our actions at all inconsistent with what the letter of what the funds enabling legislation said.

MR. WESSEL: You guys have your lights on because you want to say anything, or just to have your lights on.

MR. ALVAREZ: So I agree with what Steve said. I think that, you know, particularly as the financial systems grows internationally and becomes much more integrated, the dollar and the effect on foreign markets is going to be much more significant from troubles in the United States. So I think actually it's not hard to draw the conclusion the Exchange Stabilization Fund as it's written right now or it was written at the time of the crisis, I should say, could serve that purpose. And any tool that you have is a useful tool. Otherwise, you know, if you only have a hammer, everything looks like a nail, and that just doesn't work. Not everything is a nail in the crisis.

MR. WESSEL: Bill, you make the point, a good one I think, that while we've made some progress on resolution, one of the things we learned during the crisis is that these things spread pretty quickly from one country to another, particularly when we have global financial institutions. Lehman was one example, but of course not the only one.

So how much should I worry about the fact that we've made not very progress on how to resolve the collapse of a financial institution that sprawls across borders?

MR. DUDLEY: Well I don't want to overstate it, I mean --

MR. WESSEL: No, go ahead. You're not at the Fed anymore, you can overstate.

MR. DUDLEY: We have made some progress. I mean there actually are tripartite exercises where people were actually talking about what the responsibilities are. And every time we've done those we've learned new things that we hadn't thought about before and we need to address.

But, you know, I think --

MR. WESSEL: When you say "tripartite" what do you mean?

MR. DUDLEY: You know, like ECB --

MR. WESSEL: Bank of England and the Fed.

MR. DUDLEY: -- and the Federal Reserve. So there's been discussions like that that I think are helpful to try to sort out what's supposed to happen.

But you know what, one example of what's interesting about those discussions is who's going to be the spokesman when you have a financial crisis? Probably going to be the Finance Ministry. When are they going to be drawn into the conversation? Probably very late. So even that's like a -- shows you some of the problems are in terms of responding to a crisis.

So, look, I think we're in a better place than we were before. But until you actually do it, everyone's going to run. You know, the first time, the next time we get into this situation, people are going to run because one of the fundamental issues that are out there is the cost of running is really low. And so if you have any sense it could particularly go badly, you're going to run. And so until we pull this off well, it's going to be hard to imagine that the first time is going to go very smoothly.

MR. WESSEL: Dudley calls for collapse of major international finances so we can get more practice.

MR. ALVAREZ: How about a minor collapse?

MR. WESSEL: Yeah. Yeah, maybe a Luxembourg bank. Scott, one of the -- this is directed to you, I'm not sure you should be the only one that has to answer it. What was the thinking about setting up Title II of Dodd Frank to resolve financial institutions as opposed to just altering bankruptcy proceedings so we didn't need to involve the government so much?

MR. SHAFRAN: So the advantage of Title II over bankruptcy is multiple. One, the clearest advantage is there's a source of funding that's guaranteed for the resolution. I'm not sure how you could change the Bankruptcy Code in a way that would make that happen other than, you know, because you would be giving the funding over to a band of creditors to decide how that funding would be distributed. That creates its own sort of problems.

It also, I think, creates the idea that instead of just worrying about the repayment of creditors, you worry about financial stability. And again I go back to I'm not sure how the mechanism and structure of bankruptcy would allow that particular group, creditors, and even with court supervision, to take into account financial stability. Their incentives are not to take care of financial stability, incentives of the creditors are to take care of the creditors.

So there may be ways that bankruptcy can be improved, I think that there's a lot of people thinking about that. And I wouldn't say that we shouldn't continue to try to work on improving bankruptcy to help in a financial crisis. But I think the central core of Title II is really something that doesn't transplant easily into the Bankruptcy Code.

MR. WESSEL: In both the Lehman case and the AIG case, one of the big problems was derivatives and how extensively they were held and how hard it was to resolve them and who got stuck with the losses and all that. Is that a problem we've put behind us, or does that remain something we have despite the Central Clearing, have yet to address fully?

MR. DUDLEY: Well we've done a couple things on derivatives that I think are positive. One, Central Clearing of the derivatives is very helpful because you replace a lot of bilateral risk with risks of the Central Clearing House. And there are tools to support the Clearing House through lender of last resort. So I think that's very good.

We've working on the closeout of derivatives problem, that's the one that we sort of have to solve and it's just working on that but it hasn't really been resolved. The closeout of derivatives problem is if a firm goes into bankruptcy and fails, people have the right to close out the derivatives trades if they want to, if they close out the ones that are advantageous to them and they leave the ones in place that are disadvantageous to them. And that creates a huge amount of turmoil in the market. And that was one of the most disruptive aspects of Lehman's failure. So we gotta finish the task of managing to that if there is a Title II resolution that the derivatives book just moves into the new recapitalized company without triggering the closeout.

And, you know, I think that's going to be done. I think we're going to make it to that point, but we haven't quite got there yet.

MR. WESSEL: All right. Well with that, join me in thanking this panel and introducing the next one.

The next panel is on the minor issue of Government Sponsored Enterprises and Housing. The moderator will be Neel Kashkari, late of the TARP, now at the Federal Reserve Bank of Minneapolis. The lead speaker will be Michael Barr, and the panelists will be returning for a second appearance, Dan Jester and Andreas Lehnert from the Federal Reserve Board.

(Recess)

MR. KASHKARI: Good afternoon. My name is Neel Kashkari. Let me just offer the standard disclaimer that my remarks reflect my own views and not necessarily those of the Federal Reserve.

You know, the most common question I am asked about housing and the financial crisis is why didn't we do more for home owners? And, you know, couldn't we have just taken the 700 billion dollars and instead of focusing on banks, just focus on homeowners, wouldn't that have solved the crisis? And just to kick off the discussion, I am going to turn over to Michael here in a second.

My reaction is the US economy had a massive heart attack. And why does a heart attack kill the patient. A heart attack kills the patient because it deprives blood to their critical organs. And if you have a heart attack, heaven forbid, you go to the emergency room, the surgeon is not going to operate on all your organs. The surgeon is going to go right for the heart, to stabilize the heart, to get blood flowing to the organs. And that's why the Capital Programs that we talked about earlier were so focused on getting blood flowing in the US economy again or get credit flowing again.

Now that doesn't mean that we are going to ignore all the organs or ignore the American people or ignore housing. So, the purpose of this panel is to talk about what are the actions that we took to try to stabilize housing, to get credit flowing, to modify mortgage, et cetera. Those were necessary compliments but could not have been replacements for the direct intervention in the financial markets. So, with that overview, I am going to turn over to Michael Barr, who is going to be our lead presenter and then Dan and Andreas are going to offer their own commentaries.

MR. BARR: Great. Thanks so much, Neel for that framing and thank you all for the -- the organizers who are putting this together.

What I felt I would do is just start off with a little data context and this is just a look at the distribution of single-family mortgages over the last 60 years or so. And the big takeaway from this obviously is that as a result both of changes in market practice and because of government policy, we have moved mortgages from the savings and loan sector to GSEs and private-issued mortgage backed securities. You can see that in the very large rise in the, I guess you could call that, taupe-colored segment.

And then can you see in the lead up to the financial crisis, the significant spike in private mortgage conduit as a way of funding a sub-prime but also Alt-A and some prime mortgages. And this is important to see because one of the first things that the government had to do was figure out how to continue to have mortgages be issued when the financial sector was collapsing and one of the most important things that either administration did with respect to housing was first to work on the passage of HERA, the Housing and Economic Recovery Act in the summer of 2008 and then to place the GSEs in a conservatorship with a treasury backstop on their capital in the fall of 2008. And then subsequently three additional agreements to place additional capital behind Fannie and Freddie because if that step had not been taken there would basically have not been a functioning mortgage market at all for anyone, let alone for individuals who were falling behind on their mortgages.

So, with that basic backstop, I will just pull a couple of charts from chart book that you have in the back that our team helped with. But let me just thank David's team here at Brookings and the Yale team for the extraordinary job on these. You can see the governments housing programs implemented over time beginning really with private sector Hope Now work with the FTICs work on doing mortgage modifications with IndyMac which set a benchmark that we then used in the HAMP Program of a 31 percent debt to income ratio for modified mortgages.

You can see also the introduction of the HAMP Program for modifications and HARP which is an aspect of the refinancing programs -- don't you love these acronyms. And the important thing you can see really is that in the bottom black chart -- bottom black bar, the course of foreclosure completions and these really are rising continuously over the period 2005 to 2010 and then with the combination of these steps in the housing sector foreclosure completion rate start to come down from 2010 forward.

You can also see it in the continued effort to have mortgage flowing and here you can see the rapid diminution of the private market for mortgage-backed securities and the GSEs taking over that role continuing lending into this market. And in this chart, you get a sense of the implementation of some of the key mortgage modification programs both in HAMP and in the GSEs more broadly as well as by the private sector and their role in reducing foreclosure completions.

I think, one of the things that is very hard to explain is the full range of programs that were offered in the housing sector. I think, in the public mind that tends to be focused on the HAMP Modification Program. And you can see that HAMP is a relatively small part of the overall modifications, refinancing and other foreclosure relief conducted during the financial crisis. So, HAMP Permanent Modifications that didn't re-default are about -- helped about a million people. But if you look at the HAMP modifications and then you add the Hope Now proprietary modifications that after 2009, generally speaking, met very good standard for reduction of payment. And you add in the GSEs HAMP-like modifications that were not funded by TARP, you are at about 9.2 million modifications over the cycle of these programs that is through 2017.

Similarly, if you look at HARP, HARP Program was setup to help people who are under water, refinance their GSE-owned mortgages. HARP helped about 3.5, 3.4 and change, million households. In addition to that the FHFA and GSEs put in place a streamlined refinance program for people who are not under water but otherwise wouldn't have qualified for refinancing. And that helped another 4 million households. And the Federal Housing Administration also put in place its own streamlined refinance program that helped another two million households. So, nine and a half million of these special refinances.

And then there is a wide range of other programs that were put in place during the financial crisis. I won't go into all the details of those now. But those helped another 5.6 million households. So, if you look, you know, overall at the program, while it's the case that I think all of us would say, we wish we had done more faster for helping more -- to help more people, that the reach of these programs is significantly larger than, I think, the public believes.

I think, the other point I want to make and I know we don't have a lot of time is that the quality of mortgage modifications that were done in these programs was significantly better than the kinds of modifications that were being done prior to these programs being instituted. And this is just one measure of this looking at how monthly payments decreased. And you can see, for example, in the industry, monthly payments were decreasing only 42 percent of the time in 2008. By 2012, they were at 90 percent. While for the GSEs, monthly payments were decreasing 45 percent of the time in modifications before the programs were put in place and after at 96 percent.

So, let me leave the slides to the side and say what did we learn about implementation? The first point one which many other panelists have been making throughout the day, is there is huge uncertainty during the implementation of these programs about what would work, what wouldn't work, and what was actually going on in the market. And there was enormous amount of friction in the system. So, unlike the -- let's say, the capital purchase programs, where you are working with a defined -- a large but defined set of financial institutions, in the case of mortgage modifications you are trying to reach millions of individual homeowners with individual workouts. And a huge friction in the system, the role of servicers in having to implement this system, servicers that were often broken and ill-equipped to deal with mortgage refinancing was a huge barrier to implementation.

I think, many of us -- all of us who wrote the paper, Phil Swagel, who is not here today, would join in this, think that the kind of experimentation we did was really useful because there is no silver bullet. But we wish we had done more of it and faster -- done more of it faster and perhaps had gone bigger, much bigger, at the beginning had we known afterwards what results we would have. So, I am out of time, let me leave it there and open it up to the panel.

MR. KASHKARI: Thanks. Andreas, let me turn to you.

MR. LEHMERT: So, thanks very much. Let me just make three additional points that Michael didn't touch on. I think first and, sort of, most important, you know, if I could go backwards in time, if there is one piece of information I can convey to myself back then and other policymakers was, you know, the focus on negative equity, on strategic default, that occupied so much of, you know, our time and attention in the early -- especially in the early parts, when we were trying to figure out, you know, what was the problem, was a little bit misplaced.

Which is not to say there wasn't a lot of strategic default, there was. A lot of people who could pay their mortgages walked away but the overwhelming majority of defaults were among people who were trying to make their payments. And, you know, there is plenty of evidence that lots of borrowers out there were, you know, scrimping to try to make their mortgage payments and in fact that had, as I will come to in my third point that had a somewhat pathological result. So, the most successful and cheapest form of modification would have been a payment -- was actually the payment reduction modifications, you know, that formed the bulk of the modifications.

Second point, you know, it's -- you know, these days we have a lot of data on mortgage markets, on housing, you know, we have linked mortgage data with credit reporting bureau data with the deeds' records. So, we understand, you know, where are the mortgages, you know, what is the mark to market LTV, how many people out there are under water right now. In the early days of the crisis that stuff was -- seemed impossible. There was a complete lack of, even sort of basic data.

First time I ever spoke to Michael was during the transition. He phoned me trying to figure out, you know, some, you know, basic numbers like, you know, what fraction of the mortgage market was under water. And, you know, we discussed the data limitations and so forth and agreed that it's difficult to make policy when the uncertainty bounds include a trillion dollars, one way or the other. So, even in those days, like you know, that was real money.

Now, local governments were desperate to understand how many of these bad loans do I have. Even delinquent loans, forget about, you know, at risk loans and where, what zip codes, what streets, where, you know, where are these people and who are the underlining servicers. On my list of talking points here is taking another swipe at servicers but Michael handled that. I will skip over that.

And then finally, you know, second liens were a problem and it's worth maybe spending just a minute on them but they are a little bit of a symptom of something that I think that particular problem isn't going to be repeated, I hope. But something like it, no doubt, is going to emerge at some point. Seem like a very, sort of, good idea, people can't make the big down payments, so maybe they can borrow part of their down payment. And, you know, there will be a junior lien that's associated with that.

But in the end, you know, it really exacerbated the, you know, the problems of, you know, figuring out who borrowers needed to talk to in order to, you know, come to some agreement with their lenders. You know, there were certain pathological instances where, you know, homeowners were kind of desperate to pay anything, that they make any kind of payment that they could. So, they would pay their junior liens if they couldn't afford their senior liens. And the result was, you know, that these things were, sort of, difficult to extinguish.

MR. KASHKARI: Thanks. Dan, you want to talk us through some of the GSE actions?

MR. JESTER: Sure. I will just make a few comments on the GSEs. Michael made a reference to it earlier. But the act of placing the GSEs in the conservatorship we thought was a necessity based on the capital situation that we assessed at the time in the summer of 2008. Notwithstanding the fact that these companies had very significant positive gap net worth on their financial statements. The true economic net worth was substantially negative.

That was confirmed with analysis led by the Federal Reserve and the OCC who took a look at the -- when they became designated as the consultative regulator, for the first time gained access to the same information that FHFA and prior to that OFHEO had received on the enterprises. And led by Tim Clark with a team of others, they helped us very materially to analyze the situation of the GSEs and as I said there is a material negative net worth.

That was borne out by subsequent experience where notwithstanding the positive reported capital they had, ultimately, they had to draw more than a 190 billion dollars under the preferred stock purchase agreements that we put in place. That action to place them in the conservatorship was very important to provide the time out and provided the GSEs the ability to continue operating and providing the important credit to the housing finance market. They were the only game in town at the time doing more than 80 percent of the volume and without them, the crisis would have been much deeper and more problematic.

I think the lessons that we drew from that experience are number one that the regulatory capital standards that were in place prior to the crisis were wholly inadequate. You can't say you weren't warned about the topic. People, dating back many years, on both sides of the aisle had raised this point but sadly nothing was done to address it.

The other thing I would say is the conservatorship, again in addition to providing the flexibility for the GSEs continued to operate and support housing finance, it also enabled policy makers to frankly respond to other topics. We had rushed to resolve the GSEs prior to other things -- other clouds that we saw, storms that we saw brewing on the horizon. And we thought it was very important, you don't get a lot of credit for -- we thought it was very important that we had resolved the GSEs before they had to deal with all the things that occurred later in the fall of 2008.

I would say the last thing, we sometimes get a question, it's been ten years, congratulations, nothing has happened with the GSEs, should you have put in place a mechanism to, you know, force a resolution prior to this date. And as we look at it, we think, no. We should not have had a forcing mechanism. Our mission was not to design a GSE reform plan when we placed them into conservatorship. It was to forestall a devastating systemic collapse of the GSEs and with the attendant knock on effects to other financial institutions, the knock-on effects to homeowners and the like. And so, we very much wanted to structure a plan that would stabilize the GSEs and operate as is. The resolution of the ultimate fate of the GSEs is up to Congress and that's where it rightly belongs.

MR. KASHKARI: Thanks. So, Michael, one of the tension, I think, we all faced in our housing programs and foreclosure programs was, some people said you need to be more aggressive and reach more homeowners, at the same time we were getting criticized if people who are not 'deserving' or getting help. And there was an inherent tension between helping lots of people and minimizing waste. Could you just talk about how to navigate that and did we navigate it appropriately?

MR. BARR: Sure. No, I do think there is, not just from the outside but from the inside, you know, wanting to run a tight ship, wanting to run a program that met our expectations for using taxpayer resources. And so, we ended up designing a program that was -- that required, for example, extensive documentation to do a modification. In a narrow sense that might have been a good choice in terms of assuring the integrity of the program, insulating the program from criticism from SIGTARP or from Congress, making sure that again everything was run as a tight ship.

But it did have the effect of making it extremely hard to actually run the program because servicers would -- were really not set up to do real modifications and servicers ended up losing documents, not reporting documents, borrowers had difficulty getting all the documents in or the borrowers didn't get all the documents in that they needed. And there were probably, you know, several hundred thousand borrowers, homeowners who we could have helped if we hadn't had those requirements.

And Treasury in end by 2013 decided to put in place a streamlined program without that kind of extensive documentation. I think that was a good decision but I wish we had probably made it earlier.

MR. KASHKARI: So, Dan turning to the GSEs, one of the -- when I look at it, one of the things that was so powerful about the actions that were taken or that they were backed up by an unlimited authority from Congress. And it seems like when you have the full unlimited capacity of the US government, you could do pretty extraordinary things. I am just curious, you know, what was the hardest part about designing the solution to the GSEs because clearly it worked very very well in stabilizing them. But then what lessons do you draw on other parts of the response based on what was so successful in stabilizing the GSEs?

MR. JESTER: So, the authority which you describe as unlimited, I think we have also in the past referred to as unspecified constrained only by the Federal debt limit which at the time wasn't that big of a deal. It's a much more significant topic today. But that was a very powerful mechanism to have that. And, you know, frankly, you know, the conservatorship of the GSEs, it would have been hard to make that work without that commitment embedded within the legislation.

I think, you know, I don't have a lot of regrets over how we implemented the conservatorship of the GSEs. I wish we could all gather here today ten years later and say that the GSE ultimate resolution had been decided. And so, that's a disappointment. But it wouldn't cause me to change anything about what we did at the time.

MR. BARR: Let me just add to that. In addition to being -- the HERA authorities being important for the basic backstop for Fannie and Freddie, they were also really essential for running the mortgage modification program because the GSEs owned mortgages they modified, were not backstopped with TARP resources, they were backstopped with HERA resources that meant there is more flexibility for them to do more. It also provided us with the ability working with FHFA to stabilize state and local housing finance agencies in partnership with Fannie and Freddie. And that did a lot to stabilize local housing markets and things would have been much worse on the ground in many cities without that.

MR. KASHKARI: You know, one of my takeaways though is backed by that unlimited or unspecified authority, when I think about all the different components of the response, the GSE response seemed to have been the most effective immediately. With Treasury and FL that now FHFA took the action, that all the risk was taken off the table immediately as opposed to just about everything else we did when actions were taken, market said, well, maybe we believe you, maybe we don't believe you, maybe we are going to test you. Are there other lessons we could draw, imagine if he had that type of an authority that we could have applied to housing more directly?

MR. JESTER: Well, I would say, just speaking to the GSEs, the structure we put in place endured. It did require limits after the initial architecture that we announced. For example, we announced a commitment of a 100 billion dollars each per GSE. Subsequent administration took the view that those limits needed to be increased, which was fine. The important thing was that we were able to design a structure that permitted those [memos] be made easily and still comply with the restrictions that Congress had included in the legislation that they passed.

So, I think you are right, Neel, that the GSEs were dealt with much more decisively and conclusively, sort of, at the first instance and didn't require as many additional seeming new programs or new introductions thereafter. A lot was happening though underneath the hood as that was going on.

MR. BARR: And as you can say in February 2009, the Obama administration doubled the caps, so there was -- and then there two subsequent amendments after that increasing the cap. So, in a -- I think that Dan's right, in a sense that the structure permitted that but the market and the GSEs still needed a huge additional capital infusion effectively after the initial PSPAs were put into place. So, I think that was also a --

MR. LEHMERT: I mean, my only wonder, to what extent does that kind of implicit government backstop existed pre-crisis and the kind of the markets, kind of, comfort with the idea that somehow the government stood behind these entities, how much of that, sort of, played into, you know, the apparent smooth operating of the program. They just assumed you guys would figure it out. They had been betting on that all along presumably.

MR. JESTER: Yeah. Through our actions in placing the GSEs into conservatorship, we converted an implicit guarantee of the US government into an explicit guarantee. And that's functionally what it was.

MR. LEHMERT: Yeah.

MR. JESTER: And so, I think people took great comfort from that.

MR. KASHKARI: Let me turn to some of the questions. One of question we got from the audience is would it have been possible to introduce a one-time standard re-write of mortgage debt to reduce implementation cost and support housing markets. If not, why not? Anybody want to take that?

MR. BARR: I mean, I think that if Congress had enacted bankruptcy reform, a so-called cram down legislation then individual mortgages could have been renegotiated in that manner. But there was not an existing legal mechanism to do what you just described. And certainly not a mass basis.

MR. KASHKARI: Secretary Paulson. Hank, do you have a question?

MR. PAULSON: Excuse me. I just had one comment about the GSE authority because it was unspecified. And so, that was huge. But it was also temporary to expire in October.

MR. JESTER: December.

MR. PAULSON: Yeah, December 2010.

MR. JESTER: 9.

MR. PAULSON: 9. So, just, you know, nine months into the Obama administration or so. And so, this was an entity, for the nationalization to work, this was an entity that was insuring 30-year maturity mortgages. And so, that was a bit of a dilemma until there were some creative financial engineering to turn the temporary into essentially a permanent guarantee. And, you know, it was done perfectly legally because there the authority to put in preferred of a very long maturity. And the team designed a, you know, a keep-all agreement or a backstop to work. But that again was something -- it was very interesting when you look at where the criticisms came. And we were criticized, you know, over and over again for putting capital into banks and for some other things, and here was something where some of us that were making the decision said we are doing something that's perfectly legally but it is not totally consistent with what we thought the Congressional intent was and it was necessary --

MR. JESTER: I wouldn't have said that. I would have said it was a 100 percent both legal and consistent with their intent.

MR. PAULSON: You are right.

MR. JESTER: It may have been subject to criticism that was not consistent with the intent. But it was definitely --

MR. PAULSON: Dan, that's why you are so valuable as advisors. Let me tell you and I am really glad I knew your number.

MR. KASHKARI: So, let me ask the whole panel a question. One of the surprises for me about the GSE intervention was that the -- it didn't buy us much time. You know, after Bear Stearns was resolved, I think a bunch of thought, okay, maybe the worst is behind us and now we can breathe a sigh of relief and it bought us a few months. Then GSE started to show stress. Extraordinary work was done. Put the GSE into conservatorship. It bought us like a week. And then the next domino was falling. Any reaction on why that was?

MR. JESTER: Look, I think the reasonable inference is that people concluded that if the government was taking the step that the losses were more severe than they had been assuming and as a consequence, if the government is willing to commit its unspecified authority to stabilize the GSEs, then the embedded loss in other financial institutions were very significant. I think it's that simple.

MR. LEHMERT: I mean, I don't -- I think Dan's got, you know, an excellent point. I mean, I do think -- but it wasn't just the perception of the problem. And the reason that the GSEs needed a bailout and the reason that Lehman Brothers had so many assets that were difficult to value is because house prices were falling a lot, you know, delinquencies were rising. I mean, it was just a lot of losses floating around out there. And they were both, you know, both subject to this -- the underlying cause of both the GSE distress and subsequent distress, you know, was the same. It's this rising tide of delinquencies.

MR. KASHKARI: And Andreas, during the financial crisis, I know I think when we met you were deep deep deep in the weeds looking at all sorts of mortgage data to try to get a sense of how bad the problem was. Where -- when was it that you first said, oh my gosh, this is really bad? Can you pick a time?

MR. LEHMERT: Yeah. I mean, I was on sabbatical in the summer of 2006 and when I left to go on sabbatical, things were looking pretty good. Katrina had hit and delinquencies had, sort of, spiked but then they were, sort of, on their way back down. And then when I got back, you know, delinquencies were shooting up and, you know, for me it was -- it's funny to see, you know, these timelines that you put together of the crisis that started in 2007. Because for me and I think a lot of us who were working in the mortgage world back then, like maybe the bronze age of the financial crisis was, you know, in those months leading up to new century's failure in December 2006. Coincidentally my oldest son was born.

MR. KASHKARI: So, another question from the audience. Two big challenges in 08 and 09 which you call touched on were impeding the housing programs were mortgage services were -- I am just quoting the questioner -- 'totally overwhelmed and inept' and then secondly mortgages, what steps, if any, had been taken to address the incentives that impeded the recovery efforts? Would it be better this time?

MR. BARR: So, let me take a first stab at that. I think that it would be hard to overstate the problems in the mortgage servicing sector both in the lead-up to the financial crisis and during the modification period and subsequently if you think about the problem with robo-signing, for example, that came up after the worst moments of the crisis were over, the servicers were still engaging in behaviors that was really quite problematic.

I do think that there have been some, you know, reforms that had been put in place to make the mortgage system work better today. Many of those in the form of the Dodd-Frank Act's requirements with respect to risk retention, requirements around ability to repay and escrowing, the creation of the Consumer Financial Protection Bureau and these, I think, will make the -- have the potential to make the mortgage market safer and fairer going forward and, you know, the key difficulty there is we are in an era in which those reforms are very much at risk and the CFPB has been pulling back on enforcement in a number of areas. And I do think that we are at serious risk of recreating the kinds of problems in the consumer markets that helped to feed these difficulties in the lead-up to the last crisis.

MR. LEHMERT: So, I mean, on the positive side of the ledger, you know, the shoddiest mortgage practices, you know, are now, you know, firmly confined to the dustbin of history, you know, liar loans, stated income, et cetera. All those things, you know, have aren't out there right now. So, in that sense, you know, the system is safer. We don't -- we haven't seen a reemergence of the private label mortgage backed securities market which in its pre-crisis incarnation led to, you know, highly fractured ownership of mortgages with, you know, poor incentives for the mortgage servicers. And then as I mentioned, you know, second liens as a practice, you know, have not reemerged either. You know, so all of that is to the good.

You know, I think, you know, one potential straw in the wind that should give us all pause, is actually a paper that was presented here at Brookings in the spring, on the mortgage servicing industry that noted, you know, this very rapid growth in non-bank mortgage servicers, which isn't to say that, you know, they would necessarily not do as well as a bank at servicing. It's just they don't have necessarily the same liquidity resources that a bank-based servicer could draw on.

MR. KASHKARI: But as one of the implications of the current mortgage environment that -- I am sorry. Okay, one of the implications, if you look at the mortgage environment today, basically people with low and middle credit scores don't have access to mortgages. Or if you look at the averages, the averages for the mortgage written today are very high credit scores. So, is the result of all of this, that if you are a -- if you have some blemishes on your credit history, you are just not going to get a mortgage?

MR. LEHMERT: I mean, I think that the FHA is providing a lot of -- you know, there is a lot of FHA-based lending and that is a, sort of, three and a half percent down payment borrowers with blemished credit histories. And I do think, you know, the mortgage market certainly sustained some damage. You know, the big constraint does seem to be around the, kind of, down payment. But I also wonder to what extent, you know, homeowner -- potential home buyers have lost their taste for housing. I mean, it did feel that there was a speculative, certain kind of speculative element to home purchase, especially sort of late in the credit boom, you know, leading up to the crisis. And so, if that's not present then we are just going to see structurally a lower homeownership.

MR. BARR: We have, you know, progress to make on getting the balance right between access and affordability and safety and soundness issues and I think that if we -- I think we can do better -- a better job improving access without developing the kinds of financial products that cause people to get in such trouble. So, I think there is -- we are probably too far on the side of ignoring the access issues right now and I think we can get the balance better.

AUDIENCE: Maybe this is just a starker way to ask Neel's question which is, one of the many ways we are different as a country in our exceptional differences, is that unlike most countries, we have decided not as a country to run a financial system where we substantially limit how much people can borrow against their home. We don't even do where the government is the guarantor of the mortgages but most countries have applied various forms of system wide limitations. So, I guess, I am wondering whether you think you would be -- how you think about the cost and benefits of trying to run a system where you make it really really hard to borrow more than 80 percent of the value of your house or like many countries are meaningfully lower than that. Now I know there is like access affordability constraints but like say what you think about the merits of your own constraints, would it be a better way to run the system and worth the constraints, worth the costs? Or do you think it's a -- doesn't buy that much benefits?

MR. BARR: I mean, I do think that you need to deal with both access and affordability issues and the safety and soundness issues. So, I don't think if you had a firm 20 percent rule across the board that that would make sense. There are many instances of lower down payment mortgages being successful. But I do think you want to be careful about that sector and you want to have appropriate safeguards in place to protect borrowers and to protect the sector as a whole from potential risk. I think that a lot of interesting work has been going on around having a kind of counter cyclical LTV approach or having much higher capital requirements for very high LTV loans especially in a run up before things get out of hands. So, I do think that if you had a flexible approach that was counter cyclical and that was not a fixed floor that there is room to experiment in that area but I wouldn't do a flat, you can't borrow over 20 percent.

MR. LEHMERT: So, my reaction to your question is that -- not to answer directly that question. I mean, obviously benefits and cost to those sorts of rules, I think, I would welcome -- we all welcome a real debate on those sorts of issues. You know, it seems like as a country we could decide that there was a certain appetite that we had for risk in order to, you know, have home ownership rates, you know, rise above their current level.

And then a reaction to Michael's point about a counter cyclical LTV. You know, those kinds of time varying financial regulations, you know, are very popular around the world at the moment. They were tried in the United States aggressively following the World War II and they met with intense political push back. And you can read my paper with Doug Elliott and Greg Feldberg where we find, you know, very contemporary sounding debates where, you know, regulators are accused of instituting a credit police state and, you know, sort of, other, you know, similar sound bites. So, I think that their potential use in United States would definitely require a kind of public debate and consensus that this was a good idea, you know, in order to avoid just repeating what happened 50 years ago.

MR. KASHKARI: Hank.

MR. PAULSON: So, I would ask Tim's question in a certain different -- in a little bit different way. Do you believe we overweight and over-incent the value of home ownership in the United States? I mean, I have watched a change, you know, looking back over -- you know, I can think back when I -- we got our first home in 1974. And the average home in the United States then was 1,700 square feet. Okay. At the time of the crisis, it was 2,700 square feet.

The American dream, sort of, changed over time. You know, I remember thinking of the American dream as you could come to this country and based upon your hard work and your abilities you could achieve great success. Suddenly the American dream became about home ownership and homes more from becoming shelter to becoming an investment vehicle. And I look at all of this and I am not as focused on, you know, whether there are mortgages at 80 percent or 75 or 85 percent, you know, down -- I am really focused on, do we have a system that disadvantages renters relative to home ownership, overvalues home ownership and if we do, what's going to be done to change it?

MR. KASHKARI: I mean one of my reactions to Tim's question and yours -- and I think the challenge for all of us is, how do we institutionalize any of these lessons because we are all already forgetting about it. It's been ten years. This is long, it's just ancient history basically and this is going to happen again. So, are there any policies that one could put in place now that can actually stand up to us forgetting? And I think something like an LTV cap, as blunt as it is and as much as it would attract -- it would invite the market to try to game it, we know it would. It's better than nothing. We got to try something.

One of the challenges is other countries that have imposed -- you know, when they have imposed LTV restrictions to try to keep housing markets from taking off, they haven't been very effective. The housing market keeps taking off. That doesn't mean it's not worth trying. But, I don't know -- to my colleagues on the panel, what else could we do to institutionalize what we have learned, so that our next generation or the one after that doesn't just repeat the same mistakes if anything?

MR. BARR: I am not -- I guess I am worried about the next generation but I am already worried about us. So, I wish I had the luxury of waiting that long. No, I think we have already forgotten, really meaningfully what happened, what the causes of the financial crisis were and what the consequences were as a country. And I think our politics in Washington right now are pushing us towards a set of steps that are going to make the financial system riskier and make it harder for individual households and they are putting taxpayers at risk more than they should be. And I see that continuing. So, I am worried right now, I am not worried for 30 years from now.

MR. KASHKARI: Dan?

MR. LEHMERT: Really?

MR. KASHKARI: Okay, Andreas.

MR. LEHMERT: Okay. Well, I will make kind of a geeky point. So, you know, both Tim Clark and Scott Alvarez in remarks earlier separately touched on the fact that, you know, when, sort of, when the balloon went up and trouble started that it turned out many of the firms didn't have the data and systems in place to actually understand the risk that they were taking. And sometimes I wonder, you know, was that, sort of, by design. You know, if you can't see the risk then you can, sort of, pretend that it doesn't exist. But I also think that, you know, part of it is just the fact that people forget investing in data and systems is boring and expensive.

But as long as we are actually, sort of, doing that, you know, as long as we can actually see and measure all of things that are going on. Right now, we are focused on the housing market but, you know, there are many other instances of this kind of thing, then -- and we are, sort of, asking ourselves, how would all of these things behave in a really bad world? And taking a stab at answering that question, then we have gone a long way to, kind of, preparing for, you know, and preventing that kind of outcome from occurring.

MR. KASHKARI: So, we have another question from the audience. Why was the successful new deal program, the homeowner's loan corporation model ignored in this crisis? It seemed to work during the depression. It was there -- I thought this person said I was there. Why was it ignored? I was trying to identify who you were. So, somebody who has studied -- I think Michael you have studied the homeowner's loan corp. Any thoughts on that?

MR. BARR: Sure. I think that the homeowner's loan corporation was quite a successful model and one that we tried to incorporate into the basic design of the programs that we all worked on. So, the homeowner's loan corporation had to start from scratch because there was no government entity at all available to process any workouts for homeowners.

In the case of the financial crisis in 2008, Fannie Mae and Freddie Mac were in conservatorship. The FHA existed. So, you had three very large entities that could be deployed and were deployed immediately to begin to do modifications. And we would have been in much worse situation if we had to build a whole new government agency from scratch. It would probably have taken, I mean, I am -- this is a guess but about two years if we had been able to get legislation instantly, which we didn't have, to create such an entity. So, let's say, it takes nine months in the best-case scenario in that moment to get anything passed on this issue. It would have taken a long time to get -- take it off the ground. So, we were trying to take that basic Hope model and use the existing entities, Fannie Mae, Freddie Mac, FHA to act right away.

MR. KASHKARI: So, let's look forward and think about the GSEs. Is there any mechanism, forcing mechanism to try to catalyze action or can they just sit in conservatorship for the next 100 years?

MR. BARR: Again, I don't know about a 100 years but yeah there is no political will, I think, to address them and in their current status, no driving economic reason to address them. And so, I think that the most likely outcome is that they will still be in conservatorship when we next have a conference on the financial crisis.

MR. KASHKARI: Any other thoughts?

MR. LEHMERT: Nothing to say about that.

MR. KASHKARI: Nothing to say about that. So, when I look back and Andreas I am going to, kind of, pick on you because you are the Head of Financial Stability, the division of Financial Stability of the Board of Governors. When I describe the fundamental cause of crisis, I describe it as a mass delusion event where we all shared and I bought a home in California in 2005. So, I was a part of the delusion. We all believed that home prices only go up or if they go down, they go down locally. They don't go down nationally and that was a fundamental assumption underlying everybody's risk model. So, when people say banks needed better risk management, I think risk management is a euphemism for wisdom. Banks needed to be wiser. Investors, regulators needed to be wiser. So, what can we do to protect ourselves against future mass delusion events which will know will happen?

MR. LEHMERT: I mean, just to at first reinforce your point. You know, in a paper that I did almost exactly ten years ago this week, it's actually the Lehman Brothers weekend, Gerardi, you know, Kris Gerardi, Shane Sherland, Paul Willen and I, documented, you know, the pre-crisis expectations that people had around house prices. And we were able to go back through various investment newsletters and, you know, find that people, sort of, were putting very low likelihood, like a five percent likelihood on, you know, the worst-case scenarios, like a five percent decline in house prices, is, sort of, my recollection. You know, how do you maintain the imagination? You know, there are lots of different, sort of, best practices that one could imagine. I think they all sort of have a flavor of being willing to contemplate things that have never happened before, right? And that's a very -- I, sort of, learned, a very uncomfortable from a risk management perspective to hypothesize, you know, that, you know, certain prices could move, you know, outside of their historical distribution. You know, because people tend to use, you know, these models are complicated, the system is so complicated. People tend to use the co-variant structure, you know, the actual actually happened in the data through various stress events as the kind of scenarios that they use in risk management but, I think, we have all along recognized that, you know, thinking outside that is the, you know, it's the right way to sort of approach this kind of big rare shock problem.

MR. KASHKARI: Dan or Michael? Want to weigh in?

MR. BARR: I think that I agree with everything that Andreas said. I do think that having lots of different multiple perspectives brought to bear on the question of risk, having the regulators poking and prodding along with the financial institutions, having the Office of Financial Research poke and prod maybe in different ways from the Fed. So, trying to get multiple perspectives, not relying on a single model, having stress tests and capital ratios, having people using network theory or matrix theory to think about a problem. So, trying to get at it from multiple methodologies I think makes it less likely you will make a tragic mistake.

MR. KASHKARI: So, we have about two minutes left. Dan, any last comments?

MR. JESTER: I was just going to say, I agree with the comments that have been made. I think, Neel, your question, there is a little bit to how to be more wise and I was going to say, I don't have an prescription for how to be more rational and less human subject to, you know, fear, greed and folly. It just happens. And so, the insight I would draw from that is to say, recognizing that those cycles do happen and that unattended and unforeseen events occur, you have to design a system which can withstand those shocks. I think the most direct route to that is to have a greater level of capitalization.

MR. KASHKARI: Amen. Any final comment? I think we are -- I think we are good. So, please join me in thanking the panelists.

We are going to take a coffee break and return at 3:30. If you want your very own copy of the chart book, they are available at the registration desk.

(Recess)

MR. WESSEL: So, Janet, I'm going to let you introduce the panel.

MS. YELLEN: Thank you, David. So, this panel concerns monetary and fiscal policy around the world. We talked this morning and this afternoon about the consequences of the crisis for the financial system and for housing. The crisis took an enormous toll on workers and created hugely high unemployment. The economy fell into recession at the end of December 2007. So, even before Lehman, the unemployment rate was rising in 2008. It ended the year at 7.3%, but the job market really went into freefall after Lehman with job losses at a monthly pace over 500,000. Eventually the unemployment rate rose to 10%.

The tools that were then brought into play to address that were monetary and fiscal policy and that's what we're going to discuss in this crisis, to look at the response in the United States and also, we're broadening our trade partners. We'll talking about how aggressively and effectively tools were used to address the contraction that was taking place and what some of the constraints were.

Let me introduce the members of this panel. Jason Furman was Deputy Director of the NEC in 2009 and later became Chair of the Counsel of Economic Advisors in the White House. Don Kohn is a Fed lifer who at that point served as Vice-Chair of the Fed through 2010. Brian Sack, I believe it was 2009, became Head of the Open Markets Desk in New York where he served until 2012. Ted Truman is also another Fed lifer who had earlier left the Fed but was brought back during 2009 as Counselor to the Treasury Secretary to work on the international coordination side.

So, we're going to start off with presentation first from Jason on fiscal policy and then from Don on monetary policy. We'll bring in then the rest of the panel.

MR. FURMAN: Great. Well, thanks so much. I'm glad on this panel we're going to get at least 20% of the people up here to fiscal policy. So, inject a little bit in this room with financial and talk about some of what I talk about in the paper. The first part of the paper is just documenting what happened and when it happened. It starts with the first stimulus that was done, negotiated by Secretary Paulson, signed into law in January 2008, which makes it remarkably timely. Rarely in our history do you have one that proximate to when the date of a recession was. It was done when the Fed funds rate was still 4.25%, so there was a lot of room for monetary policy. The way I think about the rationale -- Hank may have a different thought -- is that fiscal policy could actually be faster. Within months, the first checks or electronic payments went out to people a little bit after checks did. So, it can fill in some of the gap before the monetary policy, the rate cuts were going to affect the economy. And, second, that we're never quite sure about what instrument works and with instrument uncertainty diversifying your approach makes sense.

Of course, the part of the fiscal response that got the most attention was the second part which was the recovery act signed into law by President Obama on February 17, 2009. By then it was clear we needed something much more substantial. We wanted something that was as fast as possible. So, we did things on the tax side in a substantial way with the reduced withholding going into effect by April 2009, but also, we weren't too worried about things being sustained. So, there were things on the infrastructure and investment side that played out over a longer period of time.

A lot of people think that after this there was some pivot and fiscal stimulus ended. What there was after this were a lot more fiscal stimulus proposals and a number of actions, but the actions were much more opportunistic under the radar whenever you had a chance to. There would be an FAA bill, a defense reauthorization bill, and we'd add money for teachers. We'd add money for state fiscal relief for FMAP. We took things like the making work pay tax credit, which was 60 billion dollars a year, and replaced it with a payroll tax cut that was 110 billion dollars a year.

So, when you add that next phase of -- this is about a dozen different laws. You've got those gray lines there, and you get a discretionary stimulus that over a 5-year period of time averaged 2% of GDP which is the largest discretionary fiscal stimulus we've done for counter cyclical purposes and then you get the automatic stabilizers on top of that, bringing the total to 3.4% of GDP.

Now, you'll see it maxes out in 2010. By 2011, the economy was still in a lot of trouble, but the fiscal support was declining. If you quantify the impact of this on the economy, the picture there spreads out a little bit more than this picture does because a lot of things operate with a lag. In the FRB/US model, for example, tax cuts matter just as much as T plus 1, as they do at the time you do them. So, there the maximum impact was 3.4% of GDP. Towards the end of 2010, it stayed at about that level, but the impact on the level of output is falling, starting in 2012, which means growth rates are lower than they otherwise would have been, starting in that year.

A lot of what we cared about wasn't just the GDP, but how it affected people. So, we designed a lot of things, like expanded food stamps, expanded unemployment insurance, tax credits for families. When you combine those with the existing safety net and the existing automatic stabilizers, you see something remarkable that I think is just very underappreciated, which is that market incomes fell across the board by about 10%, a little worse at the bottom because people lost jobs, and at the top because they lost their wealth. You then look at what happens after taxes and transfers, after you got the tax cuts, after you got food stamps, U.I., whatever it is. And you see a radically different picture. You actually see an increase for the bottom quintile. You see most of the damage contained for the second through fourth, and you see relatively little change for the highest quintile. These are straight out of the CBO numbers.

You can do it a lot of different ways. You can tell somewhat different stories, but you've got something that looks an awful lot like this.

You'll need to read the paper to find out about how we considered sending everyone in this room a debit card, giving you all a temporary tax holiday. Then something we publicly proposed, but didn't get done, new jobs tax credit.

What I'll end on is the 6 lessons that I derived from this experience. The first is fiscal stimulus can be very effective, especially when you're at the zero-lower bound. There's a ton of research that's been done in the last decade, some of it off the Recovery Act and it finds if anything higher multipliers than we previously thought. That's #1.

#2, be very careful about State and local moving in the opposite direction from what you're trying to do federally. State and local cutbacks took .6 of a percent off the annualized growth rate compared to the pattern of their spending in previous recessions.

Third, the fiscal system can tire of stimulus early. One of the political judgments we made was if things are worse than we expect, we can always get more. We didn't get nearly as much as we would have liked. So, building in more triggers and automatic stabilizers up front, rather than relying on the gravity of the situation to persuade people to come back, would be helpful next time.

Fourth, having program integrity, avoiding the types of scandals that we largely almost entirely avoided is important.

Fifth, that there is an increased body of evidence, the tax cuts may actually be more effective in terms of multipliers than spending. I'd want to see more data before I was 100% sure, but I certainly think that more than I thought a decade ago. The evidence on temporary business tax incentives like bonus depreciation is particularly strong as it is for low income tax cuts.

Then, finally, most of our stimulus was focused on maximizing GDP. You can also take steps that maximize the number of jobs per unit of GDP. So, something like a new jobs tax credit, our estimate was it would cost about 20,000 per new job as opposed to 100,000 per new job from just trying to raise GDP, which is what most of our approaches did. So, hopefully next time we can do more, even if we can't control the downturn, to control the impact it has on labor markets. Thank you.

MR. KOHN: So, I'll cover the monetary policy. This work is jointly with

Brian, who is sitting next to me, and clean up any messes I leave behind here. So, I think as Brian and I looked at the monetary policy process through the crisis, three themes struck us, and they are quite related to themes we've heard before today.

One was the difficulty of forecasting, forecasting not only what would happen to the financial markets, but even when you knew what was going to happen to the financial markets, what would the effects be on the economy.

The second one was the more faster one that's come up in several themes. How even given the forecast, the Federal Reserve and the FOMC was incredibly innovative and aggressive in its monetary policy, both interest rates and purchases and forward guidance, but given the forecast, it might not with 20/20 hindsight, you want to ask, could it have been more aggressive. Could it have done more and why didn't it do more sooner?

Then the final one is the importance of communication. So, let's start with the forecast. We were constantly under predicting not only what would happen to the difficulties in financial markets, but the sensitivity to the economy of what was happening in financial markets. It's not surprising. None of us had had any experience with anything like this. Ben had the advantage of having studied the depression. So, he was way ahead of the rest of us, but in general, we hadn't lived through this kind of thing. Our models and our mind set, I think, was not prepared for what we were about to, what we were going through. The models themselves had a few key financial variables, interest rates, asset prices. There was no complexity, no financial frictions, no availability constraints. I think those models reflected the way we, as economists, thought about the financial markets and the transmission of financial information to the economy. Their linear relationships extrapolated from a period, particularly the great moderation, which everything was very smooth.

So, I think the lessons from this are ones that happily the FOMC with Ben and Janet and Nellie and Andreas have learned that is, you have got to -- it's is not only for financial stability, lender of last resort stuff, but for monetary policy, you've got to have a wide focus on financial markets. You've got to be open to the potential that things will be nonlinear, that they will happen suddenly, that there will be channels of effects like credit availability onto the economy that you haven't anticipated before. You've got to probe for tail events and what their effects might be. You've got to be ready to throw out your models when things happen that aren't incorporated in those models. And I think we see in the minutes every quarter that there is a briefing of the FOMC on financial developments. It's very wide. It's not just focused on banks. It's the whole thing.

So, the important lesson here is don't back away. Keep working on trying to understand the financial system.

On the policy response, I'm thinking about two things. The federal funds rate from August of 2007 until August of 2008, we had cut the funds rate very sharply, particularly in January, March and April of 2008, but we were just keeping up with the effects of the forecast reductions. So, the forecast the FOMC and the staff had to this period had the unemployment rate staying around the full employment and inflation staying around 2%, but there was no risk management. We weren't getting ahead of the thing. We were just kind of keeping pace with the deteriorating situation to keep our forecast in line with the FOMC dual mandate. I think the question is why didn't we do more.

In the case of the federal funds rate, part of the problem was the incoming data. So, inflation was rising, and the economy was not really going into deep recession. It was soft, but not going to a deep recession. The lesson for us is risk management. So, you're in a financial problem, the risk to the economy or to the downside and the risk to not doing enough or to the downside, especially if you're near the zero lower bound or the effective lower bound. So, I think that for the next FOMC that's in this situation, taking a little bit of insurance out, or a lot of insurance, even as you're cutting the funds rate, being aggressive in that regard is very important. I think given the experience and you're thinking about what the effective lower bound is, whether you couldn't do into negative territory, they should also be doing that.

On QE, on LSAPs, large scale asset purchases, we started that in December of '08, and expanded it greatly in March of '09. We didn't think that the amount of purchases we were doing would be enough to put the economy back at full employment and keep inflation at 2%. So, we were behind the curve there. We were behind the curve because we saw the costs and benefits of additional large-scale asset purchases as approximately balanced. I think the lesson that Brian and I would draw from what we've learned since is that the costs and benefits weren't balanced, that there were definite benefits, that large scale asset purchases, QE, can lower interest rates, even in well-functioning markets. I think the evidence is pretty convincing on that. It's somewhat disputable, but I think the balance of evidence is there are benefits to these purchases. The costs were perhaps less than we had feared, in part because of actions FOMC had taken. So, for example, there was a lot of noise outside the Federal Reserve about inflation potential. I think inside the Fed, we weren't very worried about the monetary base causing inflation, but that certainly was an invalid. There was no cost, no inflation cost. Inflation was too low, not too high, and it hasn't come up. So, that was not worried about. I think exit preoccupied us a lot. Given this large balance sheet, could we raise interest rates when we, the FOMC, needed to do it, wanted to do it. Would it impede our ability to tighten policy? I think the work of the FOMC, the New York Fed, to develop tools, to absorb reserves or to raise interest rates. The interest on excess reserves that the Congress has given the Federal Reserve, we've seen over the last couple of years. The Fed has been able to raise rates, even though the balance sheet is very large. So, I think a number of the costs that preoccupied the FOMC turned out to be less serious than people thought at the time. I think a lesson we draw from this also is you can be more aggressive, given what we know now. You could be a bit more aggressive in the next thing.

The final point is about communications. Two aspects here, one is for guidance. It is really, really important that the public and the markets understand that you're going to keep interest rates low for a long time, until the recovery is well established, and your targets are in view. Conveying this, the FOMC's language changed over time about how to convey this. There were vague words used. There were dates used. There were thresholds used. Some combination of all that, I think the threshold stuff was a good invention, but it's so important for the effectiveness of monetary policy, that people understand that the reaction function of the open market committee has changed in a situation like this, and they're not going to get an increase in interest rates as soon as the economy begins to pick up.

The second part of communication, I think it's one that affects all these programs, is I don't think we -- and that's a very broad "we" including almost everybody in this room, really did as good a job as we could have explaining to the public of what we were doing and why we were doing it. I think Ben in that 60 Minutes program really was an important innovation from the Fed's prospective reaching out to a broader audience. I think we should have done more of it. All of us should have done more of it trying to explain why what we were doing was for the benefit of the economy, not for the benefit of the banks or the bankers. That's, I think, a lesson for all the programs we've examined today. Thank you.

MS. YELLEN: Thank you. I'd like to come back and drill down a little bit more on fiscal and monetary policy, but before we do that, I'd like to ask Ted to talk a little bit about globally how would you evaluate the fiscal and monetary policy response and to what extent do you think coordination among countries on policies was effective, and was it something you saw as necessary?

MR. TRUMAN: Well, that's a big set of questions, Janet. I should say in advance that along the lieutenants, I was a retired lieutenant. Fortunately, or unfortunately, Tim's secretary had my phone number, although I went to work with him again in March of 2009. So, I'm a big of an interloper in terms of the veterans of this experience, but I studied it during the period, ma'am, in connection with this very interesting project.

My sense is that the global policy community did not do a terrific job in sort of achieving early on a shared diagnosis of what's going on, and therefore, having a shared diagnosis of how collectively we should act. On the monetary policy side, leaving a side whether we -- I still say "we", for the Federal Reserve -- should have done more sooner. I think Don has laid out the case where you certainly could say we could have done more sooner in retrospect if we knew everything we know now. But the other central banks, major central banks, were much slower in general. Some of them took quite a long time for it, partly because of philosophical reasons. One important question -- partly is off your topic, Janet -- but is was already referred to, inflation was pretty high in some countries, and for those central banks who, at that time, had inflation targets which were headlined inflation targets. They were worried about pressing up again those inflation targets, and that led them to delay.

So, it took, it seems to me, really starting in August of 2007 until the fall of 2008 before Ben and Tim and others got the central banks on roughly the same page. It seems to me it was even more complicated on the fiscal side, as I read it. Actually, we say in our paper, which you guys haven't seen yet, but we say in our paper, it actually was the international monetary fund who came out with the initial idea in November or early December about a coordinated fiscal expansion. The administration sort of picked up on that. That became a huge debate, not just in this country, but a huge debate about sort of what counted as expansion and what's the role of automatic stabilizers and so forth and so on. It threatened, I think, to derail the whole process. So, the administration pulled back a bit on how forcefully they wanted, but they ended up getting. Certainly, Gordon Brown was able to put in his London communique a fairly inflated number about how big a fiscal expansion it was. So, by that time, but that was talking about April of

2009, you had the authorities mostly all agreeing. I should say, just to be fair, there was language pointing in that direction in the communique that came out of the Washington G20 summit, and the Washington G20 summit, in a very important way, lay the predicates down for what was subsequently done. So, you can't think about those two coordination exercises as separately. I think it is important, as other people have done, maybe I can say this. Coming back to the Treasury Department in March of 2009, I was impressed by what was essentially on the international side a core of dedicated public servants, as there wasn't anybody else of a political appointee at that point. The work that they put in and the dedication that they showed and the imagination they had already showed working on the Washington Summit and the hard work that they did on the London Summit was something that was very impressive and to this day, warms the cockles of my heart.

MS. YELLEN: Thank you. Brian, so let me come back and ask you a little bit about monetary policy, start with forward guidance. I wonder -- Don talked a little bit about evolving forms of forward guidance, but I wonder if you would reflect a little bit about how forward guidance was used and what lessons you see coming out of that calendar based forward guidance versus thresholds. Were they effective? Also, it's sometimes said that the Feds' forward guidance was Delphic, meant to be forecast and not in any way a commitment, but there's a good deal of literature that suggests that effective forward guidance needs to be Odessan or to involve a commitment. I wonder how you see that issue? Or do you think there was any commitment element to the Feds forward guidance?

MR. SACK: Fair. So as Don said, I think the forward guidance worked quite well, and I remember -- well, first, there was the qualitative guidance that came in December '08 and March 2009. But later on, when F1C moved to counter based guidance and eventually to threshold guidance, I remember thinking about this in real time when the first set of counter guidance was proposed. Market expectations were pretty pushed out at that time and so, the principal policy makers asked the staff how effective would this be. I think the answer was basically, well, you know, it would be effective, but the market pretty much understands that you're not tightening for a while. At least from my perspective, it actually had a bigger effect than I realized. And it had a bigger effect because even though the mode forecast was tightening would be relatively far off, it shaved off a meaningful part of the tale about an earlier liftoff. So, as we show in the paper, the different forms of guidance really seemed to affect people's perception, not just of the timing of when rates might go up, but also of the reason for why rates might go up.

So, this was not that the forward guidance conveyed a degree of pessimism about the economy and people just marked down their economic outlook, which was none of the major concerns. What we show in the paper was the markets and the public actually took this guidance as suggesting a more aggressive policy approach by the FOMC. By doing that, by shifting the perceived reaction function, I think that's how you get a lot more stimulus into the economy as opposed to conveying a pessimistic message.

So, expectations shifted quite a bit. I think that was effective. As I said, it was about the reaction function. My impression -- and the policy makers could actually answer this better than I could, but it did not go to Odessan guidance. I mean, this was not an unconditional commitment to follow this path, no matter what. This was not strongly tying the hands of the committee to follow that path, but I think by saying what the projection was, it likely raised the threshold of deviating from that path to some degree, and it likely gave the markets just clearer information about the policy intentions of the committee. I think both of those things were effective at making financial conditions more accommodating.

SPEAKER: Don, you talked about asset purchases. I guess the Fed purchased from Treasury securities and mortgage backed securities.

MS. YELLEN: So, some debt of the Federal Home loan banks. The purchases of mortgage backed securities were controversial. There were members of the FOMC and of the public, members of Congress, who felt that this was credit allocation and the Fed should not have been involved in buying mortgage backed securities. The Fed is essentially now committed to go back eventually to a Treasury only portfolio. So, on the one hand, I'm interested in your comments on whether or not you think it was important to be able to buy MBS. The other related question, I guess I would ask is, if you look around at the world, at Japan or at the European Central Bank, and you see that they are also engaged in asset purchases and they're buying a much larger range of securities, including private securities and even equities in the Japanese case. Do you think it would be useful in fighting future crisis if there was a great ability to buy a broader range of assets?

MR. KOHN: MBS and agency securities, that purchase was very important at the time. So, despite the fact that the agencies were in conservatorship and the implicit guaranty had been made explicit, those markets were disrupted. And the spreads of MBS guaranteed by the taxpayer, MBS over treasuries had risen quite a bit. We saw that on one of the charts that someone maybe in the initial presentation, had risen quite a bit, and the same was true, to some extent, for the agency debt. Here you had a crisis that was centered in and originated in the mortgage market and it seemed really important to get that market re-opened and re-going and get mortgage rates down. That would help households and the housing sector.

So, those initial purchases of MBS had a huge effect on mortgage rates, I think half a point or more on mortgage rates almost immediately. Obviously, that wasn't enough to stop the crash, but it must have helped to some extent and got those markets going again. I think there was a degree of discomfort on the FOMC having to do with getting the FOMC involved even indirectly, even though there was no credit risk because even though there was no credit risk because it was government guaranteed in credit allocation. There was an accord that the Treasury and the Fed signed in the spring, I guess, of ’09, which talked about the roles of each institution and one of the pieces of that was to acknowledge that credit allocation was in the fiscal authorities, not in the monetary authorities, but I think in this case, there was an overwhelming case for intervention in that particular market.

Now, should the Federal Reserve have more tools than corporate and Japan even equity, I think that’s very tricky and difficult. We heard about it some already today, that acting as lender of last resort, the Federal Reserve had at least some residual credit risk on its balance sheet. I think getting more deeply involved in more credit risk and more allocation would push us further and further into the fiscal space. I can see that it might be useful in some respects, but I’d be very concerned about going there without a lot of safeguards, including some explicit understanding through legislation about who would bear the loss, how the decisions would be made. The relative roles of the Federal Reserve and the Treasury in this, I think would be very, very tricky. I think we can have most of our effect in decently functioning markets. I think you can have a lot of effect buying Treasury securities and having that feed through to other rates. I think the academic literature is that our purchases of Treasury securities did feed through and somewhat attenuated form into corporate bonds and certainly helped the equity market on the way up. So, that’s a much better way to go about it, than direct purchases.

MS. YELLEN: Let me pose a question from the audience. We’ve now had a long period of low interest rates. The question is are you worried that the long period of low rates are creating new bubbles, tech stocks, commercial real estate bonds. So, whoever would like to take a stab at that.

MR. TRUMAN: I’ll start. I think you always have to be a little concerned about the financial stability implications of promising to keep rates low for long, and people with various portfolio preferences reaching for yield, as they say, and taking risks that they may not be adequately compensated for. I think so far, yes, there are little parts of the market that look like they may be a little overextended. People often cite commercial real estate leverage loans. You can find this in the Federal Reserve's annual monetary policy reports, citing these things. I think at least to date, the financial stability risks seem to be contained, and I think the way to address them is through regulatory and prudential tools. So, I think ideally, we'd have tools to address financial stability and tools to address economic and price stability, sort of a Tim burgeon world, two goals, two sets of tools. You could target the one that's the most effective.

Now, that doesn't mean, as Jeremy Stein has pointed out, there might be some times when the regulatory tools aren't effective because the risks are outside regulated entities. Then you would have to use monetary policy. But I think certainly a first resort is using monetary policy to get the unemployment rate and inflation where you want it and regulatory policy to address the financial stability risks.

MS. YELLEN: Let me ask you another question about spillovers. One of the complaints about U.S. monetary policy during this period, and particularly our asset purchases, was that they had adverse spillovers to other countries, particularly emerging markets. The complaint about it, and maybe Ted, or anyone else who would like to take this, I wonder if you think that is a valid complaint and if so, how the Feds should address that.

MR. TRUMAN: Well, I think that's a 2-part question. It certainly is the case in terms of the global economy, if we get our policies right, especially even after having gotten our policies right, we work hard to get our policies right, the core economy is better off. We may have -- I apologize for saying "we", because it isn't "I". We may have failed a little bit in making that message. I think -- and this is more of an academic comment that I guess, than a policy comment. I think it's well established with the modeling that I've seen since the crisis that things like the large-scale asset purchases and so forth and so on, like any other monetary policy action which tends to maybe on the initiative push down the exchange rate. It doesn't always happen by the way. It is s offset by the fact that it also stimulates a real demand.

So, the net effect on the net exports in the current account is likely to be close to zero. That message, I think, did not come through as clearly as it might have. There's this complicated question which I think we don't really have an actual economist don't really have a good answer to -- to the extent that we were exporting inflation, if you want to put it that way, credit easing, that may have had adverse effects on some economies, which we don't understand. My answer to that is always -- especially in the first round, right, that the world economy needed it. And in general, it depends on what country you're in, and how closely are you tied to the United States about whether expansionary policy in the United States, whether it's monetary or fiscal, is good for your country or bad for your country.

But I think that was an issue at a minimum that was not well understood and articulated around the world. Maybe we can blame the International Monetary Fund too for that, but I think it was not well understood.

MS. YELLEN: Thank you. Question for Jason from the audience. Fiscal policy was helpful, but aren't you worried about today's high and climbing debt to GDP ratio.

MR. FURMAN: I am worried about it. I should say I'm worried about a lot of things in the economy and I'm not sure where this one falls on my list. When it comes to the next recession, and we're going to have another recession, I'm far more worried that it's going to cause a political problem that will lead us to do inadequate stimulus than I think it will economically get in the way of stimulus. I think the economical evidence is increasingly a whole set of papers that stimulus is very powerful, especially when you're at the zero-lower bound, that it may even reduce the debt to GDP ratio by raising the denominator GDP more than it raises the numerator debt in those particular economic circumstances. Our backinguard jenko had a paper at Jackson Hole last summer that found no evidence that fiscal policy was less effective at high debt; in fact, if anything, more so.

So, I think if we're going into another recession, basically no matter what our debt to GCP ratio is, my economic message is we can't afford not to do stimulus. I'm worried it will get in the way of that message politically.

SPEAKER: And the final question --

MS. YELLEN: A final question, Jason, for you, from the audience. You're 5th point was that tax cuts could be more effective than direct injections of money into the economy. In light of that, how do you evaluate the Trump tax cuts? Would these be the right or wrong type of tax for stimulating the economy?

MR. FURMAN: I don't think the biggest problem on the U.S. economy right now is inadequate demand. I think we have a problem on the supply side. I think that's the way the tax cuts were conceived as encouraging more investment, investment being an ingredient of productivity growth. I did an analysis for the Brookings papers with Robert Barrow and we found very small increases in investment would result from it, relatively small increases in GDP, in part because the tax system already had lower marginal rates than appeared to be the case in part because in some tenses they are higher under this and would otherwise would have been. But I certainly don't think we need a fiscal stimulus in 2018 and even less so, the tax cut has a physical stimulus in 2019, 2020, 2021, et cetera. My comment was a comment about countercyclical tools. Our textbooks always said the spending multipliers. We had a multiplier of one over one minus T, which was larger than the tax multiplier, T over 1 minus T. The empirical evidence seems to be finding that the tax multipliers maybe larger. So, when you're designing a countercyclical package, when your problem is inadequate demand and no monetary policy, the taxes may have a bigger role than we had previously appreciated.

MS. YELLEN: Thanks. Please join me in thanking our panelists.

(Applause)

MR. FURMAN: And our final panel is summing up a paper that's been done about what we've learned and then broadened a bit. It will be moderated by our own Andrew Metrick and the panelists will be Meg McConnell, Michelle Davis, Matt K. Baker and Bill English.

MR. METRICK: We are the last panel of the afternoon. Clearly the best has been left for last. We are going to be very exciting so everybody will be forced to stay awake. Let me introduce the panelists so all the way over on the left is Meg McConnell. All of these people here had important jobs during the crisis and you can read their bios. I thought I would just say a little something that you may not see in their bios. Meg now runs a fantastic, tremendously interesting group at the New York Fed, called the Applied Critical Thinking Group which is unique in the world in how it is doing great things in trying to help us prepare for the next financial crisis. We make great use of their knowledge and services in our program at Yale. Please don't stop doing that Meg. Matt Kaybaker was at Treasury at the same time that I worked briefly for the government. I wasn't a Lieutenant, I was a Corporal, Private First Class or something like that and I got a chance to work with Matt a lot and that was tremendously impressive, great intuition. His first instincts were often better than my third and fourth well-thought out instincts. It really angers that he is such a terrific economist without having spent any of that annoying time having gotten a PhD. Michelle Davis, as people know, had many important jobs working in the Treasury in the worst part of the crisis. People also know that she was portrayed by Cynthia Nixon in "Too Big to Fail". With Cynthia Nixon now moving into government I have confirmed with Michelle that her career in the theatre will be taking off. And immediately to my left is Bill English who is now I am delighted to report, my colleague just down the hall from me at Yale and where he is teaching our students Central Banking and Monetary Policy and it's been fantastic for me because he knows so many things that I don't know and I wish I knew and I can ask him questions. It's not been as great for Bill because he looks around and does not see 350 staff members who can do all his work for him. We are going to start with Meg.

MS. MCCONNELL: Good first instincts, Matt. I wanted to start with two quick disclaimers. First, the views that I will express ae my own views, not the views of the Federal Reserve Bank of New York or the Federal Reserve system. I am not on garden leave so I probably have to be more careful that Bill was. And second, that the area that the area that Andrew mentioned, Applied Critical Thinking that I am running at the New York Fed, kind of calls me to make another disclaimer which is the assignment is we were given was to write a paper on interpreting the evidence from the outcomes to the responses to the crises and I think I just want to state the obvious which is it is probably a little fraught to try to interpret the evidence on outcomes both because the system is complex and the outcomes that we are seeing are the product of many forces and not just the policy actions and also because we are looking at all of this through the lens of hindsight. We probably are oversimplifying what we understood in real time and what was obvious and what was predictable. And the last bit of that is that there is a tendency of outcome bias to think that the things that worked out well were good decisions and the things that worked out badly were bad decisions and that's probably not a lesson that we would want future crises managers to take because you don't control the outcomes, you just control the quality of the decisions. Okay, all that said, the framework that we use to look at the evidence on outcomes was to try to organize the actions into two types but I think that Andrew and Nelly covered this but I will just mention quickly macro actions that are designed to support economic activity in spending – these are things like changes in counter cyclical monetary policy, fiscal policy, and the measures that we looked at to see how the quality of those outcomes are real GNP, bank credit, employment. On the systemic side we talked about actions that were taken for the purpose of preserving or restoring the functioning of the financial system – we call those systemic policy actions. And those are things like liquidity provisions, capital injections, debt guarantees, etc. And the measures we used here to look at the indicators of outcomes were live ROIS, CDS premiums of banks, and mortgage spreads. We also thought about the crisis in three different phases. And the first phase being from 2007-March 2008 and the conditions that people were seeing in real time, really were characterized by challenging but manageable, there wasn’t a sense that it was approaching any kind of catastrophic situation, the economy was slowing and there were strains in financial markets and there were concerns about undermining the efficacy of the transmission mechanism due to those strains. And so the outcomes of the policy actions that were taken at that time if you read back in real time were around preserving and restoring the financial markets, keeping the transmission mechanism working as well as addressing foreclosures. So and then from the second phase we said from March 2008 to September 2008 we are characterizing as broader uncertainty and deeper concerns so the recession was still seen to be shallow at that time but there was growing concern at least in some quarters about a negative feedback loop about what was going on in the financial sector and what was going on in the real economy. And I think the policy actions taken around that time were around supporting economic growth and about preventing a further deterioration of market functioning while we kind of waited out this housing adjustment. The third phase was from September 2008 (middle) to the end we are calling panic. The conditions were closer to panic and the concern there was a depression was an outright depression that was being sustained by a full scale collapse in the financial system. The types of the outcomes we were seeking to alleviate during those times were run dynamics, panic dynamics, contagion, things to conquer the generalized uncertainty that was maybe crippling the functioning of the system. So the way we approached this was to look at the wide range of literature that has been done on trying to document some of the outcomes of the crisis responses. I think we drew two overarching conclusions and the first really is that given the severity and breadth of the strains that the financial system was experiencing at that time and the scale and scope of losses and the uncertainty around how those things would play out. The overall outcomes were not as bad as you might have expected based on historical experience if you extrapolate from the size of the shock to the system you might have expected something more on par with the Great Depression and that is not what happened. And so one conclusion you could draw from that, again with the caveat of complexity and notwithstanding, is that the mix of actions taken in response to the circumstances, the escalation from more traditional policy responses to some more innovative responses that were tailored to the disruptions that were manifesting in the markets and in the institutions at the time, into what I guess we would call like the definitive actions of recapitalization and debt guarantees, that progression did play a role in keeping a very severe problem in the financial system into turning into a depression. So that's one conclusion and I think the second broad conclusion is that even though we can say that about those actions we did have a very severe economic downturn that caused a lot of damage to a lot of households and businesses for a long period of time and a recovery that was slow so things were still bad. We grappled with how you reconcile the fact that the escalation of policy measures feels like the ix of policy measures was about right. I think we tried to interpret why it was still so severe and I think one reason would be that the conditions leading up to the crisis was also severe. There was a severe misallocation of resources in the lead up to the crisis especially with the housing bubble and the role of the financial markets in that. I think the second reason that we speculate is that the definitive actions – the injections of capital and the use of guarantees came only after the conditions of panic and the real contagion in the financial system were well underway and was visible and there was no debate about what was going on. Maybe by that time the damage to future outcomes had already been done. There was a certain amount of damage baked in by the time you get to the system functioning in the way that it was that warranted finally the action on TARP which allowed for the capital injections. The capital injections were a compliment that allowed the guarantees, the use of the FDIC authority to do the guarantees. So our conclusion there is that the timing of that had an impact on what was even possible by the time we got there. So then what we did overall in the paper was look for some kind of “lessons learned” – I had to put this in quotes because I do think that everything we called “lessons learned” is generally not. But that is what we were calling it. So the lessons we learned. You should prepare for what’s likely. Financial crises are going to have certain characteristics – things that look liquid in any circumstances will be the things that turn out not to be liquid. The institutions that are well above any kind of regulatory capital ratios or well capitalized will turn out the ones that are not well capitalized. The firms that are not systemic will be systemic. So there are certain things are going to happen that you need to practice responding to and you have heard that over that over the course of the day. The second thing I think is to prepare to be surprised so I was thinking that people in the future when there is another conference like this in twenty years or something, they will look back on what we discussed here and to use another Tim word, they will think it’s quaint. I looked that up and that means “attractively unusual or old-fashioned”. So what aren’t we talking about here that is going to be the thing that is in the next crisis? How do you think about the stuff you haven’t seen yet but you could see and try to understand how you might respond? I think organizations should try to develop their capacity to develop and learn in real time, all the time and not wait for a crisis to do it.

The third lesson is to communicate before, during and after a crisis and talk to the public about what the financial system is doing, what it is supposed to do and what kinds of principles will guide your intervention in a crisis. Fourth, just recognize that will always be forces that push against early intervention. The things we now look back and say they were slow and they came too late – there were a lot of people or forces or you know there was a lot of energy against it not being too late – it was just right. Or if not early. So recognize what we see with hindsight as to how could we have not done it sooner is not really what is going to be experienced in real time. There will be about moral hazard, concerns about signaling adverse information, there will just be sheer uncertainty, lack of confidence that you understand what to do; all those things are going to cause you to move more slowly. Then I think the big thing for people to think about in that context is that we should look for where we built in too late ex-post into the crisis response tools that we have now ad look for ways to counter that bias towards inaction that I think is inevitable. It doesn't need to be inevitable hopefully. Fifth one is late intervention limits the potential for good outcomes. That's your earlier point that once the system is disrupted you don't get it back; you can't make up that lost ground. If you believe the financial system matters it matters that it is disrupted for a period of time like that. The sixth is that late intervention may raise rather than lower the potential for unintended consequences. So you delay because you don't want to create more hazard and you delay because you don't want to signal adverse information and then you have to go somewhere more extreme that is more shocking to the system and maybe creates greater sense of unfairness. That is a thing I think is a part of managing this. Seven and eight are linked. Seven is that you do need a strong regulatory and supervisory structure to reduce the probability of a crisis and the impact of a crisis on the economy. Eight is that a strong regulatory/advisory structure is not a substitute for good crisis management and that we shouldn't lure ourselves with well, now the system does have more capital now" but we are not talking about that we are talking about when it is in a crisis. The quality of the system you have is not a reason not to prepare for the problem. So those were our lessons.

MR. METRICK: Thank you very much. I am going to come down the panel a bit and ask Matt, Matt you came from the private sector, came and did your duty in government and then you went back. One way to measure outcomes is the empirical way which is what Meg has been telling us but there are other ways, and one thing that I am curious about is what do our friends and enemies in the private sector think of the job that the government did? How is it talked about when the cameras aren't on and you can tell us and we won't tell anyone us that you told us?

MR. KAYBAKER: You want me to tell you what the private sector thinks of your response?

MR. METRICK: Correct. I want you to represent the private sector.

MR. KAYBAKER: I was asked that a lot when I was in government.

There was a desire to have the private sector support a variety of things we were announcing and I was asked to make sure they rallied behind it. It turns out that it is not sort of a thing so I do not think there was unanimity in how they viewed the response. I would say that they probably preferred it to the alternative. I would also say that I think there is a probably a longer tradition of having some skepticism of government involvement in the private sector. I think there was a belief both in 2008 and 2009 that perhaps that was changing and there was going to be perhaps more permanently a government presence at least in the financial sector or perhaps more broadly the auto sector comes to mind. I think the speed at which both administrations committed to exit is definitely something I think I heard a bunch about and that reinforced a tradition of having the government pull back from that involvement which is not the case in a lot of other countries so that is sort of an interesting that that tradition managed to survive the crisis response.

MR. METRICK: One outcome which we have not measured but which we don’t need to measure because it is apparent is that the public reaction you the things were done was tremendously negative. There has been a lot of backlash, perhaps a large change in the political systems across many countries, in part due to what was done during the crisis and this is not unusual for history. So, Michelle, you had a hard job during the crisis in trying to help not just form the policies but also communicate them. And I wonder if there is anything that we can do in a crisis to have a better outcome in the way the public sees it afterwards?

MS. DAVIS: Look we did some incredible interventions that were wildly viewed as un-American as Matt said. That should be unpopular, right? We don’t want them to become like “oh yeah, let’s do that again”. That would be bad. It should be very politically difficult to do some of the things that we did so that the bar needs to be high. That is something really important to pass on. In these policy papers that everyone has been writing all day and passing on to future treasuries and feds who face these kinds of crises we need to be very clear that winning public opinion should not be your measure of success because you are setting yourself up for failure. The audiences that we needed to reach we did because we focused on the audiences that we needed to be with us and help us get the system restored as quickly as possible. I think that is really the lesson to me from a communications perspective to pass on that there were a couple of things that were absolutely critical to being able to communicate confidence. All of this was about trying to boost confidence, eliminate uncertainty, and often times we were announcing policy things that would have taken time to put together and you needed the confidence to be there that not only that it was the right idea but that we could actually execute it. We had the leaders in this crisis Hank and Ben, every time they announced something that was there, everybody trusted them and believed that they had come up with the right thing to do and that they could make it happen. We probably took it for granted at the time, but now I don’t know if you should take that for granted. And then the second thing that was so foundational to being able to communicate and raise confidence was speaking with one voice There was never light between us in the two institutions. Because you two were on the same page. And then within our Administration there were n voices raising doubts about what we were doing. That also gave some certainty that when we said something we meant it and it would happen. Those foundational pieces were really important so that we did make all these innovative policy announcements, they responded “okay, that’s a little odd but we’ll see we will give them the benefit of the doubt”. Among the people who mattered, the policy makers in Washington and around the world and in financial market participants. Public opinion would be great but we are trying to put a fire, using Tim’s fire analogy, when you are putting out the fire you don’t have time to explain how to explain how the fire extinguisher works. We tried to talk about the banking system as the plumbing of the economy that makes all these other things happen, mortgages, jobs, but that is not going to resonate in the middle of a crisis like that.

MR. METRICK: Meg had focused on the actions taken at the worse time to stem the panic and that is important and that is what she was asked to do, but there has been a long tale of reacting to the crisis, much of it through monetary policy, and I just will put Bill on the spot, we heard a little of this from Don but you don't work for him anymore so now you can say what you really think. In your completely unbiased view, how would you evaluate the outcomes of the monetary policy in the many years since the worst part of the crisis?

MR. ENGLISH: So not surprisingly I think that on the whole, I think that monetary policy did pretty well so I am in agreement with Don and Brian's paper. I think the Fed in particular was a brave and effective institution in turning to unconventional policy. I think that was not obvious that those policies will be used as aggressively as they were. I think other central banks looked to the Fed to kind of lead the way on a lot of those tools and I think those were pretty effective. As Ben Bernanke always said, the monetary policy helped, it was valuable, but it was not a panacea and that was right. There was a nice paper by Engenbach and Riefschneider where they go through and try to add up all the pieces, how much was unconventional policy worth and they end us saying "gee the maximum effect of the unconventional policy was something a bit less than one and one-half percent on the unemployment rate, something like half a percent on the inflation rate". So this is useful that is like a couple million people who would not have had jobs and inflation that is significantly closer to target. But not a panacea for sure. We still had a very long and kind of halting recovery. I think there were three constraints on policy – one that was discussed nicely in Don and Brian's paper is that the forecasting problem. I think it was kind of a surprise how big the effects on output were and how bad the crisis got. There was a lack of imagination – e really didn't understand how bad things could get so it was hard for monetary policy makers to see how bad it was going to get and to move kind of in advance of the problems. Another constraint was just the limitations on the effectiveness of policy, our estimates of the effectiveness of monetary policy is it is not that powerful a tool. We got to the zero bund more or less and then large scale asset purchases only work if they are really big. And so policy isn't that effective so I think it was hard to provide as much accommodation as we would have liked. The third constraint is that the committee was really learning over time The committee was really learning about the effectiveness of policy but more importantly but as Don and Brian emphasized, is the costs and risks and how risky was is it to push these policies further. How big a problem were you creating for yourself later in terms of inflation, in terms of financial market functioning, in terms of financial stability, in terms of exit and I think the committee took smaller steps as a result to see how it would go and how much further could they go. I think a key lesson coming out of this is those risks and costs mostly didn't eventuate. I think that doesn't mean they could never do so. So you don't want to ignore them and policy makers should think about them and monitor for them. But I hope if there is a next time, first I hope there is not a next time, but if there is a next time, I hope that the Fed could move much more rapidly and much more aggressively to address the slowdown in the economy to provide a bigger offset.

MR. METRICK: Thank you Bill. We did get a question from the audience and this is a question for you, Michelle, and I think that while this question was being written so you kind of answered it. So I am going to read it and then add a little addendum on the end because I think you kind of answered it. So there is one frequent policy criticism involves communications policy makers did not adequately explain to the public, why they undertook measures that seemed unjust like for instance bailouts and that communication failure led to populist anger on the Right, and Left that gave us among other things, our current President. Do you agree that one of the lessons learned for the next crisis, and I want the addendum here to be something that we didn't do in perhaps an attempt to have more legitimacy, something our friend Paul Tucker tells us all the time maybe we should do, is get the President of the United States, out in front of it like FDR was, giving a big speech which explained why we were doing what we were doing, not just the technocrats, but perhaps the elected officials. I wonder if you considered trying to get that done. I realize that you can only answer for one of the Administrations but perhaps speculate as to whether it might have worked for the others, or can anyone else can?

MS. DAVIS: That's a lot.

MR. METRICK: We have at least four minutes, so you should be fine.

MS. DAVIS: Yes, it was horrible to watch the news and to see every day that story would be pictures of the foreclosure signs, interviewing a family that was losing their house and a quick cut to a bunch of white guys in suits, talking about putting capital into banks and that's going to fix it. I mean that is a complete disconnect for anybody watching television. If we had to hire armies of people, we could have spent hours and hours every day trying to walk through how the financial system works and how the capital in the bank is actually what gets out into every other part of the economy. I don't even know if we would have done that if that would have penetrated because we were so busy taking so many actions and everything that we were doing was news in and of itself that there was no time to explain all of it. I love all the people who are here at this event today. They are all brilliant and they came up with some phenomenal solutions, but you have seen the charts that we have had up here today. Would those have convinced the public? That is not the expertise of the people we hired to fix these problems and that's a good thing. Certainly there are things we could have done better and they have made a difference around the margins. I do think that both Presidents did try to give an air cover where they could. It's very different to be announcing a big government spending program after the Great Depression to rebuild the economy than it is to announce that you are letting bankers keep their jobs. I don't care how many times we try to explain it, it will never be popular.

MR. KAYBAKER: I might just add that I think it is interesting to look at other cases so you could look at other countries that pursued different mixes of policies and you could ask whether they had different political results but they had these reactions even if there was a different mix on the margins. The other observation is that there were institutions that were heavily involved in the response that emerged relatively unscathed – the FDIC being I think the most clear case in point and there might be some interesting learnings in point about what it was in the way the FDIC was set up in the thirties and then revised after the SN&L crisis to allowed it as an institution to do the types of things that it did and emerged as an institution with a lot of public trust.

MR. METRICK: We have a few minutes left and I would like to ask another question and it has to do with outcomes. It is something we don't really study nor have great empirical evidence on. Some of my business school colleagues do and that has to do with teams and the effectiveness of teams. Matt, as I teased earlier, came from the private sector and went back out again and as it turns out, many important contributors in the Paulson Treasury and the Geithner Treasury did that. Phil Swagel who will be with us tomorrow, he is one of the authors on the project, told me early on in the crisis, when I was talking to him, he was coming back from an academic background and I asked him what are some of the things that he learned. He said that he learned that investment bankers are useful. He was very surprised to have learned that but he said they can do complicated things very fast and in a crisis you need to do complicated things fast. Interestingly what I believe to be quite successful team at the top of Bernanke, Geithner and Paulson, you have one academic economist, one career public servant who had been forged in many crises, and one investment banker and that multi-disciplinary team turned out to work exceptionally well together and have a complimentary set of skills. What we study often, not me, but some of my colleagues at the business school, is what makes for an effective teams. I wonder if I can put Meg on the spot, I didn't warn her at all, but I wonder if your group, Applied Critical Thinking Group, is thinking about that at all, is thinking about coming up with creative solutions or being effective at implementing them. Whether there is value in putting together certain types of teams and whether there are any lessons for us in how we should be thinking about organizing our red teams for crisis fighting in the future?

MS. MCCONNELL: I think there is a lot of research, actually just one book that emphasizes the value of cognitive diversity and it did have a positive influence I think – it's called "The Difference" by Scott Page and he has a second as well. I think this book "Team of Teams" by Stanley McCrystal tries to get at this need in a complex evolving problem for a diverse array of people to be weighing in and to be collaborating on solving it. There are certain kinds of problems where you do want a diverse team. There are practices that support that. It is not just the diversity. I think it is kind of the norms that you adopt and the ways you engage with each other and I think that was effective in what went on in the crisis. I think we should turn this over to…

MR. BERNANKE: It has been a long day and a good day. To wrap this up, I am going to give a really big thanks to Brookings, to Yale, to David Wessel, to Andrew Metrick, Nelly Lang, and Debra McCullen. This came together much better than I have ever expected. In many ways it mirrored the crisis, right? A tight deadline, a lot of anxiety, a lot of stress, and guess what, it came together at the end. And in terms of the paper writers and the presenters, what really impressed me, this was a large part of the same group that worked with us on fighting the crisis. And so they know how much worse it could have been and they are very mindful of the heavy burden that the crisis placed on those less able to bear it. So to e it's really meaningful. They have day jobs, they came together, and they gave us their time. I think these papers are going to be really helpful over time and I really, really thank them. Lastly I really want to thank Tim Geithner who conceived this event. He is a very creative guy and this was a creative guy. What better way to demonstrate the teamwork and the policy continuity that to have people from two different administrations and from different agencies in the government collaborate and write a paper? If any of you have written something you know it's hard enough to write something by yourself and to write something together is no easy task so on that Debra McCullen gets a big thanks. Tim, you got to have the last word since it was your idea and it was terrific.

MR. GEITHNER: I want to echo but not repeat Ben and Hank's compliments and thanks to all the people who helped make this work. I was terrifically impressed by the quality of the papers. I shouldn't say surprised because you guys are talented people but you were pretty reflective and it was better than I thought. I hope we can leave a better body of work to help inform the choices that our successors make. There are a bunch of people here that are not here that we should acknowledge that were critically important people in the crisis, Sheila Bear among them. Larry Sommers, White House Staffs from both Administrations, two Presidents, Leaders from Congress who made the decisive things ultimately possible and the heads of the IMF and the World Bank. This is just a tiny fraction of the people who were really important. This is a hard thing to do. I think it is a painful thing to do for all of us. We all carry the burden of the disappointments of the outcomes and the disappointments of so many others. But it's a really important thing to do because if you want to improve the chance of better outcomes you need to look back with the wisdom of hindsight such as it is with a little bit of perspective and looking at the choices that other countries have made too and ask yourself what could you learn.

I always went into my job hoping, apart from having a better arsenal of tools, that you would have in your desk drawer the cool playback or manual of lessons or wisdom that would express and reflect the experience of all your predecessors and use that to guide you. That doesn't exist. We did a lot of things in the crisis that will leave our successors a dramatically better playbook and that will help improve, not guarantee but will help improve the quality of outcomes.

Just a last thing I think you got to see, in a way we designed this as a tribute to the people and you got to see the incredible integrity, thoughtfulness, depth and creativity of the people that were in these important jobs. They are a tremendously valuable asset and what we were laying out a bunch of lessons from this crisis, how dangerous it is to let your regulatory system fall behind the curve of innovation and risk. And how important it is to preserve the defenses you need to create against the future crises. Why you need a better arsenal of tools, why you need better knowledge of what works, but you need people who come spend a big part of their lives in these institutions. They are talented and smart and thoughtful and debate and feel their way and challenge each other. You saw a measure of the quality of those people in these presentations today. Thanks r coming. These are presented as working drafts but ultimately we will publish them in a book. We hope that you and others will help us refine these drafts and help us answer the questions we didn’t ask. Thank you to all of you.

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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.

Carleton J. Anderson, III

(Signature and Seal on File)

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Expires: November 30, 2020