Transcript on "The Lessons"

Chaired by John Taylor
Opening Presentations by Darrell Duffie, and John Cochrane
General Discussion

December 7, 2018
1:30 noon to 2:45 pm

Session 4
"Workshop Series on the 2008 Financial Crisis: Causes, The Panic, The Recession, Lessons"
Hoover Institution, Stanford University

John Taylor: The next session is about lessons from the crisis, and we're going to have Darrell Duffie and John Cochrane speak to that, and hopefully everybody else will join in with their own views, regardless of where they're sitting. So, Darrell, do you want to start?

Darrell Duffie: Yeah. Thank you so much, John.

Here's a handout. Let me give you a brief introduction. First though, thanks to John Taylor and John Cochrane for encouraging me to participate. I'm sorry I couldn't be here at lunch. We had a finance seminar in the business school, and this was the best I could do. But I'm looking forward to the rest of the day.

So, as I'm sure John Taylor has explained, this is the segment where we're going to talk about lessons learned from the crisis. I'm going to kick it off, and then John Cochrane is going to bat cleanup. I'm very happy to see that Charlie Calomiris is here today, because I'm going to say one or two words about a hypothesis that he has written about as to why the US banking system was allowed to get into the state it was in before the crisis. That's going to be the main theme of the lessons that I've learned.

When I looked into a lot of primary source documents, regulatory documents in particular, filings that were made into the Financial Crisis Inquiry Commission, internal investigations of the SEC and the Fed that were eventually released, and so on, I found strong support for one of the biggest lessons learned from the crisis: We cannot rely on market discipline to ensure that the financial system is in a safe place. The financial system was not prepared to deal with a big shock coming from almost anywhere. This particular crisis came out of the housing market, but whether it was an international development or the housing market or some other financial market in the United States, when that shock hit the core of our financial system, particularly the big banks, they were not prepared for it. The reason for that was an undue reliance by regulators on the idea of market discipline. The concept of "market discipline" is that if you as a bank don't get your house in order, and get enough capital and liquidity, then counterparties won't deal with you.

George Shultz: Let me interrupt you and give a different version. The New York Fed is the prisoner of the New York financial community. And they got the person they wanted, who didn't touch them with a ten-foot pole. So, there was no regulation.

Darrell Duffie: Well, I certainly agree that there was far from sufficient regulation. And I could make the statement even more strongly with respect to the Securities and Exchange Commission, where there was really no one watching the big banks. As you recall, before the crisis, we had five large investment banks: Morgan Stanley, Goldman Sachs, Bear Stearns, Lehman and Merrill Lynch. None of them still exist as investment banks. Three of them fell or had to be merged under extreme pressure. Two of them had to become banks. And the reason none of them exist anymore is basically that the SEC did not do its job on the financial stability side. Ever since the financial crisis of 1929, which generated through the Pecora Commission the existence of the SEC, the primary mission of the SEC has been to protect investors from fraud, from being sold inappropriate products, from lack of clear disclosure by firms when they sell products. These are all very, very important investor protection motives. But the SEC never took on board the mandate of financial stability, that is, protecting the economy from the failure of either market infrastructure or a major financial market participants. Those spillover effects were not part of its accepted responsibility, and they should have been. In fact, Don Kohn, the former vice-chair of the Fed, when asked what his lessons were of the financial crisis, spoke about the need for all US financial regulators to have an explicit congressional mandate to protect financial stability. I'm just going to run through a few demonstratives in that area, make a couple of arguments about the lack of attention to financial stability, and then again come back to this idea of market discipline and why it failed.

And just to let the cat out of the bag, the reason it didn't work is that these large financial institutions were too big to fail. There were no adequate resolution methods for safely treating their insolvencies. And because there was no adequate failure-resolution method, creditors to these banks believed that the government would have to step in if they approached insolvency in order to protect the rest of the economy. And of course, they were rudely awakened when that didn't happen at Lehman. Since the fall of Lehman, a certain amount of market discipline has taken a grip, partly through legislation, Title II of the Dodd Frank Act, that makes it clear to creditors that they may now be on the hook, if a large bank were to fail. That is, theoretically at least, the largest creditors may be forced to take a loss. And market discipline has returned to some extent.

John Taylor and Ken Scott, our colleague that we lost two years ago from the law school, impaneled a group of scholars and legal practitioners to introduce market discipline through the door of better failure-resolution methods in the bankruptcy code through legislation known as Chapter 14, which is slowly making its way through Congress. It's gone through the House and it's in the Senate now. Is that right, John?

John Taylor: Yes.

But at the time – that is, before the crisis – creditors believed that these large financial institutions were too big to fail, and based on that, they competed to give them credit at razor-thin funding costs. Just to give you an example, at the one-year point, credit spreads ranged from 10 to 15 basis points, steadily, never moving much in response to changes in credit conditions in markets. After the financial crisis, when market discipline returned to some extent, these credit spreads soared and became very responsive to credit events in the market. Before the crisis, competition to give these large banks cheap credit was an incentive for them to grow their balance sheets rapidly on leverage, and I'll show you some evidence of that.

So that's all by way of preamble. Let's run through this very quickly. I have a few slides. Does anybody not have slides in front of them? Anybody need them? Okay.

Just going through the charts. Average leverage of systemic banks and investment banks, pre-crisis, was very high, especially in the investment banks where the SEC was not paying proper attention. I'm going quickly here.

Next chart, at the one-year point, unsecured credit spreads of the largest banks – and this is measured by LIBOR minus OIS, which is a proxy for the risk-free rate. You can see razor-thin credit spreads leading up to the crisis, and pretty steady, but after the crisis, much higher spreads. And even after the crisis was over, high and fluctuating credit spreads with changes in market conditions, including the European sovereign-debt crisis.

Next chart: big bank pre-crisis balance sheet size. These are the total accounting assets of the largest banks, with the red banks, the former investment banks, and the blue banks the money-center banks. And you can see the tripling of assets between 1998 and the doorstep of the crisis in 2007. And then, after market discipline returned, a big lesson, almost no growth in assets and much smaller leverage because, of the Basel requirements.

John Cochrane: Darrell, your view is that market discipline has to some extent returned.

Darrell Duffie: To a significant extent. I have some new research on that with Antje Berndt and Yichao Zhu, at Australia National University, that in our view nails this point. The capital buffers of these banks are much bigger. But if you go back two slides and look at their credit spreads, the credit spreads are way bigger now. How is it possible to reconcile those two facts, that they're a lot safer, and yet their credit spreads are a lot higher? The only reconciliation of that is that creditors now believe that there's a big bullseye on their back --- that they now expect to lose money if these banks approach insolvency.

John Cochrane: I know we've discussed this, but I want to ask it. In a systemic crisis, it still seems likely they'll be bailed out. So, they can fail individually but not collectively. Is that a reasonable interpretation of where we are?

Darrell Duffie: I would agree with that. But Congress might almost burn down in order to recapitalize the banks the next time it happens, at least within the lifetimes of anyone that's currently voting.

John Cochrane: Yeah. A serious question is whether the firehouse has now burned down. Okay.

John Taylor: Your pre-crisis big bank credit spreads are shown with a scale that is quite small compared to what I'm used to. But they actually picked up before the crisis. They skyrocketed to 50, 60 basis points.

Darrell Duffie: I'm including mid-2007 as the beginning of the crisis.

John Taylor: But that's the point. There was a time there when the Fed could have done something about that. They tended to say there was no problem. I wrote about this with John Williams. Maybe it seems like a slight amendment to what you're saying, but it's really big from my perspective.

Darrell Duffie: There are two forces on credit spreads. One is the likelihood of default, and the other is the loss given default. And I think the loss-given default was always low right through to the point at where Lehman failed, but the likelihood of default grew through 2007. The low loss-given default is the bailout effect, the very high probability of bailout. The numbers that Antje, Yichao and I estimated are on the order of point six probability of bailout for big banks pre-crisis, and now on the order of point two. So, too big to fail hasn't gone entirely away, but it's been cut down by roughly two-thirds.

Niall Ferguson: May I ask a small question? Do you think the investors are looking at the small print in Dodd-Frank and inferring that kind of new risk? Because that would support how Scott and others say embedded in Dodd-Frank it actually makes the system less flexible in a systemic crisis, because they have to resolve all these systemically important institutions?

Darrell Duffie: And also because Dodd-Frank prevents the Fed from providing liquidity in some systemic scenarios. So, there's a combination of those effects. And there's the shock effect of Lehman. It's really impossible to separate all of these effects. But I do think that big-bank creditors got religion after the fall of Lehman, that they might indeed lose money.

By the way, these are not the only hypotheses. I'm going to go through a couple of others. The one that I am bringing forward is the one that I most forcefully believe in, but there are other stories. Well, let's just go to those other stories.

I'll skip ahead to "What were they *thinking*?" This is the title of chapter two title of a new book by Andrei Shleifer and Nicola Gennaioli. This book has the central hypothesis that nobody was paying attention to disaster scenarios. That is, they have a behavioral interpretation of irrationally low belief in disaster scenarios. They have a whole book on this. It's really well written. I urge you to read it. It's got a lot of plausible stuff in it, and this behavioral effect probably contributes importantly [to the weak pre-crisis preparedness of the financial system.] But I'm still a firm believer that too big to fail was a dominant theme in wholesale lending markets for the big banks before the crisis, and that this is now a far less dominant point of view, post crisis.

The second potential explanation for what were they thinking is *Fragile by Design*, a book by Charles Calomiris, who's sitting right there, and our Stanford colleague, Steve Haber, who said, well, maybe Charles can put it in his own words, but he and Steve sort of said, "Well, what would you expect in a political economy in which the banking system wasn't set up specifically for efficiency and financial stability, as opposed to other countries that have different financial systems, like Canada for example, which has never had a serious banking crisis in 150 or 200 years?" Charles, did I get that wrong?

Charles Calomiris: No. I think it dovetails nicely with your story, too, because it actually explains why the regulatory system was not more careful. If I were going to put a sharp point on it, I'd say, if you're trying to create a subsidy for risk, then obviously creating a regulatory system that limits risk is inimical to your purpose. Well put.

John Cochrane: But the government usually likes to subsidize both ends of something.

Charles Calomiris: Or at least pretend to.

Darrell Duffie: The third point on the list is one of the elements that I put forward, which is that regulators, particularly Alan Greenspan, though he was not the only one, took a libertarian point of view, that if each financial institution was protecting its own interests, that that would be enough, both from the viewpoint of protecting interest of their shareholders from their own failure, and also from the failure of their counterparties, to whom they would not grant credit if the counterparties were unsafe. But none of that view internalizes the externalities associated with financial crises.

John Cochrane: Just to clarify, didn't Greenspan recognize people expected to big too fail, and therefore… I mean, you could be as libertarian as you want. But if the government's picking up the check, the incentives are rather distorted.

Darrell Duffie: Yeah, and he was famously asked about that in Congress in front of the – was it the Ways and Means or was it Financial Services? I think it was House Financial Services. And he basically said, "I made a giant mistake. I was wrong." By the way, there's a paper I wrote for the National Bureau of Economic Research; it's coming out in the *Journal of Economic Perspectives*. It has chapter-and-verse quotes that back up the points that I'm making today. And I want to be quick here because I want to hear what John has to say. How are we doing for time?

John Taylor: Good.

John Cochrane: We're doing fine.

Darrell Duffie: Okay. Fourth hypothesis – these have all been brought forth by various people. This one has been brought forth by regulators. It was just too difficult within reason for regulators to detect these problems. Financial innovation, complexity, large size, and so on --- it was difficult to supervise.

Well, yeah, maybe not. There's some work coming out of the New York Fed by Tom Eisenbach and coauthors that suggests that's probably not the case. And as far as the Fed, they had enough people. They had about five times more supervising people than the SEC per large bank, looking at their financial risk-taking even before the crisis.

And then I already mentioned former Fed vice-chairman Don Kohn's lesson learned, which is, what do you expect if you don't tell the regulators, that is if they don't have the legislative mandate to protect financial stability. When they're interrogated by congressional committees and asked whether they did their jobs or not,– it should be the case that you can point to legislation [covering their financial stability responsibiilties] that can be used to score their performance.

John Taylor: It seems that there's something missing here about the lack of leadership. Not what they were thinking, what were they doing. They made a decision to deal with Bear Stearns when they didn't need to. And then they that built on that in the summer of '08, when they're saying, "We saved the country, because of Bear Stearns. Education is now fixed." And so, it seems to me that they were moving in that bailout direction because of the people in charge. It's not really a list of excuses. It's that somebody didn't do their job.

Darrell Duffie: Yeah. There was a poll taken, the IGM University of Chicago poll, that polled a panel of roughly 30 US economists, and then a separate poll of 30 European economists on what were the major causes of the crisis. And they had 12 different potential causes. The one that was the majority choice independently among the US economists and the European economists was failure of regulation and supervision. They just weren't doing a good job. All of the other things that we think about that are important, showed up as important in these polls, but they didn't rank as highly as that one.

I'm going to skip ahead very quickly to vulnerability to short-term debt. So, if you jump ahead to Doug Diamond's famous quote, "Private financial crises are everywhere and always due to problems of short-term debt." Now, that might be an oversimplification, but it's a pretty darn good description of almost every major financial crisis that starts in the private sector. And these core financial institutions that I mention were extremely exposed to short-term debt. So if you go ahead one slide, you see the extent to which all the largest security dealers were funding giant securities inventories in the overnight repo market. Many of those assets were risky. And you can see the growth from 2002. One trillion of daily refunding around 200, moving up from there until just before Lehman failed to almost three trillion of overnight funding. And it wasn't only that this funding could disappear on a moment's notice. It was the way that the infrastructure was built to handle collateral sales, were they to be needed. So if a dealer were to fail on its ability to roll over its debt the next day, it would all go back into two large triparty clearing banks, JP Morgan Chase and Bank of New York Mellon. And believe it or not, even though this funding was coming from investors like money funds and sec lending firms and outside firms, each day when those repos matured in the morning, and the dealers needed funding until the afternoon that the new repos were obtained, these two clearing banks provided intraday funding to the tune of $2.8 trillion. And all of this was settled in the general commercial bank deposits of those two large banks. It's like lighting a match in a gas-filled room. You just couldn't imagine a better way to blow up the financial system than to do that.

I'm going to skip the plumbing chart on the next two pages and talk about for one minute or so about derivatives. This chart is the market value – now you've heard these stories about hundreds of trillions of derivatives. Well, that's notional. We just talk market value. How much market value was there in the derivatives market? It soared from the turn of the century to the door of the financial crisis from about two or three trillion market value to about 35 trillion market value, according to the Bank for International Settlements. And while it was soaring, proposals were made to regulate this market. There was no regulation for central clearing, no regulation for minimum margins, no regulation for transparency. Even the regulators didn't know how much derivatives there were in a given bank.

In 1998, there were proposals out of the CFTC to regulate this market, and they were pushed back, particularly by Treasury, SEC, and the Fed, with the view that – and it was well meaning – that if we were to start to regulate this market, it would just go to London. Or it would cause some sort of financial instability as people wouldn't be able to use these swaps with legal certainty as hedges anymore. You can see that post-crisis that these gross market-values of derivatives have come way down, and yet the activity level, turnover, in the derivatives market has not come down. The lesson learned, you can regulate this market more safely. Post-crisis there's been massive amounts of regulation in this market. Central clearing. Minimum margin requirements. Transparency requirements. It's all come in -- all nine yards. Capital requirements are much bigger. Exposures have gone way down, but activity levels have not. You can regulate this market and not kill it. And that's a strong lesson learned.

The next page shows the growth of the interest rate swap market in terms of turnover, and it's just been doing fine. Regulation has not killed it. So, whoever pushed back in 1998, I think they made a well-meaning mistake about whether or not derivatives regulations would kill the market or not.

So, I'm going to stop there, even though there's lots more to talk about, and sit back and listen to John.

George Shultz: Your next chart is an interesting one though, the solvency buffers, in other words the capital that they lose themselves.

Darrell Duffie: That's right. They have a lot more capital now than they did before. I mean -- give a hand to Anat Admati and her coauthors. She was really beating the drum. These banks just need more capital, and all the complaints from the banks coming with the idea that if you were to force them to have more capital, that they wouldn't be able to serve the economy anymore, that was just false. The banks are doing fine. They might have been even more profitable if you didn't regulate them with capital requirements, but now they're a lot safer. And US banks are in way better condition than European banks in terms of their capital levels, and they're the envy of Europe.

George Shultz: This is a really important point.

Darrell Duffie: Very important point. And—

David Mulford: Wonderful time to buy them right now.

Darrell Duffie: Yeah, they're getting beaten down pretty hard right now. And George is absolutely right. If there's any lesson to be learned, it's having enough capital in the banking system.

John Taylor: It sounds like you're saying we learned it.

Darrell Duffie: We have. We have. Though there's some backsliding. Now there's proposals coming into the Fed. And most of the adjustments are actually technically good. The Volker rule needs to be adjusted. The leverage ratio rule needs to be adjusted. The Dodd-Frank stress tests need to be adjusted. But all of these adjustments, at the margin, are coming with less and less capital in the banking system. So far it's not dramatic. But my view is, and I've expressed it, every time we make an improvement in terms of efficiency in the way regulations are applied, there should be an offsetting increase in basic capital, so that risk-based capital requirements, for example, could go up one for one any time capital would otherwise go down because of some tweaking of a regulation to make it work better. That's my view anyway.

John Cochrane: That was actually my last slide was going to say the same thing. It's unfortunate Congress doesn't understand this. They view all regulation as bad, and so they're backing off of capital regulation, as well as backing off of other stuff. If only we could understand, look, more capital is the key to getting rid of all the other stuff. And then you could actually get a much more efficient system without losing safety.

John Taylor: Sorry, but what you say is very important, that they're making efforts to make it more flexible or reasonable. But simultaneously, that's reducing the capital requirement?

Darrell Duffie: It has been.

John Taylor: It doesn't seem like it so far.

Darrell Duffie: Well, this chart only goes up to this year, when they changed the way that they're going to apply the stress tests based on the supplementary leverage ratio. And it's a technical improvement in the sense that it was causing a distortion. Now they're going to improve that. But curing that distortion also lowered the amount of capital in the big banks by an order of magnitude $50 billion. In the larger scheme of things --- that's not huge. But most of the changes that have been proposed lately will have the net effect of lowering capital in the system.

John Taylor: Any other points?

Alvin Rabushka: Yeah, this whole fourth principle here about too difficult for regulators to detect the problem reminds me of Markopolos who wrote 17 letters to the SEC to please look at Madoff. And the same thing happened, I think, with the banking regulators. Here you have a guy making $170,000, goes into a place where guys are worth $200 million. And that's pretty intimidating. And if you were any damn good, you'd be sitting in the $200 million spot, and I wonder if you did some kind of, I don't know IQ test or just ability test, why did someone take such a relatively low-paying job given the relatively much higher paying jobs in the private sector. So, I suspect there was some desire not to want to know what was going on and not that it was too difficult. Just don't—*I'm going, I'm looking. Oh, I'm in the first room. Oh, there's another room! Now I can finally look at the files. Oh! There's a policeman outside, better…* You know, 17, it took 17, and they finally figured out Madoff was Ponzi scheming. And the banks too. I suspect there may have been a lot of that going on. I don't know that apart from Markopolos, people have written about this mismatch, the regulators being civil servants, and the bankers being multimillionaires. I don't know. Is there anything to that story?

George Shultz: Jim Baker put it very well yesterday. He said, he had his arguments with the President, and when they ended, the President said to him, "Baker, if you're so smart, how come I'm President and you're not?

Alvin Rabushka: Okay. Well, anyway.

David Mulford: Why have the Europeans been less successful than we have now? And how vulnerable are European banks at this time?

Darrell Duffie: Well, let's think about one bank in Germany, Deutsche Bank. That's trading at an all-time low. It's stock market value is less than one and a half percent of its total assets. Now that's in terms of market value. And it's meeting its regulatory capital requirements of ---what are they ---10 or 11%. But there's no confidence in that particular bank. The Italian banking system is very undercapitalized with nonperforming loans.

Charles?

Charles Calomiris: You just made the point that I've been wanting to make in response to your presentation, which is: book values unfortunately are not a reliable basis for regulation of capital. And I think this is what we really learned about capital regulation is that book values cease to be good as measures of market values during major recessions. And this happens not just because banks hide their tangible losses. That's one of the reasons it happens. The other reason – more importantly during this crisis – is intangible values can actually be negative in banks, and that intangible negative values can make banks insolvent. So Citibank, remember, in December 2008, had a risk-based capital ratio of 12% when it was insolvent, just like Deutche Bank. And so, I'll just leave it there. Of course, I've been talking a lot about how we can fix that. But these capital ratios look good during good times. The market and the book ratios align. Actually, in the cross section, there's huge variation. JP Morgan has maintained market to book ratios consistently about three times what Citibank has, throughout the last 12 years. So, they're not getting rewarded for that, and Citibank isn't getting punished for that. So, I think our system is very screwed up, and it's not robust when we need it.

David Mulford: What do we need to do? (31:02)

John Cochrane: To answer, Europe's even worse than we are. Just to bring it home too, I went to a conference in Europe, and we spent a whole long morning talking about these fancy rules and this that and the other, and then we went to lunch, and everyone's pulling their hair out because no one in

Europe can bring themselves to say Italian debt is risky. So it's still on the balance sheets as risk-free debt. I mean, we're ten years into it, and they can't bring themselves to say sovereign debt might be risky.

David Mulford: Plus, they've never had a centralized system.

John Cochrane: Well, part of the centralized system is the ECB, which will take any piece of toilet paper as collateral.

Darrell Duffie: To be fair, there is now a central organization at the ECB that stress tests the top 120 banks in Europe. So, while their first few stress tests – not at that particular organization but at the first pan-European stress tests were kind of a joke, because immediately after them, a number of banks that had passed with flying colors failed. But it's said that this new organization inside the ECB is going to be pretty tough. So, we'll see.

John Taylor: So, shall we switch to John?

John Cochrane: Sure, I think Darrell just gave away my punchline, but I'll just say it over and over again.

John Taylor: That's okay.

John Cochrane: So, the thing is what have the lessons of the crisis done, the intellectual development of the ten years since the crisis hit. And part of this is lessons I learned. I look at myself back in 2007; I was remarkably naïve. I read Niall's book, *The Scent of Money*. Niall knew way more about the financial system than I did as of 2007, when he wrote the book. But also, I have – I think we've observed this conversation and it's one of the things we should be reflecting on is not just the lessons of the crisis, but what is the intellectual history of the last ten years.

And there I would put it as capital. We just all said, "Boy, the main problem is not enough capital in the banking system." That is an insight that has taken a long time to emerge and is still emerging. And I will emerge it as usual to the far extreme, which is where my views are. But I think we're heading that way.

My first slide is… I think a way to put this is, let's ask some big shots, is the financial system safer? And Janet Yellen answered this question, yes, there's reforms – first, more capital. Ben Bernanke was asked the same question, why is the financial system safer? More capital. And the plot is from the *Wall Street Journal answering* this question, giving many big-shot quotes. And you can see the increase in capital. So, that should make us happy.

Now, to make us not so happy, notice usually the stunning silence after that how much more capital? There's a lot more to the Dodd-Frank Act and the set of regulations than just capital. And that silence betrays a certain lack of faith in all the rest of it, which I think is emerging, and ought to emerge better.

There's also in my graph the capital ratios. Where is the financial crisis? All of these banks met their – Lehman Brothers met their regulatory capital requirements with flying colors five minutes before it went under. And that ought to make you worry about how we are measuring and regulating capital. Particularly risk weights and particularly use of – I entirely agree – book values. My favorite capital measure is the market value of equity divided by face value of debt, and throw the risk weighters out on their ears. That's an extreme view like all others.

And notice the small banks whose capital is declining. A lot of what just happened in Congress was to lighten up on the small banks and to make 250 billion [inaudible] too big to small, where you don't have to have much capital. And I think we're in danger there of forgetting history – Niall – as we are wont to do. The Great Depression was the simultaneous failure of many small banks. So was the savings and loan debacle. So, just because this last time Citi was in danger doesn't necessarily mean small was safe.

So, I'll give you my bottom line, because I'm going to run through a bunch of graphs quicker. As usual, I started with a set of slides for a two-hour talk, and I got through enough to cut it down to a one-hour talk. So, we're going to go fast.

Bottom line, I agree. To the extent that the financial system is safer, it's because capital is higher. Why? The lesson of the crisis is the crisis was a run. Period. That tells you a lot. It tells you the other things don't really matter. And I'll tell you a little more about the run in a minute. Second, the conclusion, the key to answering things like that is capital, and that capital is not socially costly. And therefore, the other policy regulations are mostly a waste of time. And I'll… risk regulation in particular… I gave you where we're heading is Basel XVII, like the Super Bowl. [Laughter] Once it gets up this big, they'll give it a Roman numeral. Intensely complicated rules – there's like 150 regulators sitting inside every big bank – I think the faith that the regulators will be clairvoyant and see it coming next time, well, I don't think it's justified, and I think implicit in people saying "capital first" is a declining… Remember, banks are really a paradox. Bank assets are really the safest assets on the planet. Bank assets are mostly loans, mortgages, stuff like that. You want a dangerous asset? Let's look at Google's self-driving car. There's an investment with some cashflow risk to it, right? Where are all the regulators? They're sitting on diversified pools of mortgages, not watching Google's self-driving car. Why in the world do we have this ton of regulation on the safest assets in the planet? Because they're financed 30 to 1 with overnight debt. Because there's gasoline in the basement, and they're run-prone liabilities. So, let's get rid of the run-prone liabilities, and then the regulators can go drive for Uber.

I think also this is a very optimistic view. If we take the usual list of all of the causes of the crisis and all of the pieces of regulation that have to work together, and you say, "Is there any chance we'll get this to work before the next crisis?" The answer is: no, forget it. I mean Fannie and Freddie, the Community Housing Act. Already, we've got no-doc mortgages are back. The housing stuff restarted, is all running all over again. And we'll never fix that. But if the problem is runs, and if the solution is capital, you can let all the other wounds fester.

I'm still doing bottom line, because I probably won't get to the other bottom lines. As I look at it, I don't think we have anywhere near enough capital. We have a little bit more. We missed a once-in-a-lifetime chance to end private financial crises forever by lots and lots and lots of…

John Taylor: What's lots?

John Cochrane: I'll get to that. And why I don't want to answer the number question.

Bob Hall: And why capital as opposed to subordinated? (38:38)

John Cochrane: Yeah, because well, what's the question to which that's answering? Capital is so much simpler. But I'm not really that picky.

And I think we should close on looking at the looming dangers. The next crisis will not look like the last one. We will not redo a housing crisis mediated by sub-prime mortgages in investment banks. So, I think we should finish this discussion – We're finishing at 2:45, right? Leave time for a little discussion.

John Taylor: You say other causes do not matter. I completely disagree with that.

John Cochrane: Well, let me get to… Because this was the preview. Good! So, I'm going to keep you awake; you have things to complain about.

I just wanted to remind other people what capital was. Capital is a source of funds not a use of funds. To this day, big shots will say, "Banks hold capital." And that verb is entirely inappropriate. Banks issue capital. They retain capital. They do not hold capital."

Bob Hall: They fund with capital. (39:42)

John Cochrane: They fund with capital – thank you – but do not use the verb "hold," that confuses capital. And therefore, if banks have more capital, that does not subtract funds that they can lend with. That is simply getting the size of the balance sheet.

Okay. The next slide, top left, I stole these—I borrowed them with permission from Anat Admati. My graphs make it look like there's more capital. The green is the actual amount of capital in the various banks. The capital portions were tiny. Two percent was considered fine by Basel.

So, okay, cause of the crisis. I, as I think economically, the crisis was a systemic run. That's the key feature of what makes a financial crisis. Why was the tech stock debacle of 2009 not a crisis? Because it was funded with equity. There was no run. Your tech stocks go down, there's nothing you can do but go home and kick the dog. You cannot get your money out. We had a systemic run. The mechanism… I like Gorton and Metrick's view of this. Assets that were designed to be information insensitive and traded like cash suddenly… Somebody said, "there's e-coli somewhere in the salad bar." What do you do? You say, "Oh, it's in the romaine. No, I'll go have something else?" No, you go have a hamburger.

It was a run, not in the classic bank run. Now, if there's one thing you have to read about the crisis, you have to read... Well, first *The Scent of Money*, of course. I have to plug my colleagues. Actually, before *The Scent of Money*, because it's much shorter, Darrell Duffie's *Failure Mechanics and Dealer Banks* was for me an eye-opener. We didn't have a classic run on bank deposits. It turned out they were run-prone liabilities stuffing the dealer banks and that's where we had a run.

Well, oh, we both get the Doug Diamond quote. That was the problem. There was gas in the basement.

But if that's true – now I'll get to where John wants to object – the spark is less important. It doesn't really matter where the original masses come from if they're going to spark a run. They could have come from real estate, they could have come from sovereign exposure, they could have come from something else. If you solve the run problem – They could have come from tech stocks. If banks were funding tech stocks 30 to 1 overnight debt, we would have had a financial crisis then. That allows us to focus on solve-the-run, and not worry about where exactly the losses come from.

Did you want to object to that?

John Taylor: Well, there's all sorts of things that makes the financial system more vulnerable to the shocks. And this is one of them. But there are also the shocks. And in terms of crises, I think there were lots of shocks, and that was causing this. And we talked about it in the first session, *Causes*.

John Cochrane: Yeah.

John Taylor: And I think it… I could go on with many other related things. But to say they're not important, this seems to be missing the whole point – not that I disagree with more capital.

John Cochrane: I have a quote from you here from the Financial Crisis Regulatory, and the next, I have a long list of things that contributed, which I won't read for you, because I was going to make fun of them.

John Taylor: 55.

John Cochrane: But if you don't have a run-prone system, then you can have losses. You can have failures of government agencies to supervise things, and then you won't turn it into a financial crisis. So really, I think you could solve the run problem in a simple, transparent way, then we wouldn't have to worry that next year, somebody would come up with some new source of losses, and we wouldn't have to have regulators watch them all. So, you can… They were all, absolutely, we had a housing crash. Had we not had a housing crash, we wouldn't have had a crisis. But when you're wandering around with gas in the basement, did someone come home with matches, or did they come home with fireworks, or did they come home with a pipe? You know, it's the gas in the basement that's the problem.

John Taylor: So, George has a question.

George Shultz: I have a different view of this, and I thought I'd take a little time to say it, but finish up.

John Cochrane: We're here to have a discussion, not to listen to me talk.

George Shultz: Well, in my view, a good operating financial system must have accountability. It must have competence. It must have trust. People have to trust the people who are running it. All these attributes went down the drain in this case.

In my view, here's what happened. There is a very large, almost worldwide view that home ownership is a good thing for various reasons. And the federal government through Freddie and Fannie, with help from the Federal Reserve, which kept it very loose, produced a huge volume of loans which were very vulnerable to any decline in prices. So, the federal government really produced these things. The private sector watched this process and got in on it. And the large financial institutions securitized all of these loans, so they wound up holding them. So, the government produced poor credit, which the private sector grabbed. And then it became apparent that when prices go down a little on the loans, they're holding a lot of bad stuff. So what happens then? What happens? The first case in which this emerged was Bear Stearns. So, the Secretary of Treasury does what bankers do. He makes a deal. The deal is bailing out Bear Stearns. And they manage somehow to persuade the Fed to take these lousy assets. I don't know why the Fed did that but they did. And then the remainder of Bear Stearns was okay, some buildings and so on, and that was acquired by JP Morgan for nothing. So the notion was then that somehow it's going to be okay. We're going to get bailed out.

Then comes Lehman Brothers. And there was a big effort to somehow bail out Lehman Brothers but at the last minute a regulatory glitch arose and it failed. So, it failed suddenly. That's very different from a regularly conducted bankruptcy, which is orderly and in which assets are passed out, management is changed, and it doesn't stop doing business. It's a very different process. So, incompetence is all over the place in this process.

Then this all begins to spread, and the Secretary of the Treasury and the head of the Federal Reserve go to the Congress, and they say, "The sky is falling. We must have a gigantic amount of money to deal with it, to deal with these assets." But everybody knew that there's no way to put a price on them. So there was no way to pull off the deal they were talking about but they got the money anyway. What do we do with it? Well, you get the big banks – some of them are in good shape, some of them are not – you get them all together and you say, "Everybody's going to take $25 billion." And some of the banks were glad to have it, and some didn't want it. Remember, we had Dick Kovacevich here practically crying. He was forced by the Federal Reserve. They said, "We'll regulate the hell out of you if you don't take this $25 billion." A total misuse of federal power. That's not why they have the power to regulate. That leads to a lack of trust in the institutions.

So, what should have been done? I reflect on the time I was a new budget director and I found that a big financial company called the Penn Central was about to go bankrupt because they had mismanaged their affairs. Arthur Burns, who was chairman of the Fed, thought that if they went bankrupt, it would be very harmful to the financial system so he had arranged for a bailout. And somehow, I thought this was a lousy idea, so I'm there arguing with Arthur. I had a minute thinking, "What the hell am I doing arguing with Arthur Burns, the chairman of the Fed, about this? What do I know? I'm a lousy labor economist." But at the critical moment, in walks the most savvy political counselor in Washington named Bryce Harlow. And Bryce says, "Mr. President, in its infinite wisdom, the Penn Central has just hired your old law firm to represent them in this matter. Under the circumstances, you can't touch this with a ten-foot pole." So, there was no bailout. What happened? It strengthened the financial institutions because they all said, "Hey, we'd better look at our hole card." And Arthur did the thing I think the Fed should do: he flooded the market with liquidity, so the result of this bankruptcy was to strengthen the financial system. So that's in the back of my mind all the time. I recognize these things are different.

Hank Paulson was out here at a SIEPR event as this was going on, and I had a talk with him on the side. I said, "Hank, what you should do is make a speech explaining how this happened and saying how the Federal Reserve has the power to keep financial markets liquid, and somehow, we're going to work our way through. But the people who made these bad decisions are going to be accountable for their decisions." If they aren't accountable, then they're off the hook, and you lose accountability, and at the same time, the whole image of the competence of these people has been totally undermined. You don't trust them anymore.

So, I think the consequences of the way this was handled are very deep in undermining people's confidence in the competence and the sense of accountability and the trust you have. Capital, I think, is the best way to bring about accountability, because if you have lots of it, then that's the money you're going to lose, not somebody else's money.

John Taylor: So, John?

John Cochrane: I just want to echo that. The way to think of capital is in terms of accountability. If you invest in a bank, and it buys some crappy stuff, then you are signed up to take the losses. You are not signed up to, oh, I can run up and get my money right away. Similar in deference to Bob, it doesn't have to be equity capital. I think mortgages can work fine in mortgage-backed securities that are held long only in mutual funds whose values float. And then if there is a bunch of default from the mortgages, well, the value of the mutual fund goes down. You've signed up, you take a price decline, you can't run and get your money out. That accountability is a good way to put how systems like that work, as opposed to the system where we all pretend we can get our money out at any time, but then we don't have to watch that.

John Gunn: Kovacevich, when we were meeting up in your conference room, added the point that if we gave the money to all the banks, we were going to destroy trust and the confidence in the whole banking system, and it would go down dramatically in the stock market. By March, those banks went down 75% from the time that they were given the money.

George Shultz: There was also the dramatic assumption that the federal government knew which banks were strong, and which banks were weak, but the market didn't know it. Come on.

John Cochrane: [Laughing]

Darrell Duffie: I'm going to push back just a little bit on that. You asked earlier why didn't this work in Europe? It was not the case in Europe that all the banks were brought into a room and told, "You're going to raise capital, and we're going to make you take it." It's not in the shareholders' interest to raise capital when it's in the public interest at the time of a crisis. Because of a simple economic phenomena called debt overhang, you can make your bank safer and you can improve its franchise value. But as you add capital to a weak bank, the creditors are getting better off and the equity owners are getting worse off. They're essentially donating money to their creditors, and they won't do it until they're forced to do it. And when you get all those bankers in a room like this, and the strong bankers hold out and say, "We don't need it. We're not taking it." And even though you know who they are, if you just let the weak banks take the money and let the strong banks continue as they are, exactly what you described is going to happen. The market is going to draw conclusions about who's strong and who's weak. The stigma of being selected for being forced to raise capital at a very weak moment, would have been very, very difficult not for Dick Kovacevich, because his bank was in fantastic shape. It wasn't involved in all these shenanigans that John and I have been talking about. But some of the other banks were not in good shape. Looking back at that time, these market to book ratios were, I don't know what, Charles? 30%?

Charles Calomiris: What year are you talking about?

Darrell Duffie: This is just after Lehman, like a month and a half after Lehman.

Charles Calomiris: Well, what's interesting is they were sorting. So, JP Morgan and Wells had pretty good market to book ratios. Citi didn't. I'm not saying that it was one for one, but it was… So, there was some differentiation. The differentiation was correct.

Darrell Duffie: The European Central Bankers point to that meeting –

George Shultz: You said the market didn't know which banks were weak and which banks were strong, but I question that. The market was pretty smart.

Charles Calomiris: The market was right. The market actually sorted pretty well in terms of John's measure of market value of equity relative to face value of debt. That's the measure I like, too. And I've calculated those. Actually, the market sorted pretty well. That is the intervened banks were all at the critical value below three percent. The non-intervened banks never got close to that.

Darrell Duffie: The Europeans point to that meeting as something that they should have done. And maybe it's not a question of weak banks versus strong banks. That meeting at Treasury in which Hank Paulson told the banks, "You're going to take it whether you want it or not."

John Cochrane: Let's at least grant Darrell that there is an argument for doing what they did, which is: 1) the debt overhang that the existing shareholders do not want to take capital, even when they need it; and the other is the stigma that a regulator comes in and says, "You take it. You don't have to," will immediately kill at least will reveal some information to the market. That's why they did it, and so, it's not entirely idiotic.

Darrell Duffie: And the banks did, after that capital raise, they were in much better shape within a few months.

John Gunn: And they were 75% cheaper. They were much better deals.

John Cochrane: Speaks the investor.

Let me go on. As we think about the intellectual history, as I look at it, I see, 2006, two percent capital was fine. 2008, you start seeing more capital. People say, "Ah, the world will end if you require more capital." Now you can say 20, 30, even 40% in polite company, and if you say 100%, people say, "Oh, you're kind of dreamy, but not completely on another planet." And I think likewise the faith in the alternatives is a little shakier.

John Cochrane: I am now, let's see, there's two little green things on the top right, and I am now on the objections slide. Largely in part to… Anat Admati has been on a crusade over the last ten years, and I'll credit her with a lot of helping the world to understand this. Let me just… One of the biggest objections to the view that we should have more capital. The first one is just the fallacy that holding more capital means less money to lend. We understand which side of capital is on which side, but I'll share with you a quote from Alan Greenspan which makes it clear he got it wrong. "Equity is costly, so banks will have to charge more interest."

Now there's a Modigliani-Miller theorem which says, "no." We've been debating that Modigliani-Miller theorem for a long time. The two points I'll make on that one – first, there's a difference between the private and the social Modigliani-Miller theorem. If the government subsidizes debt, then it is indeed, and especially if the government stands ready to cover your debts, if the government guarantees debts, then of course it is private. The Modigliani-Miller theorem fails privately. You want all the subsidized debt you can get. But that doesn't mean socially it's beneficial to have a highly leveraged system, because us taxpayers are the ones paying the bailouts. So, the failure of a social Modigliani-Miller theorem was much harder to establish, and you know, stock values of banks will show that.

Another important one I want to point out. If you go to the next graph, the costs. I just made a graph here of GDP and the financial crisis relative to an artistically drawn trend. So, if you want to whine about you might have to pay ten basis points more on your home mortgages, let us consider the losing ten percent of GDP for a generation. Maybe ten percent more on your mortgages. Or maybe, if we're going to subsidize housing, as George says our government wants to do, let us subsidize it through a direct appropriation, not by subsidizing a financial system that is prone to crises and that produces this kind of crisis/depression.

The next graph to the right is a nod to the other historians in the room. The idea that the world cannot operate without large amounts of capital – historically it did. Back in the old days, we still had crises but there was25, 35, 45% capital was common. And the graph, the effects of higher capital requirements, I just made this for fun. This is the 15-year mortgage rate and the 10-year treasury rates, so you can see the spread there between those two. As of 2009, people were telling us, "If you raise capital requirements, heavens! No one will be able to afford a mortgage again." As you saw from the very first graph, they raised capital requirements, they nearly doubled them, and the spread between mortgages and treasuries did absolutely nothing.

John Cochrane: We need banks to transform assets and create money, I'm now on the bottom one. Not any more we don't. And if you want to narrow the banking system, we've got $20 trillion in government debt. They can give you all the risk-free assets you really want.

Let me skip to the next page, bottom right, Duffie debt overhang. Darrell made a point about capital requirements that has been sticking in my craw for a while. So, this graph explains debt overhang, and I took it from a paper of Darrell's. We're now in the situation where capital requirements bind. So that banks if they want – stop me if I get this wrong, Darrell – even if they want to take on an arbitrage opportunity, would need to issue new equity to do that. As Darrell showed you, now markets think bank debt is risky, at least individually if not collectively. So issuing new equity would raise the value of their debts, and it could be unprofitable for a bank to actually take on an arbitrage opportunity. In Darrell's document, we're seeing problems in the market as a result. Now my answer to that is, yeah, you're right Darrell. But the answer to that is more equity, not less. If you have much, much more equity, so the remaining bank debt is safe, then the debt overhang goes away. And the question I'll ask of Darrell is, suppose we cut capital requirements instead? Then we will have a beautiful six months of lots of trading. The capital will go down to the new, lower capital requirement. The spreads on the debt will increase, and we'll be back to where we were in spades.

I'd also notice that what I'd like to see is proprietary trading, market making, should move out of the banks into equity finance, hedge funds, and so forth. A lot of that already happened. The Volker rule actually did some good. A lot of prop-trading desks moved out of banks, where they belonged.

On this, how much further can we go in this capital rule? I'm up to practicalities. I'll answer a little bit. So, who was it who bugged me just how much? That's an unfortunate question, because if I answer the question, it presumes that capital is really expensive. The BIS is after this now. They want countercyclical capital buffers – 12.37% in this state of the world, and if credit goes up to there, well, then we'll lower it to 9.72%. If you really have to draw it that finely, you're presuming this is something really expensive to do. Once you understand capital's not expensive at all, it's like asking the question, well, I want to drive across Nevada. How much gas should I have in the tank? Well, we could figure out it's 127.2 miles to the next gas station, and you could really keep it tight, or you could just fill the damn thing up and don't worry about it.

And so I think there's problem with the regulation. That's the first one – just how much. The mess of risk weights. How do you measure it? You saw that regulatory capital was a disaster last time. The lifeboat paradox, which is the ship is sinking, you come to the captain and say you want to get on a lifeboat. The captain says, “Regulations require ten lifeboats on this ship. I’m sorry, you can’t have a lifeboat.” We think of capital absorbing losses, but that means after the loss, you have to be undercapitalized, and of course, losses can always get worse. So how do you solve all these problems? I think you don’t answer the question exactly how much. Let us, for example, start taxing short-term debt. Every bit of short-term debt you want to issue, fine. You’re just going to pay one cent on the dollar to the federal treasury, and see if you still need to have it. The Hensarling bill was, I think, a very interesting idea. A smooth tradeoff of regulation for capital. We are missing an onramp. How can you go to the government and say, “I want to run a systemically safe institution. I don’t want a bunch of regulators. What can I do?” The answer to that is there is nothing you can do. I’m sorry. You have to obey every single one of those rules. Well how about, “I’m 100% equity funded.”

“Your exempt, from XY and Z.”

Fifty percent? Well, you’ve gotta pay attention to PQ and R, and as to the Hensarling bill, what was genius about that. You want to keep working the way you are now? Fine. You can have 10% capital and the full mercies of Dodd-Frank and the Fed. Now you choose.

That gives us two things. You don’t want to… When something is like gas in the gas tank, you don’t want a firm, on this side it’s dangerous, on that side it’s safe, especially when there’s an externality, when there’s an incentive for companies to always be up against the edge. You just want to put in a Pigovian tax, and let them figure it out.

Most of all, I want to emphasize what we need for all of our regulatory reforms is an onramp. We always think about how are we going to fix these big banks. That’s never how progress happens. The way progress happens is you let a new system in, the new system comes in and takes over. So, if we let the fintech in or TNBA, a narrow bank that was just denied the opportunity to enter by the Fed, let the onramp— I’m sorry?

John Cochrane: It’s just amazing. Here we come – they should have given them like Catch-22. Here’s a gold star, you’re non-systemic, thank you very much. You’re helping us. Instead: no, no, no. We’re keeping the profits for our friends over there.

Bob Hall: They denied Walmart a banking license.

John Cochrane: Yeah. Exactly.

Bob Hall: Way too much capital, $250 billion of capital – we can’t allow that. It have an unfair competitive advantage, because it’s got so much capital.

John Cochrane: Yeah, so politically the onramp to the new system is ok to think about as opposed to how do we fix it. You know, the airlines. We let Southwest in. The regulator didn’t tell United, “Here’s the rules to turn a plane around in under two hours.”

Okay, I’m not going to go through it. I documented some ten years of intellectual progress on this, along with some fun quotes that you can read on people making fun… silly things. I wanted a little nostra culpa of the *Squam Lake Report* slide. I participated in something early on, went back to read it, and we were a little bit naïve early on about capital. Many of my coauthors at least were, I think, entranced with other, more clever systems.

So, where are we today? I list money market funds as a success. Those are now largely either floating value or we have narrow banking and floating value money market funds. We talked a little bit about what's going on, especially in the *Squam Lake Report*… And BIS to this day wants countercyclical capital buffers. We'll raise them in the boom, and then we'll lower them in the bust to try to do this stuff. Well, here we are in the boom, time for the countercyclical capital buffer. And what's going on? Once again, the war on capital is on, and everybody is shaving back and getting rid of the capital.

So, let us think a little bit about the next crisis. Where does it come from? We need a spark. We need a source. Where is there a lot of debt that can't be paid off? Whom are we accounting to hide it all? Hidden off-balance sheet credit guarantees? And whose rolling over a lot of short-term debt? That looks to me like sovereign debt. I don't know where. I don't know how. But if I did, of course, it would have happened already.

I can think of sparks. China. Who knows who owes to who what in China, what's going to happen? A cyberattack strikes me as something – I know people are thinking about it. But you know, imagine new coms. Oh, North Korea has just hacked all the accounts at Chase, and your bank account is with Bank of America. What do you do? I think you run to the ATM machine. And once again, banks… Let's go back to the Europe story. Banks, especially in Europe, are full of sovereign debt. And our banks are counting on a sovereign bailout. If we have a global sovereign debt crisis, we have just dragged the banks down with it one more time. The banks' assets fall down, and the banks are counting on a sovereign bailout. And what happens when the fire department has just burned down?

If banks had tons and tons of capital; if everything risky were financed by floating value liabilities, then even in the event of sovereign debt, we wouldn't pull the financial system down along with the sovereigns. That might be a much better system. So, capital can insulate in a way that regulation, clairvoyance, and ex-post bailouts can't. I'll close there.

John Taylor: Okay, thank you.

John Gunn : The problem with is political. From your graph, which was the increased leverage of the banking system, the pollical demand for housing. And I don't see how that happens. As a matter of fact, the larger you make the capital, the more attractive it's going to become to Congress to rate it.

John Cochrane: No, the political – So it's just a question of how we do it. If you want to subsidize housing, fine. Every American who wants to buy a house, the Treasury will write them a check for 10% of the house. If you don't want to actually do that, then maybe you don't think it's housing.

John Taylor: So actually, we've got to break. We have a few minutes to get our act together and go over to the big auditorium. This has been very productive. We're going to have another productive hour. So, everybody please join us, along with 500 other people.

John Cochrane: Or 22.