Transcript of Presentation and Q&A

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This transcript has been lightly edited for clarity.

Ellen Zentner: So I'm going to be very high-tech this morning, and I wrote my comments out on my trusty iPad. Hopefully it doesn't cut off on me in the middle of remarks, and I'm stuck trying to figure out how to turn it back on. So, as Mine (Yücel) said, I'm Ellen Zentner, Morgan Stanley's Chief U.S. Economist. I've been a member of NABE since the 1990s, no need to specify exactly which year within that, but I feel like this is an AA meeting up here. My name is Ellen. I've been a member of NABE for a long time. So I have the honor of introducing St. Louis Federal Reserve Bank President James Bullard at this annual economic policy conference.

Dr. Bullard has been the president and CEO of the St. Louis Fed since 2008, and so he has participated on the Federal Open Market Committee at a critical time in the history of monetary policymaking. A dinner with colleagues last night provided me with a good deal of fodder for today's introduction. I asked the table what their general impression was of President Bullard. I don't know why there are chuckles. It was all good. So "thoughtful" was one of the words that came up, and that also included "thought leader" and other derivations thereof. "Careful consideration," which you could probably also put in that bucket. "Conviction," which for economists, and especially economists that have to take a view on things, is very important, and "willing to stand alone." Of course, Dr. Bullard has taken stances on monetary policy that have been something that he's had to stand alone in in the past.

Now, that's not a bad list of traits for someone serving on the FOMC in a post-financial-crisis world that demands that out-of-the-box thinking. My husband and I recently found ourselves watching *World War Z*. That's the zombie apocalypse movie from 2013 starring Brad Pitt. I know you wonder where this is going. [laughter] So if I were a world leader, I would want President Bullard to be my tenth man, and if you saw the movie, then you know what that means. Basically, when everyone else is thinking the same, I would rely on Dr. Bullard to prepare for the opposite.

But those are the traits associated with President Bullard as FOMC participant. There are other important traits as well. Dr. Bullard has a strong sense of community, giving back by donating his time and expertise. This is how he conducts himself personally, but also brings that to the table at the St. Louis Federal Reserve Bank. He is one of the more open regional bank presidents when it comes to seeking voices within the community in order to better understand the real world around him.

To that end, and since we're at a conference for economists, last week I had the honor of participating in the St. Louis Fed's first Women in Economics Symposium. I was blown away by the level of talent and enthusiasm among the dozens of women from across the country that had gathered there who were studying to receive a degree in economics, and I welcomed the opportunity to provide a view as a practitioner from the business side. I'm so glad that the St. Louis Fed stresses the importance of diversity in the field of economics and so generously used the time and efforts of its staff, like Mary Suiter and Scott Wolla, I have to tell you, for organizing as well as its facilities to host an important inaugural event.

Finally, I wonder what kind of pressure one feels when Macroeconomic Advisers, who are—there are people littered in the audience today—name you the FOMC's second biggest mover of markets in 2010 behind then-Fed Chairman Ben Bernanke. How about the biggest mover of markets in 2011 and 2013? *The Economist* also named President Bullard the seventh-most influential economist in the world in 2014. That's a good deal of pressure. So while he may not be a voting member of the FOMC this year, let's see if he can't move markets today at this conference. [laughter] President Bullard, please do us the honor. [audience applause]

James Bullard: Well, good morning and thanks very much for that very kind introduction. I thought you were going to say it's the likeness to Brad Pitt that's really, you know, kind of the Brad Pitt of the FOMC. [laughter] And I kind of like that. So I'm going to tell my wife about that. So good morning, and it's great to be here before this group. I'm going to actually leave the title slide up most of the time because we spent a lot of time on the title. [laughter] The content probably doesn't live up to the title.

But I do want to talk about r-star issues today. I thought this would be a good audience. You guys know this issue pretty well, especially those of you that follow monetary policy very closely. And so I'm going to give you Jim's view on r-star, the phantom menace.

So r-star is the natural real rate of interest. In this talk, it's going to be the natural safe real rate of interest. If you look at contemporary theory, you have to know something about what r-star is and then where the current real interest rate is relative to r-star in order to say whether current monetary policy is easy, tight or neutral. But, in practice, pinning down this value of r-star is mostly about imputing an underlying trend from the data, and that can be difficult. That's kind of the theme of what I'm going to talk about here. So it's something of a phantom menace in monetary policy circles, and especially in recent years. Do we have the right level of real interest rates for the U.S. or is this r-star moving around on us, and so

therefore we can't tell exactly where we are?

So if you don't want to pay attention to the whole talk and it is 8 o'clock in the morning, you could just pay attention to this slide. By the way, we're going to post these slides as well. This is kind of a long and technical talk, but the slides are up on the webpage.

So, first of all, r-star is, in practice, a low-frequency trend measure of a short-term real interest rate, and I'm going to take this regime-switching view and tell you all about that. So I've got lots of slides about regime switching in here. One thing I want to stress is that the downward trend in the safe real interest rate is not necessarily a downward trend in the rate of return to capital. I've got a picture on that. We've tried to stress that quite a bit over the last two years. So we'll talk about that issue.

There appears to be a large demand for safe assets globally. This is something that many academics and practitioners have talked about. That's actually going to turn out to be the biggest factor driving r-star in this talk.

And finally, in my opinion, there's only modest evidence that the trends that have driven r-star lower over the last 30 years are changing today. So I think our baseline should be r-star has come to a low level, and there's not really any reason to predict that it's going to move off that low level over a forecast horizon that's relevant for policymakers, like two years. There's no reason to predict an inflection point right at this juncture, but I'll get to that as we go through this talk here.

So these are the main things that I want to talk about. … Short-term real interest rates are at the center of macroeconomic theory and monetary policy. The natural of interest is some kind of concept about the trend component of short-term real interest rates, so sometimes there's confusion in talking about this issue. The idea is the Fed can push the real interest rate around temporarily, but the Fed cannot influence this longer-run trend. That's driven by fundamental factors and ground out by global supply-and-demand factors. And so you need to know where that level of real interest rates is, where that trend is, and then you can talk about where the policy setting is relative to that trend. But the problem is there are many, many ways to detrend the data and, in fact, I'm bringing a new one in here today. So this is adding to the mayhem on this issue.

The raw data for this talk is very simple. It's a one-year ex-post real interest rate, so you take a one-year Treasury and subtract off the Dallas Fed trimmed-mean PCE inflation rate. That's the raw data for this talk. You can do this other ways. You can do an ex-ante version of that, and get an ex-ante real interest rate. It will be more volatile, but the basic story is not very different.

And then I'm just going to show you a picture right now about four ways to detrend the data. You can do what Taylor did, use a constant. You can use a model like Holston, Laubach and Williams, I'm going to refer to their paper a fair amount. You can use a model like Del

Negro et al. You could use a linear trend. You could use an atheoretical filter like the Hodrick-Prescott filter. So here's what the picture looks like starting in the '80s, and I like to start in the '80s. I like 1984. That was a period where we started to get over the big inflation era and the economy moderated considerably.

So in this picture, the blue line is the raw data and then the other four lines are the possible detrending methods. The dotted line that's horizontal is what Taylor said in his 1993 paper, and most theories that you would write down would just have a balanced growth path and they would have a real interest rate associated with that balanced growth path. So that's how I interpret Taylor. He just drew a horizontal line at 2 percent. That doesn't work very well if you look at this picture today. It might have looked OK in 1993 when he first published his paper.

If you look at the other methods, the two modeling approaches or the linear trend, which is just the downward-sloping line, or the Hodrick-Prescott filter, they're all going to give you the idea that real safe interest rates are much lower today than they were 30 years ago. They've been on a downward trend for a long time, and so that's where we are.

So I'm going to add a way to detrend this data to this many-lined picture here. I'm going to take a regime-switching view of these issues. So we'll take the fundamental factors that drive the real interest rate, and they're the same ones that other people have talked about, but we'll view those factors as switching between high-mean stochastic processes and low-mean stochastic processes. And just to not confuse what I'm doing with the good work that many of my colleagues in the profession are doing, I'm going to call this r-dagger in order to emphasize that these estimates use an alternative methodology.

I guess what I'm concerned about on this issue is that r-star has been wrapped up in New Keynesian models, and I'm not doing anything like that. I'm using an approach that puts much less structure on the data, and therefore I want to call it something else just to remind you that I'm not using the New Keynesian model to do this. And then to center this analysis, I'm going to keep everything around a Taylor rule, and I'll come back to the Taylor rule at the end. I'll actually give you my policy recommendation.

So in the Taylor-type rule, the real interest rate, this r-dagger would be the first term on the right-hand side. The "i" there is the actual policy rate. This real interest rate r-dagger is on the right-hand side. You've got the inflation rate, and then you've got gap variables, and if the gaps were zero, then this equation would recommend that the policy rate "i" should just be set equal to the real interest rate r-dagger plus the inflation target, but the point of this is we don't know what this value of r-dagger is. So I'll come back to this later, and we'll actually use a Taylor rule just like this to get a policy recommendation.

So what I want to do is decompose the natural real rate into three factors: "lambda," which will be the labor productivity growth rate for the U.S. economy; "psi," which is going to be the labor force growth rate for the economy; and then "xi," which is going to be an investor

desire for safe assets. "Xi" is kind of upside-down here, so a strong desire for safe assets is going to drive the real interest rate lower and weak, where normal desire for safe assets would mean a higher value for this r-dagger variable. So the point is we're going to divide into three parts, and then we're going to look at the three parts individually, and then it's going to add up to the r-dagger as we get about 40 slides down the line here.

So why do we want to use this decomposition? There are lots of ways to talk about these interest rates. And it's because Jim likes this model. [laughter] So I like overlapping generations, and one reason I like that is because it endogenously determines an interest rate. A lot of models have the beta, the discount factor in there, and that's really just a parameter coming from you and me. So OLG is all about supply and demand, how many older people do you have, how many younger people do you have, how productive are they, and so on. So if you do log preferences and many-period OLG, no discounting, fixed capital, no other frictions, what will happen in that model is that the real interest rate will be exactly equal to the output growth rate as a theoretical construct, and that's true even in the stochastic version of that model. That's something I've been working on recently. So what you would get in that model if you didn't have the safe asset demand is you would just get "lambda" plus "psi," would be the natural rate of interest along the balanced growth path, and so that's one concept of the natural rate of interest. It's pretty close to what other people have talked about anyway. So that's my rationale for using this particular decomposition of r-star.

Now, the way you would normally do this is you would just say there's a mean value of the labor force growth rate, there's a mean value of the productivity growth rate, and therefore you get a mean value of r-dagger, and that would be that. So the point of this presentation is to say maybe one mean isn't enough. Maybe the means are switching between high and low values for the fundamental factors, and so we're going to do that. We're going to say that for each factor, there are two means, and they could be switching over time.

So the prototypical example would be productivity growth. In the U.S., we had a long period of low productivity growth from 1973 to the mid-1990s. Then we had a period of high productivity growth, that's the high regime, for maybe a decade, and now we've come back down to a lower value. So that's the kind of thing we want to do, but we want to do that for all three factors here that are driving this natural rate of interest.

Now, the declining trend on the natural rate of interest is associated with safe returns to government paper, or relatively safe returns to government paper, does not appear to extend to ex-post real returns on claims to capital as measured from the U.S. GDP accounts the way Kydland and Prescott would do it. That return has been fairly constant since the 1980s, and I'm going to show you that in the next chart. So, in my mind, that suggests the inclusion of the factor that says there's a big global demand for safe assets. That rationalizes that, because a lot of these models that are being used, you know, there's only one interest rate, and so all the interest rates should move together if that's the kind of approach that you take, but that's not what's happening in the data.

So let me show you this picture. The top line there is the ex-post real return to capital since the '80s calculated out of the GDP accounts and the bottom line is the same data I showed you before, the ex-post real return on one-year Treasuries from the 1980s. So the bottom line has a downward trend, and the upper line does not really have much of a trend. So what you're saying here is that if you want to use a full-fledged model, you should be talking about the equity premium in that model, and expanding equity premium over time. Most authors are not doing that. They should be doing that if they want to address this data here or convince me something else about the returns to capital. So this is as much as I'm going to say about this, but this does rationalize the idea that the demand for safe assets—the bottom line—the global demand for safe assets has increased over time.

OK. So the main question here is which of these three factors is most important for accounting for the downward trend in the natural rate of interest? Is it productivity growth, labor force growth or the desirability of safe assets? And I'm going to look at each of these factors as a regime-switching process. Each will have a high mean and a low mean. We'll do the very simplest type of regime switching that you can do. Those two means are called regimes. That came from Hamilton, not from me, so we'll call them regimes the way Hamilton did. The basic idea is that these kinds of factors generally have pretty constant means, but there can be long eras where they shift to lower values or to higher values, and it makes total sense, let's say, in terms of the demographics of the U.S. economy or the productivity of the U.S. economy.

So let's start. We're going to have a sequence of slides with all three of these here, and we're going to start with labor productivity growth, which has been low, as you guys know. For this factor, we actually have a model that's in use and continually updated in real time—it's the Kahn and Rich model on the New York Fed's website—so we're going to use that. They have a low state at 1.33 percent and a high state at 2.9 percent labor productivity growth, and the U.S. economy, according to this model, was in the high-productivity growth regime from early 1997 to 2004, and I think the picture's worth a thousand words here. This is a volatile series, but you can reliably estimate this via the Kahn and Rich methodology. You will get the low regime up until the mid-90s, the high regime from the mid-90s to the mid-2000s, and the low regime again post-2000.

Now, one thing I want to mention about this is that—so this would say, the picture says we're still in the low regime, and, in fact, we haven't really observed anything that would say that we're moving to the high regime. Now, one thing I would say about this is productivity has picked up on the right-hand side of this picture, but it's only picked up to the mean of the low state, and so it doesn't really look like, based on this, anyway, that we can predict a productivity boom in the U.S. I am kind of modestly optimistic that the tax plan that has been passed will actually work and there will be an investment boom and that will feed into productivity, but as far as where the data is right now, we're not seeing that. So, for this, we're in the low regime.

Let's look at labor force growth. Labor force growth in the U.S. has been low. It was

growing at about, over 1 percent, one and one-third percent until the financial crisis and only about half a percent since the financial crisis. This one's harder to estimate and get reliable estimates, so what we did was we just divided the data at the financial crisis. Could be that you're in the high state or the low state here, so I'll do it both ways when we get to the policy part of the talk.

Here's the raw data on labor force growth in the U.S. pre-crisis and post-crisis. We're calling those the two regimes. We had pretty good labor force growth in the 2015 era on the right-hand part of the chart, but it's kind of backed off some since then, so depending on how you want to interpret this particular set of possible regimes, it could be high or low.

Now, how about investor desire for safe assets? So what I'm basically going to do is take those previous two trends out of the data. That's going to leave me with a residual, and I'm going to fit a regime-switching process to that, and that'll be the investor desire for safe assets.

So let's take both of those regime-switching trends out of the data. Assuming you're in the low labor force growth regime, that'll give you a time series of adjusted safe real returns, and that'll still have a downward trend. So you've got to do something else to fully account for the downward trend in the data, and we'll fit a two-state regime-switching process to the residual values and interpret the two states as strong desire for safe assets versus a more normal desire for safe assets.

The values you get out of that are -3 percent in the high-desire-for-assets regime and about 57 basis points in the normal-desire-for-safe-assets regime. And we're currently in the regime with a high desire for safe assets. So the distance between these two regimes is large, and so, in that sense, this is the most important factor of the three.

So here are the fitted values. Basically, in the early part of the sample from the '80s and '90s, we were in the normal desire for safe assets, and then as you go on in time, the model wants to come down to the high desire for safe assets, and that's how the model wants to fit this data, and it certainly appears that we're staying in that regime, although, of course, safe rates have gone up a little bit recently on the right-hand side of this picture.

So now we've got three regime-switching processes for our three factors. How do you put it all together? This chart shows the two states, the high state and the low state, for each of the three factors. It gives in basis points how much each value is worth, and then the difference between the two states in the third column. So the investor desire for safe assets, the difference there is 363 basis points, so it's gigantic compared to what you can get out of labor productivity being in a high regime or a low regime or what you can get out of demographics being a high regime or a low regime. So that's one thing to take out of this little analysis here. Also, the 607 basis points, down in the lower right-hand corner, it matters a lot. If all three factors were in the high regime, rates would be way higher; if all three factors are in the low regime, they're going to be way lower. So it matters a lot which regime or combination

of regimes you're in for the U.S. economy.

So labor productivity growth looks like it's in the low-growth regime, so let's set that to 133 (basis points). Labor force could be in the low or high, but let's set it low, 46 basis points; a high desire for safe assets, so that gives you -306 basis points. And if you put it all together, you get r-dagger is either -127 or -40, so you get a very low value for your natural safe real interest rate through this process.

OK. There's big literature on this, and I just want to make just a few comments on this literature. It tends to be a lot more sophisticated than what I did here. So this is kind of a back-of-the-envelope kinds of calculations with not too much structure imposed. We've just got the one time series that you're trying to explain with a few thoughts about what the theory would be behind it. So the only point of this is to think in terms of this regime-switching concept as opposed to a linear trend or a Hodrick-Prescott or a model that imposes a lot of structure on what you're trying to do. And two of the three factors analyzed—the labor productivity growth and the desire for safe assets—appear to be in the low state and don't appear to be shifting. So that suggests that the natural safe real rate of interest, and hence the Fed's policy rate, is going to be low over the forecast horizon.

We've got Laubach and Williams who've done seminal work on this. The update of that is the Holston et al. paper, extended to an international perspective. I'd encourage people to look at Vasco Curdia's paper from the San Francisco Fed, which is a similar analysis, but comes out with a lower value of r-star. Del Negro et al. have a structural model and include the safe asset demand in a more fundamental way, and they get a low value for r-star. I've put less structure on the problem with an alternative stochastic conception, regime switching. That gives you a different view of the mean-reversion processes.

There are other papers that I'd recommend—a Rachel and Smith paper from 2015 has many more factors in it instead of just the three that I've got here. You can also look at the Borio et al. paper; they've got a much longer dataset across countries. They argue that it's all about monetary policy regimes, historically speaking, a very interesting paper. And if you want even more data, you can look at the book on the history of interest rates by Homer and Sylla.

Well, what does this imply for the policy rate? "Don't give me the mumbo-jumbo, just give me the bottom line." So that's what I'll do here. OK. I'm going to return to a Taylor-type monetary policy rule, and I'll give you the impact of this analysis on a rate recommendation. So, again, if the gaps were zero in a Taylor-type rule, then you're just going to set the nominal interest rate, the policy rate, equal to the natural rate of interest plus the inflation target. The gap variables probably aren't exactly zero, so I'm going to take a few slides and look at the gap variables and put high and low values on those.

So, for inflation, inflation's been below the 2 percent target since 2012. If you look at inflation measured from one year ago, Dallas Fed trimmed-mean, a little bit below 2 percent; headline PCE, a little bit below 2 percent. Core PCE, which tends to be the favorite of my

colleagues on the FOMC, that's about 1.5 percent. So depending on which of those you chose, that's your inflation gap.

And then for the output gap, you could look at CBO as of the fourth quarter. You could look at deviation from a Hodrick-Prescott trend, you get a small gap there. If you look at Okun's law and a natural rate of 4.5 percent, you'll get about a 1 percent output gap. So depending on which of those you want to choose, that's your output gap.

And then here's your policy rule. We can use Taylor's coefficients from 1993 or Taylor's coefficients from 1999, and then we've got our natural real rate there, r-dagger, we set it somewhere between -127 and -40 basis points. Then you've got your gap measures. So you stick all those in your Taylor rule and you're going to get that the '93 Taylor rule implies set the policy rate somewhere between 8 basis points and 161. Taylor '99, which is more popular today, set it between 15 and 207 basis points, OK? So the actual policy setting—the fed funds is trading at 142 basis points—fits in those intervals. So you could argue based on this that, at least broadly speaking, policy is about right today, even given the very low natural rate estimates that I gave you. Everything looks about right. However, if the Committee raises the policy rate substantially from here and nothing changed in the data, then you'd start to go outside the upper bounds here, the 161 or the 207, and then you'd start to have a restrictive policy according to this analysis.

OK. This regime-switching approach suggests that the current setting of the policy rate is appropriate, but what it really does is it gives you a different view of mean-reversion properties than you would have if you had some estimate of the natural rate that always had to be returning to its long-run mean value.

This analysis suggests that r-dagger is unlikely to shift over a forecast horizon of two years. The whole nature of regime switching is if you're in one of the states, you're probably going to stay in that state, at least over a horizon like two years. And what did we say? We said basically all three factors look like they're in a low state. They don't really look like they're moving. Maybe, but they don't really look like they're moving. So what you would do from a policymaker's perspective like my perspective, you would say, well, you know, for purposes of making policy, let's just assume everything is going to stay in the same state, and then let's set policy appropriately given those values for the various states.

So I think forward guidance should be characterized by a relatively flat policy rate path as opposed to an upward-sloping one. So what you can do is say, OK, probably we're going to stay in the low states for all these fundamental factors. Probably the policy rate doesn't have to move very far if we want to get to neutral. We're probably about at neutral. If you wanted it to be a little bit restrictive, you wouldn't have to move very far in order to be a little bit restrictive. And then we'd keep an eye on all these factors to see if maybe they're switching up to the high states, so there would be some upside risk, because any of these three factors could switch to their high states, and that would be very important for short-term interest rates and

for the policy setting. So you'd have to be alert to that, but the idea would be for the purposes of giving forward guidance, you wouldn't expect that.

OK. So let's conclude and move to some Q&A here. This analysis provided some background on how you might begin to think about recent trends in the natural safe real rate of interest in a regime-switching context. According to the analysis presented here, the natural safe real rate of interest—and the appropriate policy rate—is relatively low and unlikely to change very much over the forecast horizon. If you want to impose a model and put a lot more structure around it, I'd recommend the Del Negro et al. paper, which tries to do exactly that. They have a convenience yield that's woven into the model, and is part of the estimates that they get. And then they do the estimation several different ways, so you can pick your favorite way. But this analysis here did not impose that much structure. You have to buy into a model if you're going to impose that much structure on this kind of analysis.

So I'm going to stop there. So I hope this has been a stimulating start to the NABE conference. The St. Louis Fed is a huge supporter of NABE and all the work that you do, and I appreciate the opportunity to be here this morning and to talk to you, and I'm looking forward to your questions. So thanks very much. [audience applause]

Ellen Zentner: President Bullard, I'm going to invite you over here, and we'll take some questions. And I believe that we're going to be gathering cards from the audience, so please hold them up. Someone is gathering them and will bring them up. Tara is, thank you.

So a question from me, then, while we wait for some of the cards to come forward. So the desire for safe assets, that appears to be the biggest factor in this model. Thinking to today's fiscal policy environment, would an increasing budget deficit and current account deficit threaten the desire for safe assets, and therefore have a big impact on this model?

James Bullard: OK. So that's a great question, and one I've had before. I think that this is a global issue, not a U.S. issue, so the way we have framed it with our staff is that you're talking about a trend over 30 years, so what has happened is that you divide the world in half, into developed-world GDP and emerging-market GDP. And the developed world issues safe assets. The emerging-market world does not issue safe assets for whatever reason. And emerging markets have become a bigger and bigger fraction of global GDP, but they don't issue very much, and so it's up to the other half of the world to issue the safe assets, and in a big picture sense, the supply of safe assets has not kept up with the growing demand of safe assets that's coming, because the other half of GDP is growing faster and has grown a lot over the 30-year period.

OK, so whether you can get that to work in a model and get that to get a good picture that would summarize that, I don't know. I have not really seen one, but conceptually, I think it's a global phenomenon, not a U.S. phenomenon. If the U.S. issues a bit more, you know, I know it sounds like big numbers to us, but on a planetary scale there aren't enough safe assets, and this is what's driving what is going on in the picture. So that's the way I think about this

issue.

Ellen Zentner: Thank you. So we have a lot of questions here. I was quickly trying to put them into buckets, but certainly quite a few here on the inflation framework of the FOMC. Can you help us think about the process that the FOMC would go through when contemplating a change in its inflation framework? And if it was deemed that a change was warranted—of course these things can play out very slowly over time—how do you think the Committee would engage with Congress and the public when introducing a change?

James Bullard: Yeah. I think one idea that I think is gaining popularity is that it's best practice to review the inflation framework on a regular basis, and the Bank of Canada has been a leader on this. We adopted our inflation target in January 2012, so now you're six years past. I don't think you should just say it's fixed and immutable for the next 50 years and we're never going to review it. So I think to have a process in place where you would regularly think about issues around this and consider the framework, I think that's a good thing to do, and I'm hopeful that the Committee will go ahead and do that. This is the kind of thing where even if the Committee wanted to go in some direction, it would take quite a long time, and I think you would have to get buy-in from the political side and you would have to get buy-in from the larger financial community so that everyone understood why the change is being made and what we expect to gain.

Some of you that saw my speech at the memorial for Allan Meltzer, I talked about this issue that a lot of the gains may have come already just from the fact that inflation targeting has become so popular and really so successful around the world compared to the '70s and early '80s, that maybe we got all the gains just from going to inflation targeting, and further refinements maybe—I think the onus is on those that want to do further refinements to say that you're going to get further gains from that compared to what we already got from just adopting inflation targeting around the world over the last 25 years. So the basic story is I think reviewing the policy framework would be a good idea, but it would be a slow-motion process.

Ellen Zentner: Thank you. So, staying on the inflation front, back in January 2016, in its annual statement, the Fed shifted to a symmetric 2 percent goal. At the time, you had argued almost what sounded like, "Well, this is a start, but it doesn't go far enough." What was the drive of your thinking then in terms of how the Fed was still lacking clarity and communication around inflation?

James Bullard: Yeah. Actually, at the time, I actually dissented on it, which is funny because I was one of the leading advocates of writing the statement out in the first place, but I didn't like—if you look at the statement, it's kind of backward-looking, and I wanted the Committee to say something about we intend to hit the inflation target in a forward-looking sense, and it doesn't really say that now. So I think that's a little bit of an issue. It's not a huge issue, but it's a little bit of an issue for our current statement.

Ellen Zentner: Thank you. Do you want to count how many cards are on the table

here? [laughter] But I am, again, trying to put them into buckets. So we're business economists in the room. Many of us forecast the general outlook for the economy and what it means for industry. So, thinking about your own economic outlook, we've had a pretty swift rise in interest rates recently, the 10-year now closing in on 3 percent. In your modeling, how would that affect your forecast that you turn in let's say four times a year to the Federal Open Market Committee, and specifically could you cover how that plays into the effect on housing from higher interest rates?

James Bullard: Well, one factor that's driven the yields on 10-year is that inflation expectations have moved up some in the U.S. based on TIPS yields. I think that's been a welcome development. They've been moderately depressed, I think, from where I'd like to see them, so I just see the inflation expectations as having come up toward something that's more reasonable and more consistent with the inflation target in the U.S. Even today, I actually don't know where they're trading right now, but they look a little bit light even today. So I think that's part of what's going on, that markets have decided that they see a little bit more inflation than they would have seen otherwise. But surely that's good news, since we've missed our inflation target on the low side for five years in a row.

Ellen Zentner: Is that in line with your thinking of the forecasts that you've turned in, that you expect a gradual rise in inflation this year?

James Bullard: You know, I expect a gradual rise in inflation under appropriate policy, which is the way the SEP is done. So when I'm turning that in, I'm saying, "Listen to Jim, and then inflation will go back to target." [laughter]

Ellen Zentner: What about thinking about factors cyclically because there's some cyclicality in the factors in your model? If we're getting a rise in productivity now that's helped along by fiscal policy, how do you recognize—I suppose the bottom line would be: How do you recognize when these factors in your model are moving, that it's just cyclical and not some shift in the longer-term trend?

James Bullard: Yeah. Well, on productivity, we have the Kahn and Rich model, which is actually updated monthly, I think. Or if you wanted to adjust their assumptions a little bit and estimate something else, you could. You could do that in real time. The model would kick out the probability that any shift is going on. So if productivity does start to creep up, what the model will say, the model probability will move up, and I think that's a useful way to think about it. If you look at that picture, though, that I showed you earlier, productivity has been below the low regime for the last few years. It's now come up, but it's only come up to where the low regime is. It doesn't look like we're getting back to the kind of thing we observed in 1995 to 2005. Alan Greenspan was famous in the 1990s for recognizing a shift as it occurred in real time, so I'm optimistic that we could do the same if something similar was happening.

Ellen Zentner: So, you know, given the nature of your talk, would you sit around the table at the FOMC and argue for the adoption of a monetary policy rule, something that, say,

suggested monetary policy should follow a regime-type model?

James Bullard: Well, the Committee does use monetary policy rules as a reference point, and I think it's a starting point for a lot of discussion about monetary policy. It gives you a benchmark to look at, but I think everybody feels, and certainly I feel like I also know the weaknesses of models and the weaknesses of many types of analysis. So you have to bring some judgment in about how much you're going to trust a particular model or a particular recommendation from a policy rule. I think it gives you a great starting point, I think it's a great way to communicate to the public about why the policy setting is where it is, but I don't think you'd want to be absolutely tied to, you know, sort of putting that together. The people that are saying this in Congress, by the way, are very aware of this issue. They don't mean to be so prescriptive that you have to actually use Taylor 1993 or something like that, but they want policy to be explained in terms of monetary policy rules so that everyone can understand what the heck is going on, and I think that's not too bad an idea.

Ellen Zentner: We can use Bullard 2018. [laughter] So, last question. Going back to the 10-year yield near 3 percent, growth for the past few quarters has been around 3 percent. The unemployment rate is very low and could move even lower. In your mind, where does the 10-year end? What's a reasonable range under the outlook that the FOMC has or that you have currently? What would be a reasonable area for the 10-year yield and what would make you nervous?

James Bullard: You know, over the last four years or so, the 10-year yield has traded between 150 basis points and 300 basis points, and it's fluctuated in that range. We're at the high end of that range. I would submit to you what was weird was the low end of the range, the 150 basis points, and maybe the 3 percent is not so unusual. And whether you'd break out from here, I'm a little skeptical that you'd break out from here, but I'll certainly take market signals on board in making monetary policy.

Ellen Zentner: Thank you. Thank you so much, President Bullard.

James Bullard: All right. Thanks a lot. [audience applause]

[End of audio]