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DANIEL TARULLO:
FROM LAW PROFESSOR TO FEDERAL RESERVE GOVERNOR

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PARTICIPANTS:

Moderator:

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Remarks: Monetary Policy Without a Working Theory of Inflation:

DANIEL K. TARULLO
Former Governor, U.S. Federal Reserve Board
Georgetown University

Panel Discussion:

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P R O C E E D I N G S

MR. WESSEL: -- fiscal and monetary policy here at Brookings. Our mission is to improve the quality and effectiveness of fiscal and monetary policy and public understanding of it. I think we all understand, if we didn't we learned during the great recession, how important monetary policy is. It seems to me that in a democracy monetary policy is too important to be left only to economists. And that's one reason why I'm very pleased that we have Dan Tarullo here with us today.

Dan is a Boston native, a graduate of Georgetown, University of Michigan Law School. He's worked in the Justice Department, the Commerce Department, the State Department, Ted Kennedy's staff, and coordinated international economic policy in the Clinton White House. He's practiced law, he's taught at Harvard Law School and Georgetown Law School, and he tells me he will return to teaching in January, but he doesn't know where or if he is he's not telling us where. So that will be the mystery. See if someone can pull that out of him. Dan was an early supporter of Barack Obama, which doesn't seem particularly courageous in hindsight, but at the time it wasn't what everybody who had been in democratic policy circles was doing. And at the beginning of President Obama's term he had nominated Dan to be a governor of the Federal Reserve, a position he held from early 2009 until just recently. In one way you might say Dan is responsible for Janet Yellen, in which I mean that I discovered that since there was no vice chair Dan was the Governor who swore in Janet Yellen when she became Fed Chairman in 2014. Now, of course, Dan's background is in financial regulation and studying banking law and that's what he spent most of his time doing at the Fed, and as for which he's most know. But today he's not going to talk about that. After all, it is the fact that all seven members of the Federal Reserve Board, whether they're economists or now, whether they're assigned responsibility for banking or not, have to make decisions on monetary policy. And the same goes for the 12 presidents of the Federal Reserve Banks, some of whom are economists and some of whom aren't.

So Dan's going to today about really two things. One is about what's it like to be a non-economist on the board of the most powerful economic institution in the world. And, secondly, some of his observations about the policy questions that were confronted by the Fed when he was there and, in fact, continued to confront the Fed now in an era of unusually low inflation.

Dan will speak, give some summary of his remarks, a longer version of which is posted

on our website, and then I'll be joined up here with my two colleagues from Brookings, Louise Sheiner, who spent 20 years on the staff of the Federal Reserve, and Don Cohen, who has served both on the staff and is vice chairman of the Federal Reserve Board.

So, with that, Dan, the podium is yours. (Applause)

MR. TARULLO: Thank you, David. It's good to be here this afternoon. So, as David said, I was obviously a non-economist coming into the Fed with a specific academic background, specific expertise in financial regulation. While like almost everybody I had taken the basic economic courses in college, that was quite a while ago, and had picked up some macroeconomics along the various policy making jobs that David recounted, I certainly was not immersed in monetary policy when I arrived in 2009. And, obviously, that was to some degree a handicap, to some non-trivial degree (technical interruption). But as I'll try to explain, it I think turned out over time to be something of an advantage in one respect as well, because once I had had an opportunity to dig into some of the concepts and theories around which monetary policy decisions were being made I might have had a slight advantage in seeing where some traditional correlations were breaking down, some traditional assumptions that would be shared, at least in the general sense, among the economists at the FOMC might not be as airtight or as powerful as they once had been.

So in the paper that David mentions that has been posted on the Brookings website I try to explain two things I learned during my time in the Fed. One is substantive monetary policy point, which is that we do not at present have a theory of inflation dynamics that works sufficiently well to be of use to the business of real time monetary policy making. And I emphasize that real time, meaning at particular meetings do you stay where you are at the Federal funds rate, do you raise it, or do you lower it. Second is more of a sociological point, which is an observation of the dynamics of my economist colleagues, both on the FOMC itself but also the excellent staff at the Fed. And that is many, although by no means all, good monetary policy makers -- even really good ones -- are maybe a little bit more attached to some of the concepts and theories that are not as airtight or not as useful as they might once have been. And the reasons for that and the implications of it I'll try to say a little bit more about later.

But I want to say right at the outset this is the furthest thing in the world from an emperor has no clothes kind of talk. I learned an incredible amount from my colleagues, both on staff and on the

FOMC. I mean, first and foremost, from Ben and from Janet, and more recently from Stan, but from others as well. And what I often found my role being is one who kind of in a law professor -- sort of a nudging law professor way -- would begin asking questions, but instead of getting resistance actually it would sometimes provoke what I at least thought were very productive conversations. So it's not as if the economists closed ranks, but I do think the sociology of any group that has its own learning, its own traditions, is something we need to take account of when we are formulating the composition of any policy making institution.

I'm going to substantively focus most on inflation expectations because I think that is and has become a very important concept in thinking about inflation dynamics, one where I ended up having an awful lot of questions about its relative utility for real time policy making. But I wanted to start off -- and there's way more on this in the paper than I'm going to use in my (technical interruption). But I'm going to start off talking about three of the variables that are projected in the summary of economic projections, which each participant in the FOMC does for every other meeting, four times a year. Now, I learned quickly after getting there that while the dual mandate in the Federal Reserve Act, which instructs the Fed to achieve price stability with maximum employment, refers to two things which are very much observable, employment and inflation. Most important considerations in monetary policy are unobservable. And when you stop and think about it that's perfectly appropriate because when you're making policy, particularly something like monetary policy that has a lag in its effectiveness, you need to be concerned not so much with where you are today but where you're going to be several months or quarters from now, and thus by definition the board and the FOMC as a whole need to be looking forward. And, of course, in order to look forward people look for concepts that help them make those kinds of projections.

Now, the three variables that I'm referring to are potential GDP growth, the natural rate of unemployment, and the neutral real rate of interest. Technically those are not called for projections in the SEP. Technically what the SEP asks for is the values to which GDP growth, unemployment, and the federal funds rate would converge in the longer run with appropriate monetary policy and no further shocks. But without getting into the details of it, workably speaking those three concepts that I just identified are really quite similar to what's being asked for in the SEP.

Now, the fourth variable that's asked for, the longer run variable, inflation, is not really a variable. The FOMC has adopted a two percent target. Everybody dutifully puts in two percent as the long run variable for every SEP projection. So it's really -- you can almost think of it as more of a constant or more of an independent variable with the other three being relevant to policy making.

Now, these three variables are not simply unobservable directly, as for example, productivity or savings rates would be, but they're not data at all, they're concepts which can be translated into concrete values only through estimation and judgment. They're determined by fundamental forces that are at work in the economy, such as long-term fiscal situation, productivity, some of the other things which people have talked about as shaping the potential for the economy more generally. When I first got to the Fed and the first time I was asked to do these -- we didn't have the neutral rate of interest in 2009 -- but I was asked to do the others. I was a bit perplexed because I sort of wondered, this may be where you really need technical Ph.D.-like training in order to make these kind of projections, because I, for the life of me, couldn't see my way through everything that was happening in the economy and that might be happening subsequently in order to project where unemployment, GDP growth would converge or would end up some years down the line.

Well, it turned out that I wasn't the only one who had difficulty doing this. And, indeed, if you look at the progression of those longer run projections by the FOMC from the 2009-10 period you'll see exactly how much they've changed. The median longer run unemployment rate projected by the FOMC has dropped more than a percentage point from the 5.5 projected in late 2010. The median longer-term GDP growth rate has declined almost a percentage point from the 2.7 percent projected at the same time, a much more dramatic change in relative terms, by the way. And with R-star, the medium projection of the longer run federal funds rate has come down with from the traditional 4 percent of 5 years ago, which is basically 2 percent on inflation plus a 2 percent R-star, the neutral rate on top of anticipated inflation, to 2.75 percent today. So you can see there's been a lot of change. And on one level that's a very good thing, it shows that FOMC members have not gotten stubborn about their projections when reality has kind of undermined initial expectations. But one thing that I did observe or wonder about over time is how much impact the whole exercise and the assumptions that lay behind it may be having on decision making. The concepts themselves, obviously, necessarily involve hypotheses

about the relationships of economic variable to one another. Most importantly for monetary policy purposes the relationship of employment and output to inflation. These concepts are frequently explained or even assumed to define and upper bound to growth and the lower bound to unemployment beyond which inflationary pressures are somewhere between likely and sure to take hold.

So you hear echoes of a Philips Curve relationship. A relationship between slack and inflation. But as everybody in monetary policy knows the Phillips Curve has had a much flatter slope for the last 20 years or so than it did when it was originally derived, first by Professor Phillips for Australia and then later adapted for the U.S. Now this didn't matter particularly I don't think four or five years ago. Everybody's assessment of the gap between the natural rate, wherever they thought it was, and the actual rate of unemployment was broad enough that even if you were operating in a kind of Phillips Curve mentality you weren't going to see a need for tight monetary policy tightening. But it may have begun to matter more maybe like two years ago as we got closer to and then -- for at least some members of the FOMC -- overshot what they believe the natural rate of unemployment was. Because over time it seemed to me that some economists at least on the committee and elsewhere were implicitly assuming a stronger correlation between declining unemployment and rising inflation than the quite attenuated relationship that had been well documented by economists, by academic economists, for more than 20 years. Nearly everyone shares the intuition about the directional relationship between inflation and unemployment that's embedded in the Phillips Curve, but that intuition just isn't very much help in making policy decisions on a meeting by meeting basis.

So what I observed was almost a paradoxical coincident of intellectual doubt, and extremely well informed and well-read intellectual doubt on the part of some people within the Fed and outside it I should say, on the one hand. But on the other hand a kind of almost instinctual affirmation of the utility of these unobservables, of expected GDP trend growth, of expected of the natural rate of unemployment in their policy making. And in the absence of another theory that can explain the behavior of inflation and thereby guide policy making, I suspect that at least some economists are reluctant to let go of an approach that uses the natural rate and that assumes perhaps more robustness of the Phillips Curve than, again, analytically and intellectually is known to be the case based on the research that's been done. And I think this is more likely to happen when the basic relationship implied by the model

continues to seem correct, but the coefficient is either weak or in doubt. But, of course, it's the coefficient which is most important for real time policy making. When do you raise rates? If you just have this general sense of well, yes, slack is removed from the economy, and other things being equal that's probably going to start putting pressure on inflation at some point, that's a framework within which you can start thinking, but if the coefficients for the more precise relationship between say unemployment and inflation or other variables are more in doubt then you have less guidance on a meeting to meeting basis which, to get back to my theme, is what's most important for real time policy making.

As Jim Stock, my go to econometrician, and Mark Watson noted in an article they wrote in 2010, the history of the Phillips Curve is one of inflation forecasting in which apparently stable relationships fall apart upon publication. So this is a backdrop within which sort of I saw more general thinking about monetary policy. It was almost as if the SEP kind of encouraged you to think in those terms. The people in the FOMC are too smart to just in a kind of mechanical fashion think in those terms, but I do think it had some impact, as I say, a couple of years on -- so the expectations of some people as to when and where inflation might start to rise.

So now I want to turn to inflation expectations. This is a different kind of unobservable. It's hard to observe inflation expectations directly to be sure, but unlike unobservables like the natural rate of unemployment, expectations are not just a factor that helps determine the path the economy will take with a given monetary policy. They're believed to exert a direct effect on the inflation rate, and this is very important, to be significantly within the control of the central bank. After the early '80s, when you had kind of a breakdown of some of the traditional assumptions about the relationship between unemployment and inflation -- we had stagflation -- economic shocks of all sorts seemed to affect actual inflation less than before. And so the hypothesis that gained a lot of traction within monetary policy circles was that economic actors now believed inflation would be less volatile because of the action of the Fed and other central banks around the world in the late '70s and early '80s in taming inflation. So we got expectations augmented Phillips Curve and we had that phrase echoing through the boardroom and the halls of the Federal Reserve, well anchored inflation expectations. That was one of the phrases that jumped out at me early in my time at the Fed. Almost a kind of talismanic invocation of well anchored inflation expectations.

So this was -- my experience there was I said okay, I had some knowledge of inflation expectations but it was clear to me that I didn't understand the potency that they were presumed to have in anchoring inflation. And so I dug in a good bit more, found there were some things I didn't understand, but that actually there were a lot of gaps in theory, and even more in what we need to know about inflation expectations in practical terms to make the concept practically useful for, again, meeting to meeting policy making. So this is where my legal academic background actually resonated a bit because you have this experience, particularly in the first year of law school, where you read some case and there's a doctrine that's stated there and you kind of puzzle over it and say, man, I don't understand this, I must not quite be getting it. And so you wrestle with it for a while, you dig into it, you usually learn that there were some things you didn't understand, but then when you go into class the next day or the next week the brilliant law professor shows you that actually the doctrine is not all that coherent or convincing after all and that there are some real problems with it, but that it's the best the courts have been able to come up with. That was a little bit my experience with inflation expectations. So I understood the appeal of inflation expectations, the notion that well we had this experience, inflation has been more stable since, it appears as though market actors, consumers, businesses, other economic forecasters, are all more convinced that inflation expectations will be stable, and indeed it appears to have been the case that inflation was stable for quite some time.

So that you can understand the appeal of the theory, but I found over time -- and again, this is new news to monetary policy economists -- and some of what I found was based on them explaining it to me when I asked them more questions. I think there are some fairly basic issues. First, how to measure inflation expectations. Measurement problems are pervasive in economic policy making, but I think they're more challenging when you do have, for example, surveys in which people are asked to self-report expectations.

Secondly, and this begins to become more important, what in concrete terms is the mechanism by which expectations, apart from measurement issues, influence behavior in setting or accepting a price or wage or investment return. This is where I think a convincing account of how it actually happens has been formulated. How is it that if we stipulation that consumers have a certain expectation about inflation, which is a bit of a heroic assumption maybe, but if we stipulate it how does

that translate into actual price or wage behavior. I think we can all agree that it surely should be a factor, but a factor or something influencing people is quite different from stipulating a pretty robust mechanism that helps keep inflation stable over time. This view was reinforced when I would have discussions with businesspeople and I'd basically ask them, so tell me about how you go about setting prices. And often time those discussions -- since I was longer in the Anti-Trust Division of the Justice Department -- I think I probably got a fairly straight forward answer, and those discussions often you wouldn't hear anything about inflation expectations. And indeed I often realized that a lot of businesses were a little more backward looking in setting prices, what costs had they already incurred that they needed to cover. And when they were forward looking they tended to articulate it in terms of what will the market bear. Now, again, you can tell a story as to how some sense of expectation about inflation does matter to people, but that's a lot different from a well specified theory as to how expectations translate into behavior, which in turn translates into a particular level for inflation.

Third, and in some sense most importantly, how and why do expectations change? How do they become unanchored? And how big a change is needed to affect inflation? Here again there's lots of work that people have done to try to answer those questions, but I don't think we're -- at least now I don't think we're close to something that's like a consensus working notion of how those expectations changed. Remember, expectations, certainly consumer expectations and to some degree market based expectations, have been at the low end of historical ranges for quite some time, which has caused some people to wonder whether actual inflation may be affecting expectations as much or more as the other way around. That is, instead of saying well, people know you're going to get back -- you know, two percent is the place and therefore we're kind of anchored around two percent. Instead, if inflation stays well below two percent, so the concern goes, then the expectations may actually begin to pull inflation down. Whether or not that's right I think that's part of the debate that's going on right now. The key point though is there's not I think again a reasonable working theory for how the expectations would change even though there are lots of efforts to start developing one.

So I was and I am uncomfortable with putting so much weight on a concept that is under theorized and is empirically really quite hard to pin down. And I should say although that my concern has been manifested during a period in which, you know, I worry that -- past period, when I was on the Fed --

that inflation was persistently under the two percent target. You've got to have the symmetrical concern as well. If we were in an environment in which there were things going on in the economy which would reasonably lead one to believe that there might be significantly upward pressures on inflation. I don't think one should have too much confidence that well anchored inflation expectations would keep inflation around two percent instead of it overshooting.

So after my time at the Fed, and actually well before that, my conclusion was that there's not really a well elaborated and empirically grounded theory that explains contemporary inflation dynamics in a way that's useful to real time policy making. It's not surprising, really. I mean forecasting is notoriously difficult, with the difficulty increasing exponentially as one's forecasting horizon lengthens. And I think these difficulties are only compounded when the economy is changing in significant ways even as we're trying to make policy.

So what implications do I draw from my experience with the unobservables and with the absence of working theory of inflation dynamics? I'll suggest three, one at some length, the other two very briefly.

First, I think we need to be paying more attention to the observables. In recent times this has meant to me placing greater emphasis on actual observed inflation as well as a broad array of observable economic factors that may be determining inflation in this specific context. That doesn't mean you have to get to two percent before you do anything, but I think it does mean that one wants to see non transitory movement in the direction of the target to a greater extent than if you were confident about the coefficient that represented the relationship say between slack and inflation. Now, I should make the point that I found it useful to have the results of several models as a point of reference in thinking about my own policy position. I mean the virtues of modeling are very real. They force you to specify your assumptions, what are the causal relationships which you think are at work. And, you know, what I was saying earlier is I think this kind of leaves some economists a little unanchored when the model doesn't seem to be getting them quite what they need. You know, those expectations augmented Phillips curves that seem to work pretty well pre crisis broke down in the crisis. So there isn't the model there that seems to be working, and yet modeling in a conceptual sense is still a very valuable exercise. And as I said before, I think the problem lies more with the coefficients than in the constant. The direction of the

economic variables predicted by the model was often convincing, but the idea that we know pretty accurately how much and how quickly a change in one variable, like unemployment, will affect another, like inflation, is not. Hence the limitation on the utility of the models for deciding when to change the target rate as opposed to -- if I could put it this way -- tell you, okay, you should now be in a mode where that is what you're thinking about.

So in practical terms I think it all argues for using concepts like the Phillips Curve and inflation expectations as directional guidance, but relying more on observed indicators and deciding on monetary policy in real time. And, you know, John Faust co-authored a paper, and it was given at Jackson Hole I think 2105 in which he ran through a lot of the other factors that may be affecting inflation, that may dominate, you know, the more traditional slack or expectations kinds of explanations. What I characterize as a pragmatic approach shouldn't be understood as simple reliance on your gut, much less on ideology, far from it. It suggests instead a careful analysis of the myriad of factors that may be holding back or pumping up inflation within the broader but less determined relationship defined by an inflation augmented Phillips Curve.

It also seems to me that we should be, as I said, placing more emphasis on actual observed inflation rates as opposed to assuming we know where they're headed based on past correlations. Now, it's likely and probably unavoidable, that in the absence of reliably precise coefficients policy makers will to some extent act on predispositions. And I think all we can ask is that they remain data sensitive, open to adjusting their views, and transparent about their reasoning. And I should say that I think recently the FOMC as a whole has been moving closer towards that kind of position de facto. The sizeable markdowns in R-star and the longer-term expected unemployment rate reflect the reassessment of a range of factors affecting those variables. And I think the behavior of inflation this year in particular has prompted some of that reconsideration.

I had written this paper by the time Chair Yellen gave her speech last week, but I thought the speech was both an acknowledgement of the gaps in everyone's understanding of inflation dynamics and an example of analysis that took careful account of the configuration of economic factors currently affecting the inflation outlook, although expectations continue to play an important role. Whether you agree or disagree with her conclusions, I think her transparency in explaining her thinking is laudable.

And of course it becomes even more important in the context in which you don't have a model or (technical interruption) correlation with a reasonably sized coefficient that allows you to use that as your benchmark.

So let's see, I think I'm going to skip the other two implications because that's the most important. Because I want to turn -- I just end by saying it's -- not -- I'm going to turn to the institutional stuff in a second -- but it is worthwhile for economists to continue working to try to establish useful coefficients even if they turn out much of the time to do a better job of describing what has happened rather than what will happen. Because I think at the very least elucidation of the relationships that have prevailed in the recent past can help place present policy making decisions in a richer context, and at least some of those efforts may prove to have value beyond the purely heuristic.

Now, what do my views imply for the makeup of the FOMC, for institutional issues? Well, first, I mean it must be obvious, I think it is a good thing, very good thing to have some voices from analytic traditions other than macroeconomics. Needless to say, that doesn't have to be legal academia as the source of that different analytic tradition. In fact, I think other specialties within economics can provide a very useful complementary perspective, particularly there because those -- you know, if you're a labor economist or international economist, you may have a bit of an outsider perspective on the inside baseball of the macro economists, but you've also got some of the technical training that allows you to maybe take it a level or two deeper.

I also have long thought that somewhere in the FOMC we ought to have someone with a background who has been in non-finance business, who has been in some part of the real economy. I met these people, the chairs and vice chairs of the Reserve Bank boards, and then other groups that would just come in to make presentations to the board and, you know, there were a lot of very perceptive people who had been in business quite a while and who read what was going on in the economy I think somewhat different from the way our analysis at the Fed went and I think often times were just -- because of their experience were just a step or two ahead of the data in seeing where things were going or how to interpret it. And I really do -- I mean I don't understand why we don't have someone like that, but think we should.

Having said that, the weight of the committee should remain, in my view, with those who

have been long immersed in monetary policy, so long as the individuals are in question re not enthralled to models. Now, why do I say that? Well, my experience with my colleagues when I pushed at concepts was, as I noted earlier, that they would often actually reinforce my views because they knew the literature and the history so well. I think economists can both fall into their own models and become a little bit more attached to their own models than we might think warranted, but who are the people how undermine those models -- they're other economists, who are the ones who have the technical where with all to say here's what's not working and run.

So paradoxically, the absence of a working theory of inflation dynamics only reinforces my view. If there was something like a Phillips Curve that was providing reasonably good guidance on monetary policy decisions then one or more capable non specialists would have a sound starting point for monetary policy. But in the current circumstances I think it's even more important to have people who can draw on a deep knowledge of the history and theoretical evolution of monetary policy in assessing contemporary economic conditions and who have the competence to evaluate the continuing efforts to devise correlations and coefficients that might inform contemporary decision.

So I do, as I say -- you know, the real experience that I had was one of a bit of an outsider from a different analytic tradition without all the technical background necessary to make some forms of critique, but who knew enough and spent enough time to be able to ask the slightly uncomfortable question. But the thing I want people to come away with today -- so to come degree, yeah, I thought there was maybe a little bit too much attachment to things that were perhaps not as useful or powerful as they were assumed to be. But the most important part of the story is that when that conversation got going, it is the same people, the macro economists. You know, it's people like Ben and Janet and Stan and Don, who's sitting in front of us, who I think are as well-equipped as anybody to critique what has been the received wisdom and to be able to draw on a very rich background to know, yeah, this has happened before, this hasn't, here's something that may be relevant in thinking about what is happening now. And, of course, to have the technical confidence to evaluate not just what the Fed staff is doing but all that literature that is coming out in SSR and the old NBER yellow books, which are not just on line.

So that's where I end up. On the substance, you know, I think we're in an interesting

position right now. What it makes me feel institutionally is that macro economists are more important than ever, that those who are sort of self-critiquing, but I do think that as with almost any group it's useful to have some outsiders who take the time to dig into the learning, but who still bring a different perspective to it. (Applause)

MR. WESSEL: Thank you very much for that, Dan. And I just want to introduce Louise and Don a little bit more. Louise is the Policy Director of the Hutchins Center, of which I'm the Director. She spent 20 years at Federal Reserve, much of that actually thinking about fiscal policy. But she's been involved in some of the staff forecasting for policy makers at the Fed. And Don joined the Fed staff in Kansas City in 1970 and worked his way up to Vice Chairman of the Federal Reserve Board, a 40 year career at the Federal Reserve. Because he wasn't done making monetary policy we've lent him to the British and he's helping to make financial stability policy in the UK. He's the Robert Roosa Chair or Fellow, or something, in Economic Studies here at Brookings.

And I want to start -- Louise, maybe I can start with you. So I think what I want to do is I want to divide this in two pieces. One is about the sociology of the Fed and the relationship between the economists and the policy makers, and then to turn to the substance of Dan's observations about inflation expectations.

So, do you recognize Dan's description of economists? Of people who are very good at modeling and who sometimes hold onto a model longer than it is useful?

MS. SHEINER: Definitely. As you were talking I thought about something, so what models are a way of being extremely clear and logical about what you're saying. You can't just sort of put things together. A has to lead to B, B has to lead to C, you have to say what you're assuming. So people who are economists they chose being an economist because they are drawn to that. So we have this way of viewing the world as sort of it makes intuitive sense to use and it's true we know that there are errors in everything. There are errors in the model, there are errors in the data, things are changing all the time and we know that. But in the absence of something else to replace it we're going to go to what seems logical. And I think that's why we make it drawn to our models. Also we really care about internal consistency. And so sometimes we can have a beautiful model that's internally consistent but wrong. And it will be easier for us to give it up, as you say, when someone can point to, you know what, here's

the assumption that's wrong, or here is -- and then we'll -- I think it's easy for us to move onto a different view because oh, that makes sense, I can understand that logically. But without that, yeah, I think that we go to our intuition and our intuition is going to be similar to the models because that's the kind of people we are.

MR. WESSEL: And what's the value of having non economists to talk to if you're a Fed staff economist.

MS. SHEINER: So I think the thing that you didn't mention that from my perspective is the biggest value at having non economists is that you have to be able to explain what you're talking about in plain English to someone who might say well, wait, why does that work, how do business people set braces? And you have to say oh, yeah, maybe I haven't had to do that in a long time. If I just talk to other economists we just assume it, we get past of course inflation expectations matter, and I might say, huh, you're right, why is that? Oh, here's why or here's where we're not sure. And I think having to explain, just like the way you learn a lot when you teach, having to answer to somebody, explain things, you know, is really a helpful discipline. You might go back and say, you know what, why don't we rethink that. You know, what do we know, can we look at the literature again, maybe we put a little bit too much weight on this. You know those kinds of conversations do help you go back to basics a little bit. And I think constantly going back to basics is really important.

MR. WESSEL: Don, how about you, what do you think the role of the economists is in making monetary policy and what's the role of the non-economist policy maker?

MR. KOHN: Well, I agree broadly with what Louise said. I do think the word model needs to be interpreted in a broad way. You need to have -- and I would go back to what Louise said about what's causing what that's causing what that's going to result in something in the future, because when you're making monetary policy you're really making -- you're doing something today that's going to have an effect in the future over several years potentially. So you need to have something in your mind about how -- and to be able to explain it, as Louise says, about how what you're doing today is going to play out in the financial markets and the economy relative to those two objectives of the Federal Reserve price stability and maximum employment. You need to be able to connect your actions to the objectives that congress gave you. So you need a logical way of doing that. You can write down equations and fit

them and that's one piece of it, but I think most policy makers understand that there are very large errors in all those equations. They are updating their view of how the world works as new data come in. I think perhaps what Dan is saying is they're not updating it fast enough, they're too attached to the old models. I don't know, I think my impression when I was there was that many people were pretty skeptical about the models and pretty ready to do the updating for new data. If I think about the behavior of the Federal Reserve over a couple of decades, including the last few years. Think about the last couple of years, in 2014 or 2015, 2016, the FOMC went into those years expecting to raise rates several times. They didn't do it because the information came in that said that wouldn't have been appropriate. So I think people are doing what you want them to do and policy benefits from that.

In terms of the non-economist, I do think there's a lot of value. And I guess I would emphasize it a little more than Louise, not just forcing economists to explain what they're doing, although that's really important. I think they do bring a real world kind of perspective into the room, they can say well, your models may say this, this, and this, but this is how I observe business people working, this is how I observe the labor market working because I'm deeply -- and maybe they're seeing a micro piece and maybe not, but I think it's helpful to get views from outside of academia into the policy discussion and can bring common sense. When I think of this I think of Mike Kelly, who was a manufacturer I think in Houston in Texas and was appointed to the Federal Reserve Board by Reagan in '86 or '87, somewhere in there, and he didn't know any economics as Louise and I would think of it. And I would say initially -- and I told him this -- his contributions to the committee weren't very helpful at all. (Laughter) But over time -- I did --

MR. WESSEL: May he rest in peace.

MR. KOHN: I told him after the fact.

MS. SHEINER: He got better.

MR. KOHN: Right.

MR. WESSEL: You're a lot better than you used to be, Mike. (Laughter)

MR. KOHN: Over time he kind of saw the common sense of what we were trying to do.

He was a very centered, practical person. He had a sense of what was going on out there in the economy. And I think over the years people really listened to him when he gave presentations, not

because he was going to comment on the flatness of the Phillips Curve but because this brought this perspective that wasn't otherwise in the room.

MR. WESSEL: So, Dan, when I listened to what -- you talk, I have a sense of one thing that you're saying that makes a lot of sense to me, which is that in any profession there's a tendency to hold onto the received wisdom. I mean Thomas Kuhn wrote a whole book about this. And it takes an awful lot of the theory not fitting the data before the people who were trained in it are willing to give it up. And I suspect that's true of economists as well as it is of other scientists.

And I think that you make a very strong point that I found as a non-economist, that economists when they're trying to explain something to you they kind of start with the basics as sort of the received wisdom, then when you press them a little bit it turns out they actually have a lot more doubts about whether that works than they let on the first blush. And I suspect that's what happens when a new governor shows up at the Fed and they roll their eyes and say, oh, we've got to teach another one some economics. (Laughter)

But what I want to ask you about is I'm trying to understand how you would do it differently than they do it. So you made the point that the Fed has to come up with some way to look into the future because we know that we're trying to -- it takes a while for monetary policy to have an effect and the Fed has certain goals, price stability and maximum employment, and you said yourself you can't wait for inflation to hit two percent before you tighten, so you have to have some way of getting a feel for what the future is going to look like so you can adjust policy accordingly. Some people think that Alan Greenspan just did it completely by feel. He had his own way of looking at the economy -- that I don't think he ever managed to explain to me -- but it seemed to work pretty well for a while. But more traditional economists say well we have these relationships in the past and that's kind of our first cut, and we should be careful if the world isn't evolving the way we expect to do something to different. So I'm trying to understand, how would you do it differently than my caricature of how they do it. What is it that you would do differently?

MR. TARULLO: So I mean I think it goes back to the models point in a way, David, which is as Louise explained, you know, the model is really intended to be a heuristic device rather than an answer producer. What I observed, and I think this is what you were alluding to, is a little bit of cognitive

dissidence or some tension between the analytic and intellectual understanding that formally trained economists had of a particular model and the way in which their instincts for policy making clicked in.

So, you know, as Don was speaking I was thinking of the number of times I heard someone say because I think we're near the natural rate it's time to start raising rates. And yet if you engage some of those same people in an extended conversation and you would say well, you know, what about the fact that here's where inflation has been, what about the potential that there's actually more slack in the labor market than the unemployment rate reflects, what about the fact that some combination of the end of the commodity super cycle and technology and the like -- not only you get an acknowledgement of that stuff, but they would often have better sights than you did to support some of those arguments. But what I still observed was a bit of -- which we probably all do -- a bit of a default instinct. And to put it in the model terms I think it's as if there are other forces which the model isn't taking into account. No one has yet created a new model that effectively incorporates those. And as economists often like to say, we need a model to beat a model. And so I think that there is sometimes more attachment to the model than I at least thought -- and this is as I say particularly true a couple of years ago -- that I would have though optimal.

Now, how do you do it differently? Well, as I said, directionally I think the models, even including the Phillips Curve, are still valid. The problem is that there's a lot of other stuff going on and I think that stuff is -- at least it's arguable that it's more contextualized to a given point in time. So what I was trying to describe was a circumstance in which you have the models, the received wisdoms and correlations are setting a framework for you in which you kind of know directionally where you're headed, but you also understand that in order to make specific decisions you have to be a little less driven by the model and a little bit more sort of inductive rather than deductive. And that's why I say looking at observable things, whether in Alan Greenspan's case it was his correct intuition that the reported productivity numbers were not accurate, or whether it is as we were doing a few years ago, the sense that there was more slack in the economy than might have been suggested, or whether, you know, there are just medium to longer-term forces affecting inflation in a different way. To me it is -- I don't want to say it's more like a common law exercise because that sounds very lawyerly, but it is an acknowledgment that you're making decisions in an environment in which there are a lot of factors affecting the variable you

care most about. And that at present at least we don't have a model that seems to take adequate account of those other factors, in part because we haven't really pinned down which are the most important.

So, to me, it is more of (inaudible) here, we are here directionally but now we have to talk carefully about what other forces may be out there pushing faster in the direction, the basic direction the model says we're going, or maybe retarding movement in that direction. And that's why I thought Janet -- you know, I think if you read Janet's speech last week, that is very much what I thought she was doing.

MR. WESSEL: Louise?

MS. SHEINER: Well, I had a -- go ahead.

MR. WESSEL: Let Don respond and then --

MS. SHEINER: So let Don respond. Okay.

MR. KOHN: So I think my impression, Dan, is that the model driven kinds of things you're talking about are more influential for the economic projections than they are for the actual action. So all those things that you mentioned that should also be taken into account haven't been taken into account as the Federal Reserve raised interest rates over the last couple of years. And even though --

MR. TARULLO: Yes. But, Don -- can I try to -- these were big -- I mean they were very serious discussions about a lot of things.

MR. KOHN: Good. As an outsider I'm reassured.

MR. WESSEL: What he's saying is it wasn't obvious that the outcome was going to be the one that you thought was right.

MR. KOHN: That's right.

MR. WESSEL: That there might have been people who wanted to -- putting words in -- prematurely tighten. They were convinced that inflation was around the corner and Dan thought that it wasn't based on --

MR. TARULLO: I don't want to play (inaudible).

MR. KOHN: And they had a good discussion and they were very, very gradual in raising rates, in part because of those things. So I think the outcomes don't reflect the kind of holding onto models too long that you -- the projections might have reflected that.

MR. TARULLO: This then may just be an insider/outsider difference in perspective I think.

MS. SHEINER: I think it is. So I want to say two things. One is I think you're right and the reason there were some people who were holding off this idea so long is that one of the things that's sort of frustrating about economics is there are no good experiments. We can't run control experiments. And in macro in particular there are no good natural experiments. So whenever things come in in a way that the models don't predict you sort of want to say well why is that, what special factors. And there's never -- if you really have a strong belief in some underlying relationship it's pretty easy always to say well this happened at that time and that happened and it's easy to discount because you just can't do it the way you'd like to.

MR. KOHN: Lower cell phone rate.

MS. SHEINER: That's right, you can always look for special factors, but you also want to look at that. So that's what's complicated, is that the world is extremely messy and it's hard to get those underlying relationships. So I think to some extent people's beliefs will sort of influence how they read the data. On the other hand, I would say what Janet did in her speech, the Fed staff is really good at doing exactly -- the board staff -- what you're saying. So you may not see all the deliberations, but when the forecast the Fed puts out isn't a model forecast. We have models, we have those running, but we also have the judgmental forecast. And the process by which that's put together is like 25 economists in a room going through doing exactly what you said. How do we know inflation expectations matter, what happened to the coefficient, what happens if you estimate it jumping off at 1990 instead of 2000. All the kinds of things that you want people to push and question on, that's sort of what happens in that room. And I think because the people who are at the Fed, as opposed from academia, know that what they say matters, that making a mistake matters, they're very open to going off model. What if half the people who don't pay any attention are rule of thumbers? What would that imply?

So I think that, you know, I totally agree that that's what needs to happen in this world of messy data and changing relationships at all times. But I think the Fed is pretty good at that. And I think when people come in from graduate school they have to learn, right, because that's not the training they have. And also understanding when are the data bad. The Fed are really good at that too,

understanding, you know, how the data are put together. And GDP is just sort of made up in a way, right. It's some observation, it's some judgment, and knowing that I think is something that the Fed staff is pretty good at.

MR. WESSEL: So this is Louise's way of telling you, you think it was bad with the Fed staff, imagine if you had to deal with an academic economics department. (Laughter)

So you make a point in the speech, and I think it's quite obvious from what you've said already, that writing into law the Taylor Rule, given that we can't be sure of the coefficients and we don't even know what the Taylor Rule relies on, on some of the so called non observables, as we have to decide what they are, that you think that's a bad idea. But one of the things I'm struck by looking at the markets, if you hear the phrase inflation expectations are anchored a lot inside the Fed, what I hear from people in the markets all the time is the Fed's reaction formation. In other words -- and we don't understand it -- that somehow it's important to the markets, presumably meaning the people who have to predict for their clients what the Fed is going to do next week, that they understand under circumstance X the Fed will do this and under circumstance Y the Fed will do this. That's a bit at odds with your view that you should look at what the models say and then you have to look at in what sense do the models fit today's circumstance and judge accordingly.

So I'm just curious, what do you say to this constant cry from the markets that we need to know what your reaction formation is. If we don't know it the markets won't function the way they should and it will be harder for you to achieve your goals? And I'm sure you've heard the speech.

MR. TARULLO: So I think you do have to distinguish between guys want to know this because they're concerned with a couple to five basis points on stuff they're trading as opposed to households and businesses in the real economy. The former I'm less concerned with than the latter. And that kind of gets back to the question of inflation expectations and how much it really -- there's a really nice paper that came out the Fed staff not long ago that questioned whether consumers have any idea what they're talking about when they say what their inflation expectations are. So it's not at all clear that the kind of precise reaction function that some people would like is really fundamental to good monetary policy making.

Now, having said that, point two, David, you don't want to fall into a circumstance where

you are articulating a reaction function that has a kind of false precision and then, as happened a couple of years ago, stuff happens and you say, whoops, guess we're not going to be able to stick to that one because that's when the credibility of the Fed actually does take a hit. And, sorry, guys, but I do think that what was going on a couple of years ago was people were a little too wedded to their models and then reality intruded but it was a reality that was predictable at the time. But anyway we're not going to belabor that discussion.

So what I think, when you talk about reaction function, the Fed needs to explain as clearly as it can its assessment of what is affecting the economy and thus guess what might make it change its monetary policy in the near to medium-term. And that's what I think Janet's speech last week was doing. And she's had prior speeches that have done much the same. If people are frustrated because they say we don't know exactly -- I mean if unemployment goes down to 4.14 percent does that mean it's going to be -- you're not going to be able to give that kind of answer and we wouldn't want people locking themselves into something like that.

MR. WESSEL: Okay. Don, let's turn to inflation expectations. So do you think inflation expectations are important to making monetary policy? Do you think that there's too much religion about them, the way that Dan implied -- I'm putting words in his mouth -- or not?

MR. KOHN: So I think they're very important. We saw in the 1970s what happens when they become an anchor. We've seen in Japan in the '90s and 2000s and 2010s what happens when they become anchored at a very low level. It's hard to change people's expectations and that has an influence on wage and price setting even if we're not clear exactly how that influence goes. So I think it's quite important. I think there are lots of things we don't understand. So I agree with Dan that -- and Janet herself raised this point a couple of years ago when she highlighted things for research that inflation expectations, their formation, how they get -- and I did myself actually in a speech in 2004-2005 somewhere in there to a bunch of economists said here's some things you need to look at. And they were many of the same things Dan said. How are they formed, can we measure them better. At least we have some measurements there, it's not as if we don't know anything, but how can we measure them better, how are they formed, and then how does that formation feed through to wage and price behaviors. So I think there's a lot we need to understand better, but I do think it's very important.

MR. WESSEL: I thought that one of the arguments that people who believe inflation expectations are important make is that once upon a time it looked like -- inflation looked a lot next year and the year after like it did the year before. And then over time -- but correct me if I'm wrong -- inflation is less predicted by what's happened and that the explanation of that is that people have begun to accept that if inflation goes up a little bit or goes down a little bit that the Fed will bring it back on course. Is that too much of a caricature?

MR. KOHN: No. I think that's right. I do think Dan points to an important aspect of this expectations formation, that is how much is dependent on past behavior of inflation and how much do people take from what the central bank does and says. So I think in the FOMC there were some people who I thought were emphasizing the latter part too much, particularly as we went into those --

MR. WESSEL: The latter point to much being -- they --

MR. KOHN: There are people who are going to misinterpret what we're doing. So as we went into the quantitative easing period there were people in the FOMC who said people will see what we're doing and they'll expect inflation to be much higher and we'll lose that anchor. And it didn't happen. So I think people do smooth through past inflation and project that into the future, they take their cue a little bit from the central bank, but mainly I think, primarily from what the central bank is able to do to inflation. So the effect of central bank on inflation is to keep it moving towards its target. And then in that case there will be more confidence that it will get to the target more than -- financial markets might be influenced to some extent by what the central bank says it's going to do, but I think the households and businesses are probably observing the world around them and -

MR. WESSEL: So, Dan, what I took you as saying is two things. One is let's not pretend we understand this better than we really do. And, secondly, in some cases this becomes the all-purpose explanation and excuse for doing what you want to do. We can't do this because of (inaudible) anchor expectations. This didn't happen because of -- and it becomes a kind of all purpose --

MR. TARULLO: Oh, yeah, so some people do that, but that's definitely not what the staff does at the Fed.

MR. WESSEL: Right. I didn't mean the staff.

MR. TARULLO: And there's no way that people like Ben or Janet would do that. So

while some might do it in a kind of tactical or litigating like way I don't think that's a serious issue. I think it's more, as I said, the weight that is placed on a concept. And it makes me nervous that we've got a concept that we haven't articulated and verified to the point where you can say, okay, we've gone through a couple of cycles where we can see what the changes were, we can see why those changes occurred and what impact they had. You know, 10 years from now our successors may be sitting here and saying well we've now got that, but I don't think we're there now. So it doesn't mean ignore them, it means I think not placing -- and when I get nervous is when I heard people say well we don't have to worry too much that inflation has been running below target for this length of time and that the model only shows us getting up to 1.75 percent or something because expectations will pull it up the rest of the way. That's the sort of thing that concerns me. So, again, it's not directionally, it's not that it's a force, is the weight of the thing. And remember, the expectations augmented Phillips Curve didn't really predict particularly well what was going to happen in 2009 and 2010. And even today, how do you explain that? Some people basically say well, boy, expectations were really well anchored, you know, even with all of this. Well, maybe, but how do we know. And there are alternative hypotheses. Nominal wage rigidity is one. You know, different -- a big gap between what was going on with the long-term unemployed and the short-term unemployed. There are these alternative ideas which you could also spin out and suggest. So that's why I don't want to put too much weight on it. It's not like I'm saying, gee, there's nothing to it.

MR. WESSEL: Right. So a shorthand way of saying what you're saying is -- I think what you're saying and correct me if I'm wrong -- the Fed has made pretty good decisions over the last several years, but if there's too much emphasis on these things that you don't think work very well in the future, it's not guaranteed that we will always make good decisions unless we have the appropriate weight on what we see out there and what the models are.

MR. TARULLO: Yeah. I mean a lot of this is sort a tribute to Janet, right, with the kind of intellectual and institutional leadership that she's brought.

MR. WESSEL: Well, now that you mention it, my last question before we turn -- so I read your remarks as suggesting that you think that having an economist as Fed Chairman is a good idea?

MR. TARULLO: No. I think, you know, someone -- so as I think about Fed Chair today, 2017 as opposed to 1997 or 1957, I mean I think there are three kinds of characteristics one wants to

think about. First -- this is obvious -- is intellectual and analytic background that allows one to make decisions in a period in which I don't think there are lots of clear guideposts. As I said in my remarks, if you had some correlation that was working really well then you're not going to be strictly mechanical about it, but you could kind of take it and give it to somebody and if they're a sensible person they'd probably make it work reasonable well. But in an environment to which there are lots of different factors, the relative importance of which may be hard to disentangle, may be evolving. That sort of analytic intellectual capacity, not just smarts in some abstract way, but as I put it, some non-trivial amount of immersion into the economics of monetary policy, recent past, but I would say probably more distant past as well, is important.

Second, something which I continue to think is underappreciated by the world at large, whatever the Fed was like 12 or 14 or 16 years ago -- and I was an outsider watching it then -- today it is an institution in which no member of the FOMC just kind of falls into line because a chair wants them to fall into line. It may just be the evolution of the institution. I think it was probably partially a result of the crisis where everybody was sort of feeling, gee, you know, we've got to make our own decisions here. But the challenge of achieving a working consensus on an approach is I think substantial. And so you do need somebody -- it is a very useful characteristic to have someone who's actually good at the process of forging a consensus which may mean adjusting policy a little bit from one's own preferred position, persuading people, sort of bringing people together.

And then third, I think you need someone who has credibility with markets, particularly in periods of stress. Someone who stands up and markets both believe what the individual is saying and have some reason to believe that the individual knows what she's talking about. And so I think, you know, you're never going to find anyone who has -- you know, is A+ in all those and other categories, but those are the three things that I would think about.

MR. WESSEL: So what would you tell the President if he called you after you got off the state here about what he ought to do?

MR. TARULLO: First off, I think the likelihood of that is sufficiently small (laughter) so that I don't have to worry about it. Secondly, if it happened I would certainly want to abide by the normal kind of guideline that you don't reveal to the rest of the world what you told the President when he asks.

(Laughter)

MR. WESSEL: Okay. So what if I ask you? What if I asked you and said -- you know, for all I know the President has tweeted while we were up here. You never know. What if I asked you, would you favor the reappointment of Janet Yellen?

MR. TARULLO: Well, so it's hard for me -- you know, I don't think it's any secret that I have enormous respect for her on both a professional and a personal level. And I think she's done a terrific job. So in that sense I'm biased, although I think in a well-grounded way. I think she's done a terrific job and my expectation would be if she were reappointed she would continue to do a terrific job.

MR. WESSEL: I'll let someone else try. (Laughter) So I'm going to take two or three questions and then let whoever respond and then we'll go ahead.

Why don't we start with -- Mike, the guy right in the back behind you. Mike, behind you. I always start in the front, so. Tell us who you are and let's keep it short because we have to --

QUESTIONER: Sure. Sam Bell. Very quick question following up on the last one. Does Kevin Warsh have the track record of good judgment on monetary policy that gives each of you the confidence that he would be an effective chair of this powerful central bank?

Thank you.

MR. WESSEL: Okay. Keep going forward, Mike; the guy you were going to give it to.

QUESTIONER: Yes, Bill Viel; I'm retired foreign service. I have a question for Professor Tarullo. As a non-economist looking at the coming efforts of the Fed to unwind its balance sheet what risks do you see for inflation there in terms of the choices they made between the assets they're going to reinvest in or liquidate?

MR. TARULLO: I'm sorry, did you say risk for inflation?

QUESTIONER: Yes.

MR. TARULLO: Okay.

MR. WESSEL: And the gentleman in that aisle too. We'll come to the front in a minute. Rich, is that you?

MR. MILLER: Yes, Rich Miller, Bloomberg. So two related questions. Given all the uncertainties does that argue that we shouldn't have such a specific inflation target as two percent? And

also sort of looking at the last two recessions when unemployment -- well, last two periods when unemployment got this low the problem wasn't so much that inflation got high but that asset prices arguably got high. Does that suggest that maybe that's one of the observables that we should be taking more account of?

MR. WESSEL: Okay. Kevin Warsh?

MR. KOHN: I'm not going to comment on specific people.

MR. WESSEL: Louise, you want to comment? (Laughter) How about you, Dan?

MR. TARULLO: No, no. This is the thing that -- I have gotten more press inquiries on this question -- not Kevin specifically, but those that it affected -- in the almost six months I've been gone than any other and so I've got the same response. I'm not going to comment on any individuals either other than the kind of comments I just made on that person whose leadership I operated.

MR. WESSEL: You mean people aren't calling you up and asking you to critique inflation expectation models for prime time television? (Laughter)

MR. TARULLO: You did.

MR. WESSEL: Other than me? (Laughter) All right. So one question was about the balance sheet and I think it's a broader question about do we really know what's going to happen when the Fed shrinks the balance sheet to anything, inflation or anything else.

MR. TARULLO: You want to start, Don?

MR. WESSEL: You want to take --

MR. KOHN: I think we have some notion of the direction of travel here and I think having the Fed -- so other things equal, as we economists like to say, it might put a little bit of upward pressure on interest rates as term premium rise, but I think we've had a nice demonstration over the last several months that a well-advertised, well anticipated, very gradual wind down in the balance sheet isn't going to have much effect. So if it doesn't have much effect on financial markets, small effects, or drowned out by other things that are going on, then it's probably not going to have a huge effect on inflation.

MR. WESSEL: You look dubious.

MR. TARULLO: Not dubious, but I think there's a chance -- there's at least some risk that there is more impact on financial markets than currently anticipated. Not simply because of what the Fed

does, because I agree with Don, I mean this has been -- talk about something that was carefully formulated and telegraphed -- although we don't know the end point.

MR. WESSEL: Right.

MR. KOHN: Right.

MR. TARULLO: But there are other central banks in the world as well and I think that one wouldn't want to be too assured that once everybody is kind of moving in the same direction that there may be some discontinuities in markets. You know we've never done this before. Just like -- you know, there was a playbook to get in, there wasn't so much of a -- the playbook to get out has been written over the last few years basically and it was written -- you know, each central bank has kind of written it for themselves. So I think we're going to have to kind of -- we will have to watch it, but you might say what's the alternative for the central banks other than to do what they've tried to do. And I think that communication and the gradual exit are both sensible things.

MR. WESSEL: Okay. Asset prices and the wisdom of a two percent inflation target. Anybody want to draw that straw?

MR. TARULLO: I mean having a target I do think is one of the things the macro economists convinced me of. Having the target stated is a useful thing. I at the time wanted more emphasis on our aims for unemployment, even if you couldn't have a quantitative target, and make sure that these are symmetrical aims. There is a debate as to whether two percent is the right number. And I think in a world in which you believe R-star may be pretty low and thus the amount of space that you have to reduce rates in the case of a recession is more limited, then that intellectual question as to whether two percent is the right number is probably going to be alive for a while. There are obviously a lot of problems with trying to go above two percent, transitional and otherwise. So having the target, yes, what the target should be probably is going to remain two percent. But if it remains two percent there's got to be another answer to what do we do when a recession hits because in a moderate to severe recession historically we reduce rates by 400-500 basis points. There ain't 400-500 basis points of room there.

MR. WESSEL: Right.

MR. KOHN: And the asset price part of that, my preference would be not to use monetary policy but to keep regulatory supervisory policy, financial stability, oversight of the markets very

attuned to any risks that might be out there. And it's clear that the Federal Reserve, as well as the other agencies, are doing that. This is now the FOMC gets regular updates on risks to financial stability. This is reflected in the minutes of their meeting. I guess the question -- and they've taken -- all the regulators, led by the Federal Reserve have taken tremendous steps to -- and led by Dan Tarullo in particular -- to make the financial system itself, particularly the banking system, the holding companies that now include the major investment banks, much more robust to an unexpected change in asset prices tested by the stress test. So that particular amplification mechanism of an unexpected decline in asset prices I think has been at least damped and the system is much more resilient. But outside the banking system I think is the issue, what's going on there. And the U.S. authorities don't have that many tools to deal with, let's say the housing market, if some of the mortgages are outside the banking system. I wish there were more financial stability tools in the U.S. to take pressure off of monetary policy if something should be seen to occur. I would try the other things first and I would prefer a much better toolkit to deal with these before I turn to monetary policy.

MR. TARULLO: Did we miss one question?

MR. WESSEL: No, I think we hit them all.

MR. TARULLO: You think we got them all?

MR. WESSEL: One here and there's a woman there. Mike, why don't you come down and give --

MR. VITARELLO: My name is Jim Vitarello; I'm a Housing Specialist at GAO. I'm kind of surprised that you all didn't talk about the very complex and controversial relationship between fiscal and monetary policy, particularly the time when you came on the Obama Administration. There was a lot of controversy between economists, what impact all this spending was going to have, impact that Bernanke's, you know, bond purchase and all that is going to have. Conservative economists kept saying oh, inflation is going to go skyrocketing high, Paul Krugman wrote an op-ed article saying forget about it, that's not going to happen.

I'm going to talk about that because I don't think the economists are all that monolithic on these kind of issues, are they?

MR. WESSEL: Ma'am?

QUESTIONER: Thank you. I was happy to hear you bring up Kuhn and --

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

QUESTIONER: Yeah, I'm Bettina Daniel; I'm a novelist. And the inevitability of paradigm shift. And I was wondering what factors that you all look at might be causing the most model fatigue in those conversations where, you know, economist to economist you're really kicking the tires on the robustness of your model. And the particular factor that I'm thinking about is the disappearance of low and medium skilled jobs in a place where obviously full employment is supposed to be the name of the game.

MR. WESSEL: One more? Roberto here.

QUESTIONER: Thank you. (Inaudible). It's interesting that the topic of bank regulation came up just at the end of this discussion, but, obviously, you, Governor, made a lot of contributions there. So how worried are you about the durability of your efforts given the prospects for potential nominations here?

MR. WESSEL: It was by design that we've had a lot of conversations about (inaudible). It wasn't that we don't think they're important, we just wanted to do something novel.

All right. You want to start with that one, Dan? How durable do you think the regulations you helped write and the practice?

MR. TARULLO: Well, you know, we'll see. A few things to say. One is I think that there is a lot that can be done in terms of rationalizing, making more efficient, the broad range of regulations that were put in place since 2009 really, even before Dodd-Frank was passed. And I tried to suggest some of those when I was on my way out the door of the Fed. Where I would become concerned is if the regulations, particularly the capital and liquidity regulations applicable to the very largest institutions, the most systemically important institutions were to be diluted. I mean this kind of gets back to the point Don was making in the financial -- if you know that the kind of the backbone of the financial system is relatively secure, relatively resilient, then you can probably sustain some hits from what's going on outside that system. It won't be optimal, but you can sustain some hits. But if we are faced with a prospect of one or more of those institutions experiencing serious funding or capital or -- which was probably a byproduct of the two -- market credibility issues, that still puts the whole financial system at risk. And, you know, we

can't -- even though I think Fed staff have done really a fabulous job at the evolving stress test, the supervisory model for the stress test, refining it every year, getting some of the bugs out of the system and all the rest, nobody is going to predict the scenarios, the severely adverse scenario any more accurately than one can really predict anything else. So part of the reason for having capital in the amounts that we do -- my own view of why it's important to incorporate the Sifi surcharge, the G-SIB surcharge in the post stress capital buffers, is precisely that uncertainty that you don't know what's going to -- everybody says it and they're right. You know, you don't know how the next financial stress is going to unfold. You do your best to project it, you vary the stress test from year to year, you put special elements in, but don't kid yourself that you've covered all the basis. And so that extra amount of capital in those institutions, any one of which individually can cause a major problem, is I think really important.

Now, with respect to regional banks, I think there's a lot that can be done in terms of simplification.

MR. WESSEL: Do you think that there's a consensus to maintain those capital levels?

MR. TARULLO: I hope so. The document that Treasury put out a while back had quite a bit of stuff that I thought was somewhere between a good idea and okay. There are some things in there that I wouldn't have done but I don't think it's the end of the regulatory world. The things that I worried about most were the things that basically said give the banks more information about the stress test -- they didn't say the following -- so that they can customize their balance sheets right before they send them into the Fed. Don't have anything above minimum international capital requirements for the banks, which by the way -- I mean there's a reason why internationally we say it's a minimum. There's an expectation that jurisdictions like Switzerland and the UK and the U.S. will go above them. So that part of it worried me a good bit. A lot of the rest of it, as I say, is -- and there's stuff you can do to simplify for the biggest banks. Like the Volcker Rule can be simplified. As I said I think that we're past the point at which we need the qualitative CCAR for even the biggest banks. You just incorporate it into year round supervision. But those capital levels and the funding requirements and the capacity to be resolved, that's about as core to too big to fail as you can get.

MR. WESSEL: Louise, if you had to pick a couple of things that you wished the economists understood better, the novelist's question about where our models are maybe showing a bit of

wear, what would you put on the list?

MS. SHEINER: So I don't know if it's a matter of showing a bit of wear. I think, you know, we had this movement to try to understand macro from the micro foundation. And I think that's kind of what you were talking about, inflation expectations and not understanding the mechanism. There's this tension in economists which is that a lot of the macro relationships we don't actually quite understand how they work. And so I think we all would like to get there because then we could tell you this is how it's going to work. These businesses do this and this happens and this happens. And in a macro you sort of can't do that and I think the efforts to do that have been rightly criticized because it's too complicated and they don't work very well. And at the Fed there's that going on where people are working in the models with micro foundations, but there's also a much more practical, let's just look at the relationships and history. So I think, you know, it's a frustrating thing about macro is that sometimes you'll say well we don't really even know why interest rates work that much. We have some ideas, but we have other places where we think well, you know, businesses don't -- if you ask businesses how they invest they say they don't pay attention to the costing capital. That can't be right, right? Which is a little different than the old models not working. So I think that's just like -- the problem with economic is it's really hard and it's not science in the way physics is science. We're trying to get it there, but we're not there.

The things that you mentioned about changes in sort of low skilled labor and of job opportunities, I'm not sure it's where the models don't work but I do think we need to try to understand how that might have macro-economic implications. I mean the place where we've obviously looked is on labor force participation and trying to think about the future and the automation of job. Trying to think about the future and automation of jobs. I mean people will say we're always worried about it and there's always been employment. And then some people will say no, this time is different. And I'm not sure we have a really good way of knowing that.

MR. WESSEL: So, Don, wouldn't you say -- I sound like Christian (inaudible) -- wouldn't you say, Don (laughter). Wouldn't you say that it's a bit of a puzzle why inflation has been so stubbornly low, below target? We don't really have a good explanation of that.

MR. KOHN: Yes. So I think Dan highlighted one of the areas that needs more work. I agree with that. I thought last year, and into early this year, inflation looked like it was creeping up, and

that's exactly what I would have expected, even with a kind of flattish Phillips Curve. Then over the last few months you haven't seen that. Chair Yellen is emphasizing temporary transitory factors. She may well be right, she probably is right. But I think it does argue for a bit of a cautious attitude towards what's happening in the future. And this is very consistent with Dan's point.

To add on to what Louise said, I think another thing that's come out of the crisis in terms of where to work on the models is the intersection of the financial markets and the macro economy. So most of these models going into the crisis had at best rudimentary financial markets on them. The Federal Reserve changed interest rates, that was transmitted to stock prices and exchange rates and other longer-term interest rates. And none of these models produced a crisis. And the very complex and difficult feedback mechanisms, I think that's an area that really needs more work. There are a lot of -- economists are working very hard on that, there are new models trying to incorporate these things, but it's one of the weaknesses.

MR. WESSEL: Okay, Dan, last word. You can answer any question that has been asked or any that you wish you were asked. (Laughter)

MR. TARULLO: I think good questions were asked and I just want to end kind of with the reiteration of what I said. I mean I think you did see a little bit of the inside/outside perspective here. I mean it's weird, after eight years at the Fed I can still sort of think of myself as an outsider, not on regulation admittedly, but on the -- and the economists enforce the guild fairly strongly.

MR. WESSEL: Just to distinguish them from lawyers, of course. (Laughter)

MR. TARULLO: Lawyers, man, they fight with each other all the time. As you can tell I think there's a little more than Don and Louise think there is to the people a little wedded to the models in -- as I put it in an instinctual way. And I think it's important to be aware of that, but I guess maybe -- so here's maybe -- this gets back to one question that was asked -- it is unreasonable for the public to expect that kind of precise reaction function that people sometimes seem to ask for. And I think that if the Fed were trying to do that with some sort of blunt rule I think it would be really bad for monetary policy.

And this gets back to your Taylor Rule point. As a law professor, as I look at the spectrum of things between rule and discretion, the Taylor Rule is a lot further along towards discretion than it is to -- a rule is something that, you know, we think it tells you what to do in a fairly direct sense.

You have to figure out what you think R-star is and what you think U-Star is before you start to -- and that's even if you assume that the Taylor Rule equation would be right then. So there's actually a lot of discretion that goes into it. And I think that people need to understand that. And -- and this I should have more credibility in saying this -- that this is not the fault of economists, right. The economists are -- the good economists, the open minded economists, the economists who are not captive to models even though they use them, are those who are looking most intensively at how we can do better. And there are a lot of those people at the Fed. I do think that there's been a shift in attitudes, sort of the balance of the committee over the last couple of years. A little bit more to this sort of more open textured approach to it. But you don't want to change the Shakespeare throwaway line about let's kill all the lawyers to let's kill all the economists. As I said earlier, it is they get too attached to the models, but they are the very ones who end up undermining and revising them.

MR. WESSEL: So, thank you. I'm sorry we have to stop now. I have one favor, we have another event in here in a couple of hours, so it would be really useful if you took the papers and cups at your feet. And please join me in thanking Dan, Louise, and Don for their time. (Applause)

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