

## James Bullard on The U.S. Economy and Monetary Policy

April 21, 2022

### Webinar Transcript

#### Transcript:

Markus Brunnermeier: Welcome back everybody to another webinar organized by Princeton for everyone worldwide, we are very happy to have James Bullard with us, the President and CEO of the St. Louis Federal Reserve Bank, hi Jim, nice to have you. James Bullard will talk about is the Fed “behind the curve”? And he will give two different interpretations and learn a lot about how one thinks, how to catch up, essentially, if one is behind the curve, or how one does it? So inflation was on this webinar series, we have covered inflation extensively, and I just want to do a little bit of advertising about the previous webinars we had on the inflation topic since 2020, January 2020. It started with Charles Goodhart, who really early identified all of the inflation threats and based on his book, and we had the Federal Reserve Chairman, Jay Powell, in January 2020, we had a big debate with Krugman and Summers in February 2020, and another debate one year later. Emi Nakamura was talking about the flatness of the Phillips’ curve, and then we had Alberto Cavallo from HBS who analyzes online prices to get a prediction of inflation coming forward. And Mervyn King was talking about central banking, Alan Blinder was talking about soft versus hard landings, we will come back to that today as well, I guess. Yuriy Gorodnichenko was talking about inflation expectations, Ricardo Reis was talking about inflation expectations derived from option prices, where you get the whole distribution of inflation expectations and then Itamar Dreschler and Alexi Savov were talking about investing if you have high inflation, what you should do. So, if you look at inflation and inflation forecasts, just this week, the IMF came out with its most recent inflation forecasts and you can see, for the United States, the inflation is going up and they’ve predicted it will peak at a high rate and then come back very quickly after one year, little bit more than one year, will close to the target again. The January 2020 prediction was also coming back very quickly and earlier they didn’t predict such a subsequent increase, so this is now the current prediction after the invasion of Russia into Ukraine, January 2020 was before the invasion of Russia in Ukraine. In Europe the situation is not much better and it’s a little bit lower but it takes a little bit longer to come back close to the inflation target. But it’s also much worse than it was anticipated before and all anticipation is a much worse situation but, again, the assumption here from the IMF is that you come back to the target fairly quickly in the US, as well as in the Euro area. For the emerging economies the situation is also very dire so we have high inflation rates all over the world, the exception is to some extent Asia, where the increase in inflation in Japan and other Asian countries is less pronounced. Now the question is, what is the monetary policy reaction time, in a sense, as attention there if you do monetary policy today how long does it take until it really affects the real economy, and there are two aspects, I would like to contrast: one is that it’s well known that there’s the delayed impact of monetary policy on the real economy, because it takes time until you know, the low interest rate or high interest rate feeds into real decision making. So monetary policy has to be forward looking, but if you look at the new 2020 fed framework, it was actually under emphasizing the forward looking element of monetary policy. On the other hand–

so that's essentially arguing that you should actually act very early. On the other hand, future rate hikes are also already priced in if you look at our long term bond prices and other prices, so when people anticipate that there will be future rate hikes they will already slow down the economy today, so that works in the opposite direction. And this works when the communication is working well from the Central Bank, and it depends on the credibility of the reaction function of the Central Bank, so this forward guidance or communication is a key element which plays more and more important role in more recent events and there's also some particular how powerful is for guidance, or is it less powerful than people think?

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And there are different types of forward guidance, one is the Delphian forward guidance, where you just communicate what you think the future interest rate will be, but you don't commit to it. And then you have Odyssean forward guidance, where you really commit to certain interest rates down the road and you might want to change your mind later on, but because you've committed you cannot then optimally respond what you find subsequently optimal, not what defined today optimally, and perhaps you can go into this aspects as well. Now, in a sense, the question, the big drawback, or the big question we are facing at the moment is do you want to have a swift reaction, but ultimately, you probably need less of a hike, or do you want to do it slowly, but ultimately might need a larger hike? So put it differently, one strategy is putting one stitch in time saves nine: essentially you react quickly and this means you don't have to make so many tightening elements later on. The alternative is to act very slowly, but ultimately, you might because it might be behind the curve, you might have to act more drastically. And that's a timing question: how you want to act on that and my question is, then, you know how it interacts with fiscal and financial dominance. If you act more slowly, it might be less of an issue for the sovereign debt market or the financial markets more generally. If you act very sharply, that might actually lead to some dislocation on the financial market side and is this important or not, should the Fed care about that? In particular if it doesn't translate into some real dislocations and that leads me already to the soft versus hard landing and we had Alan Blinder on a webinar earlier who was arguing for a soft landing and typically when you went to all the tightening cycles and it's typically about 300 basis points, these tightening cycles, even earlier when inflation was not so high. And one prominent example was in the early 1990s where there was a soft landing in the real economy, but there was a hard landing on the bond market, and the question is, should the Fed care about default landing in the bond market as long as the GDP is a soft landing and to what extent can we generate a soft landing from that. And, in contrast, Larry Summers just brought out an NBER paper where he argues that in a world where the labor market is super tight, as it is now, there would be wage inflation, wage inflation will drag on, and there's no way to get rid of this high inflation, in particular, wage inflation, without a tightening/ a hard landing. And so he argues, it would be very difficult, almost impossible to get the soft landing. So these are two perspectives, but the question is always landing in what? Landing and the real economy, landing in the financial economy? Have to take that into account as well. Now what's about inflation anchor in the monetary policy framework, so that we know that you know whether you can really do this smoothly depends very much as to whether the inflation anchor holds or not. And what I find interesting is that the inflation expectations of households in particular is driven by some salient prices, in particular the gas prices. And so, one should watch out how the gas prices develop, because this might actually destabilize the inflation anchor. And on the other hand, the gas price because it's so flexible it's not part of the core inflation index so there's a tension there. On the one hand, we should look at the gas prices a lot, because it might destroy the inflation anchor. On the other hand, it's not part of the core so we don't focus so much on it, so that's an interesting tension to discuss as well.

8:14

And, of course, the credibility of the central bank's reaction function is key in all of these things, and it will be nice to understand better to what extent the fed flexible average inflation targeting framework, which was established in August 2020 is still alive or not. Are we still trying to take some average over inflation or not, or are we going back to the previous monetary policy framework. And is it still the case, given that inflation is now so high that actually we will actually undershoot the target of 2% down the road. And the second element of this new inflation target regime is that we look more at how the labor market, we put more emphasis on the labor market, less on inflation, and we don't do this forward looking element, are these elements still to be staying and I think it will be nice to get some more insights now on this as well, what the thinking is at the at the St. Louis Fed and more generally on the Fed board. Now we have a few polling questions to be answered and, here are some questions which I put forward: is the Fed behind the curve, yes or no, and actually 80% yes, 20% say no. The other question: is the ECP behind the curve, 75% say yes, 25% say no, so it's a little bit like the ECP is a little bit less behind the curve, but I also feel like the Fed has decided now to move aggressively while the ECP has not, it is still waiting. And what interest rate impacts the economy, so which interest rate is really impacting the real economy the most, the behavior of people, the most: is the short rate, is it the mortgage rate, or is it the corporate loan rate? And the answers here were 33% think the short rate is very important. The majority think the mortgage rates are very important, so these are longer duration maturity interest rates, 48% think this way. And 20% thought the corporate loan rate is very important, so it's a short rate and corporate loan debt but primarily mortgage rates through the housing market has been probably the biggest impact. And do we think that the landing will be soft, here to focus on real GDP growth rather than you know financial aspects. Hard landing is thought by 75% and soft landing, 25%, so many people actually expect the hard landing also for the real economy. So with these brief opening remarks, I will pass on the floor to Jim who will tell us the two different angles, whether one can see what the Fed is behind the curve or not and answer perhaps, go beyond the questions, and answer the question as well, and gives us perspective, how do we best think about this U.S. monetary policy at this stage. Thanks again for doing it for being with us today.

James Bullard: Great thanks Markus and thanks for inviting me. I'm looking forward to trying out this material with the group here and looking forward to the question and answer period and see what you guys think. My answers on the poll would be from this talk are going to be yes, the Fed is behind the curve, although you have to reinterpret it a little bit, but no we're not going to have a hard landing, so the audience is wrong and on that so this is called, is it Fed behind the curve, two interpretations. And it's very much trying to get a handle on where policy is right now, given the burst of inflation that we've had in the last year. The subtext here, which was alluded to in the opening comments by Markus, is a quote from Ben Bernanke key, which I believe is correct that he said monetary policy is 90% communication and 10% action. So we're very much going to explore that angle today in these slides. I've taken the real economy part of this talk out, so I thought it might just mention at the beginning that you know real growth in the U.S. for 2022 is still projected to be around 3% depending on who you talk to, labor markets are at a generational high, if you look at the labor market conditions index from the Kansas City Fed, it is at the highest level of what has been in 25 years so very hot, very tight labor market. And on recessions I would just say that, in the inflation targeting era which I would date from 1995, the recessions that have occurred have occurred because of shocks, or because of bursting of asset price bubbles and not because of monetary policy, those recessions came from an earlier era of monetary policy makers didn't have as much credibility as they have today, so that'll be a theme of of these slides here, so let's get into it, and is the Fed behind the curve, two interpretations.

Let's go to the next slide, so the themes here are that U.S. inflation is not just above target, it's exceptionally high, and it's comparable to the 1970s period. I'll have a chart and I'll talk about this way, and so that's the first point. If you take— this is all going to be a Taylor rule type calculation here in this talk— if you take a standard Taylor type monetary policy rule, and you make some generous assumptions, and I'll talk extensively about the generous assumptions, it's still going to recommend substantial increases in the policy rates, so that provides one baseline definition of the idea that the Fed is behind the curve, and indeed, by that definition, we're way behind. But I'm also going to argue that all is not lost here because modern central banks are a lot more credible than their 1970s counterparts, in particular, we make extensive use of forward guidance and transparency in monetary policy making and because of that, market based pricing has changed dramatically since last November, and so because the market interest rates have increased substantially in advance of tangible Fed action, we can get a different definition of whether we're behind the curve or not compared to the Taylor rule calculation, and based on that, we're not as far behind the curve, based on that definition, and one of the slides might even suggest that we're in a pretty good place with respect to policy, so I'll point that out when we get to that point. So this is basically the gist of the slide deck here. Let's go to the next slide, and the next slide. So when I say, inflation is high, you know I'm willing to throw out the food and energy components, at least for now, and just talk about core inflation, and the measure that the committee likes is core personal consumption expenditure inflation, measured from one year earlier that number is 5.4% as of February. The sense of which this is extremely high, is that there have been only two other times since 1960 when the Committee sat down and was looking at a 5.4% core personal consumption expenditures inflation rate; one time was in 1974 and the other time was in 1983, let's go to the next slide.

Markus Brunnermeier: So Jim can explain why they commit to like the PCE inflation index the best among all the indices?

James Bullard: Yeah there was a there was— in the 90s, there was an assessment of inflation measurement (I think we're overdue for a reassessment of inflation measurement) but in the 90s, there was, led by Greenspan, there was a look at whether we should use consumer price index inflation or core PCE inflation and the the answer was PCE inflation, because it was thought to be a broader measure of price prices in the economy and gave you a better sense of the overall inflation picture, and then you can throw out the food and energy components, if you want, and then you get core PCE inflation, so, really, strictly speaking, this to be the measure we all look at because the committee has been trying this by putting in in its summary of economic projections as one of the things that gets mentioned there, and so this is the most logical measure to talk about.

17:38

Now there are many other measures and I'm going to talk about some other ones here, but this is the one that the committee prefers. This is the picture since 1960. The blue line is core PCE inflation, so many will be very familiar with this picture. We're at 5.4% on the right hand part of this chart so if you draw the dotted red line back across history, you see that you only get these two crossings once in 1974 and once in 1983. So I'm going to talk about what Monetary Policy did in these two periods. Let's go to the next slide. So the 1974 FOMC which was looking at the same kind of core PCE inflation that we're looking at today, talked a lot about non monetary factors affecting inflation, not unlike today they like to keep the policy rate relatively low, even though inflation was rising. The associated ex post real interest rate was relatively low, much as it is today, in fact, our ex post real interest rate might be even lower than it was 1974. And what did they get out of that kind of policy view? The subsequent experience was that core PCE

inflation was above 5.4% for nearly a decade after they met on that day in 1974. I think the other thing that many people point out about the 70s is not just that they accepted higher inflation, but that the real economy was also volatile with multiple recessions so 74-75, the 1980 and then, then the big 1981-82 recession. And you know the thinking, at least casually in my mind, has been that when you have high inflation and variable inflation, the price signals and the economy are not as precise as they would otherwise be and this distorts investment decisions and consumption decisions across the economy. People aren't quite sure you know what the relative prices really are and so they make mistakes and you get more problems in the economy than you would otherwise have, so the lesson was high inflation/variable inflation, but also a very highly variable real economy as well, after 1974. Let's go to the next slide.

Markus Brunnermeier: Can you also tell us what the inflation forecast in '74 was, were they expecting? Or it was very transitory and inflation would come back down again...

James Bullard: Yeah if you read the transcripts of those meetings, they would blame special factors for inflation, say inflation was coming down. If you look at the picture, it never went below 5.4% for the next decade, but there was constant hope just around the corner that inflation was naturally going to subside and they kept the policy rate relatively low compared to the inflation rate. The 1983 Committee, which also sat down and looked at a 5.4% inflation rate had a different approach to monetary policy. They spoke a lot more about monetary factors affecting inflation and that it was the central bank's responsibility to control inflation and they de-emphasized special factors; they kept the policy rate relatively high even when inflation was declining and the associated ex-post real interest rate was relatively high. In fact, it was so high, I think that today's economists would say that they had such a high real interest rate that they would have caused a recession. That didn't happen after 1983, the subsequent experience was that core PCE inflation was below 5.4% for the next decade, or, in fact, the next 4 years. The real economy also stabilized. I think that's a key factor, why you want to keep inflation low and stable is that the 80s expansion was quite long, there was a recession in 1990-91 and then the 90s expansion was long, very long again so by stabilizing the inflation rate we got better real economy outcomes as well, so I would say it's this experience, the contrast between 1974 and 1983 that convinced many that you don't want to get behind the curve on inflation, so behind the curve somehow means that the 74 committee didn't do enough to contain inflation, it was too ready to blame special factors, whereas the 1983 committee got ahead of inflation and they had a high policy rate relative to the inflation rate, high real rates and that produced very good outcomes in the 1980s and 1990s.

22:55

Markus Brunnermeier: And the forecast was in '83 as well that inflation would come down?

James Bullard: You know one thing about the picture if you look at it was that the Volcker disinflation wasn't immediately successful. It actually took all the way through the 1980s and into the 1990s, to get to 2% inflation, I think that it was the 1994 tightening cycle that really established an implicit 2% inflation target for the United States, so um Volker didn't really have credibility on inflation, he had to earn credibility on inflation, and it took a good 15 years, probably, to establish that credibility, but since '95, we and other central banks have had much more credibility on inflation, that's what's enabled for guidance to be an important part of the story and that's the story I'm going to tell them the rest of the slides. Let's go to the next slide.

Markus Brunnermeier: So you're saying that essentially in '73 we had a very low real interest rate and didn't have to boost the economy. In '84 we had a high real interest rate and actually

too high growth. Would you make a causal statement to that, in the sense that normally every model would say if you have a lower real interest rate, it will boost growth, while a higher real interest rate would actually hurt growth, what is your explanation for this?

James Bullard: Well, I think that's an excellent question. I think if we just plugged the 1983 values into your model, you'd probably have a recession because the real interest rate was very high at that point, ex-post real interest rate was very high, but also based on expected inflation is probably also very high, so I don't think that that is very consistent with what goes on in models so I think I want to think in this talk more about the credibility of the Central Bank it's really that that is the key factor in interpreting the 70s and 80s versus where we are today as opposed to let's say new Keynesian models which assume the credibility, and then try to fit the dynamics of a model, assuming that you have a perfectly credible 2% inflation target, and you're trying to stabilize the economy around that credible target. Okay let's try the first interpretation here. First of all, we have to say we've talked about it already a little bit, but we have to say what we mean by inflation, we do have a statutory mandate to provide stable prices for the U.S. economy. The committee has associated with this mandate an inflation target of 2%. That target is stated in terms of the headline PCE inflation rate. That number was 6.4% in February, measured from one year earlier so we're missing on this dimension of our mandate by 440 basis points. So it's a big mess and there's a lot of inflation. Now you might say, and I've actually argued elsewhere that we shouldn't do this, but you might say that while food and energy components are highly volatile, so maybe we should just look at the core PCE inflation rate, we've already seen that that was 5.4% as of February and then others might argue that the current situation is really special, we're coming out of the pandemic, there's been global inflation surprise, we've got other factors going on and including the war in Ukraine, so the truly persistent factors would be better captured by the Dallas Fed trimmed mean inflation rate, and that is 3.6%, in February, measured from one year earlier, so I have a picture that shows these.

28:18

James Bullard: The next slide here's the picture. The 2% inflation target is the dotted line here. All three of these you know were relatively close to 2% in pre-pandemic. The recession is a gray shaded area here, and you can see that, starting in 2021, these numbers went up dramatically. The headline is that blue line there, the core is the gold line, and the Dallas Fed trimmed mean is the black line here, so all three of them are way up. The other thing about this chart is to notice, if you don't— someone you don't follow current macro economics, day by day, the way I do, but that gold line there you know went up and it did look like it was rolling over a little bit and then took a step higher in last six months or so so it's really that component right there. November, December, January, February, October I guess too, all of those who are high much higher ratings than were previously anticipated and that gave an extra leg up to all of these, but but to have this showing up in the Dallas fed trimmed mean is also very worrying because the Dallas Fed trimmed mean throws out the biggest price changes to the positive side and the smallest price changes to the negative side, throws out a very large amount of the data, and just tries to get the center of the distribution, but the center— even the Center of the distribution, up three point up 3.6% from one year ago— now what I'm going to do here... yeah go ahead Markus.

Markus Brunnermeier: So, you made a very important point that you say all the new Keynesian was assume credibility of the inflation anchor will hold. Are there certain measures to look at how the inflation expectations move, and what are the moving more with you know gas prices as salient prices. What measures do you look at to figure out how strict or strongly the inflation anchor is still holding, and inflation expectations are moving up.

James Bullard: Yeah I'm going to come back at the end to inflation expectations, and I do think it's worrisome, I wouldn't say that inflation expectations have become unmoored but they're threatening to become unmoored, and I would look at a variety of charts about different surveys that are being taken about inflation over the next one year to three years, and also tip space measures of inflation expectations but they're all up and they're threatening to go still higher if the Central Bank doesn't act in an expeditious way and to keep inflation under control, so that's why I think the situation that we're in is more like the 70s and 80s, where we want to reestablish our credibility on inflation fighting, and it has more to do with that than it has to do with econometrics of local analysis around a credible inflation target.

Markus Brunnermeier: So that leads me to— so Jack Chamberlain is asking me a question whether the Fed should do some unexpected sharp hike, like 100 basis points, just to signal to everybody it's very, very serious, to strengthen the inflation anchor I'm not asking you to comment on a hundred basis points, but would you say it might make sense to send a very strong signal in order to strengthen the inflation anchor or are we just too early in order for this to be— part of my talk here is to argue that we kind of are doing that in our own way, maybe, but I think we're doing that. Only six eight weeks ago, markets would have been thinking very differently about upcoming FOMC meetings than they are now and now it looks like markets are pricing in balance sheet runoff starting in the second quarter here. They're pricing in 50 basis points at the next meeting, so those are very different numbers than what they would have been thinking eight weeks ago or six weeks ago, so I think there has been a sharp upward movement, but the part of the talk here is to say that this has occurred, despite the actual moves that we've made only being the 25 basis point move at the March meeting, so if you just take a naive approach, it looks like we're way behind the curve, but I'm going to argue that we're not quite as far behind as you think we're.

32:18

Okay next slide. So what could behind the curve even mean? What I'm going to say is that we're going to use a generous interpretation, or the lowest interpretation of the persistent component of current inflation, so I'll take the 3.6% Dallas Fed trimmed mean value. And then, what this will do is help give us a minimal definition of behind the curve, so the idea is to measure the degree to which the current level of the policy rate is less than some minimally reasonable level. So the idea would be in ordinary monetary policy debates, there would be some range of values and we'd be interpreting whether you know, the current tea leaves and the current data as to how we want to interpret things, and then we would have a reasonable argument based on our own individual preferences for our Taylor type policy rules, whether the policy rate was too low or too high for that situation, but the current situation is different, so the current situation is that the current level of the policy rate is below even the minimal definition that would come out of the Taylor rule calculation, so that's going to be my definition of behind the curve. And I think when we do this, we should keep in mind that we're excluding a lot of the inflation that is actually occurring and that the Fed's inflation target is ultimately stated in terms of headline inflation. I'm very sensitive to the fact that typical houses, all households, you know, have to face all the prices that are out there in the economy, so they don't get to just pick and choose core inflation prices, a lot of the experience comes from food and energy. So I'm sensitive to that, but for this calculation we're going to do this minimal definition of inflation, So I'm going to take the Dallas Fed trimmed mean. Next slide. Taylor rules are of course famous and they've been used in a policy discussion for the last 30 years, and we're going to do this Taylor type rule with generous assumptions and then we'll compare the minimal recommended rate to the actual policy rate and that will give us a measure of the degree to which monetary policy is behind the curve, so to

speak. Next slide. So I'm asking you to remember your Taylor rules from memory here, but if you want to put in some numbers for the Taylor rule, you're going to need some kind of value for the real interest rate. And so I'm going to use a very generous value of minus 50 basis points and the rationale for that is that that's what it looks like we were at pre-pandemic, sort of the December, January, February period of 2019-2020, that period right in there, it was about minus 50 basis points because the policy rate was about 150 and the inflation target is 200 so that gives you minus 50 on the ex-post basis, so this is very generous most people have our star at higher values like a plus 50 basis points or higher. And then you need a parameter value that describes the reaction of the policymakers at deviations of inflation from target. These numbers are traditionally thought to be bigger than one the so-called Taylor principle, so I'm going to use a 1.25 here as a very generous low value. And then you have to also say something about the output gap term in the Taylor rule but I'm just going to zero out the output gap term and I'm going to appeal to our most recent statement on longer run goals and monetary policy strategy which says that we're not going to worry about labor markets if they're doing very well and they're doing very well here, so I'm going to zero that part out. So these are all very generous assumptions, there they're leading to a lower value of the recommended policy rate than you would get otherwise. Next slide. So yeah you put these values in, and this is a non inertial tailored policy rule. The inertia component is just talking about how fast you want to get to this value. But the value that comes out is three and a half percent.

37:14

So this is kind of the gist of the minimal value that you can rationalize through this type of calculation under my very generous assumptions and the current value of the policy rate is just 37 basis points, so we're a good 300 basis points below where we need to be according to this calculation, so this provides a definition of the idea that you're behind the curve. You're below even what the lowest recommendation could be coming out of a Taylor rule type calculation and then we're keeping in mind that you would get even farther behind the curve, if you weren't as generous with these assumptions about what kind of inflation, you want to put in, or the parameter values that you want to put into your Taylor rule. So, Markus, do you find this convincing as a definition of behind the curve?

Markus Brunnermeier: I mean it's, as you said, it's a very generous way of looking at and even despite its was generous, it would increase, we can ask for a sharp increase of the policy rate, but I guess you will tell us we should look at the long range rather than only the short rate.

James Bullard: Yeah this would say so, this kind of sets a target and certainly the committee has been other members have been talking about moving expeditiously and trying to get to neutral. And things like that, and this kind of gives us a target about where we need to get to near term. Let's go to the next slide.

Markus Brunnermeier: So can I just ask, so in terms of hikes versus cuts of interest rates it's not uncommon that you do have a hundred basis points cut if there is some financial crisis or some huge shock. But it seems not really appropriate to do a 100 basis points hike. Is this application correct that there is some asymmetry in terms of their reaction function, because if you look at the Taylor principle it would be very symmetric, if you follow the Taylor rule literally, would you say in the real world, policymakers would react differently, whether it's a cut or a hike?

James Bullard: I think we need to be sensitive to possible disruption in markets and, if it was literally a price increase of that magnitude, that probably would cause a lot of disruption and chaos in financial markets, there have been times when interest rate moves where of that short

term and fight moves were of that magnitude in higher inflation environments, especially in the early 1980s. And you do have the 1994 tightening episode, where the Greenspan Fed increased the policy rate 300 basis points in a single year, and there was a 75 basis point increase in that sequence. And so it can be done, and you know the world doesn't come to an end, but I think we, you know, in the era of transparency, I think you want to be, you might as well be, since you have more credibility, and you can be more transparent, you might as well avoid the disruption that might come from really big surprise moves.

40:34

James Bullard: So I think that's where we are right now. All hope is not lost is the rest of the talk, so it sounds like we're way behind the curve but we're not as far behind as you think, so let's go to the next slide. So the point is that since 1995, central banks have— the Fed in particular— has more credibility than it did in the 1970s and much of that comes from the explicit commitment to inflation target, we have a 2% inflation target we're trying to hit 2% and we're going to take actions to get to 2% and that allows us to also use forward guidance as a tool and so what's happening is that as the Bernanke quote at the beginning, suggests that the indications of future policy rate increases are incorporated into current financial market pricing, even before the policy actions are taken, so this has been a key factor since November and the two year treasury yield and 30 year mortgage rates have increased substantially. So let's go to the next slide. So let me just spend a moment on this slide. The gold line is the two year treasury yield often considered the best near term indicator of the path of monetary policy and 30 year fixed conforming mortgage index rates now trading above five, and around five and a quarter. Now this chart goes back to January 2020, pre-pandemic. So in the vertical line, there is the hawkish shift by Chair Powell when he said that we had to retire the word transitory, and the Fed was going to get more hawkish, so since then there has been a lot of discussion both by policymakers inside and outside the committee, and as a result of that you know you've got a good 200 basis points on the two year end, and maybe something similar on 30 year. So this is all in a context where we didn't actually move the policy rate, except for the 25 basis points at the March meeting. Now, I just want to point out one other thing about this picture that might give you some hope here: the pre pandemic levels of these variables were one and a half, on the two year and a little under 4% on the 30 year fixed mortgage so the current values are actually higher than the pre pandemic values by 100 basis points or so, so that if you think that the pre pandemic levels were you know balanced growth path type levels that were consistent with 2% inflation, and then the current values are actually higher than the pre pandemic value, so you might argue that we're already putting downward pressure on inflation, with the current market pricing, even though we haven't actually moved the policy rate all that much. So that gives you some hope that we are acting appropriately to keep inflation under control.

Markus Brunnermeier: Jim, this is the nominal, and inflation is also way higher than pre-pandemic. If you were to look at the real interest rate, it is still highly accommodative.

James Bullard: Oh yeah. No that's true but that you know where are we compared to the pre pandemic balanced growth path? This picture would say that we've got rates higher than that so in a tailor type calculation and that would be hawkish, you're leaning against the inflation that is out there, plus you probably think some of the inflation is going to naturally moderate. I've got more to say about this so let's go to the next slide.

Markus Brunnermeier: Can I just ask another question which came up in the chat box about the balance sheet activities of the Fed as well, so, if you look at this rate, particularly the long term

rates, to what extent is it do you think forward guidance and to what extent is it the fact that you stop the QE measures, the purchases of mortgage options.

44:58

James Bullard: I think that's a great point and so we're supplementing our hawkish rhetoric on the policy rate with an end to asset purchases and and hopefully in a coming meeting the passive run off of the balance sheet, so you know, there are a wide variety of estimates and how much impact that has longer term yields, but I do think it's putting upward pressure on longer term yields and some of that pricing has already come into the markets as well ahead of us actually making the decision, so that's helping us as well to go in the right direction to get inflation under control. I don't have very much on the balance sheet in these slides here. So the Taylor type rule calculation under generous assumptions recommended a policy rate of three and a half percent. The two year treasury yield might provide a better indicator than the current value of the policy rate about whether— or sorry, where Fed policy is likely to be in the near future. As of April 18, the two year treasury is 246. I think it's about 260 or 262 this morning, so we're only about— if it's 260 we're only 90 basis points away from the recommended value in the simple Taylor rule calculation so under this definition we're still behind the curve by that amount, but not as much as as you would get out of just looking at the policy rate itself. Now, another feature of this and my staff is always reminding me of this is that this doesn't absolve the Fed from raising the policy rate, this is just saying that the effects of raising the policy rate are present in financial markets right now, but we still have to follow through and actually raise the policy rate and in order to ratify the expectations that are out there and embedded in the two year treasury yield and the 30 year fixed mortgage rate. Next slide. So we're not as far behind the curve, but we're still behind the curve, so that three and a half percent baseline was made on very generous assumptions about a Taylor type policy rule calculation. If you thought that the value for  $r^*$  should be higher, then that would lead to a higher recommended policy rate, if you took a broader definition of inflation, such as core PCE inflation or headline PCE inflation, then you get a much higher value for the minimum policy rate definition. So even with this second definition we're still behind the curve, but less than it appears in the first interpretation.

Markus Brunnermeier: So you put a lot of emphasis on communication forward guidance, if I contrast this with other commentators like your former colleague Dudley, he essentially argues forward guidance is dead. That's a sharp contrast. How do you reconcile this? Do you think he has a different perspective on forward guidance, it's more Odyssean rather than communication or Delphian forward guidance, or how would you see this?

James Bullard: Well if he thinks forward guidance is dead, I would challenge how he interprets the two year yields. The two year old has relentlessly gone up since November, because the Fed got more hawkish. That sounds like forward guidance to me. We didn't actually raise the policy rate during that period, except for 25 basis points in March.

Markus Brunnermeier: I mean, it could be that he interprets it as a forward guidance with commitment, such that, even if you want to change it later on, you will be reluctant, or you can't change it later on, and your interpretation is much more communication/signaling what you will do subsequently.

49:08

James Bullard: I don't think it's really completely feasible to be Odyssean in that sense that you can say that I won't react to future circumstances, you can say what you're trying to do, and that you're trying to keep inflation under control, but you're going to have to react to data as it comes

in. I think we found that with the lower for longer, in the earlier era and the Bernanke/Yellen era as well that you could say some things about future forward guidance, that the committee wanted to stay near zero policy rate for a long time, but you had to make that at least partly conditional on economic events as they occur.

Markus Brunnermeier: Coming back to the balance sheet, so one way to communicate is just giving speeches, another way is to really do some balancing sheet operations. It could be that the increase in rates, you see, is mostly because of balance sheet operations as well. And that's, I guess, I can interpret Bill Dudley this way, that if you really want to credibly communicate, you have to do some balance sheet operation on top of it in order to make it credible. Would you argue that actually its traditional communication without balance sheet operation is a very powerful tool and that's what the recent increase relied on primarily rather than doing the QE or stopping the QE and perhaps doing QT subsequently.

James Bullard: Yeah I guess the way I would think of it is that if you have a lot of credibility, you will get 90% of the pricing ahead of time, ahead to actually taking any action. That's because when you say you're going to do something, markets believe you and they price it in right there, but you get an additional reaction on the day that you actually take the move because that's the follow through, and there are always some parts of the market that didn't think you were actually going to follow through, and then they have to reprice at the moment that you do follow through, so I think there is— not everything gets priced in immediately because credibility isn't perfect, but even if it's very good. The 70s, I think, we see the opposite, so the committee would say they were going to do something, they would say they were going to try to keep inflation under control. But markets didn't believe them so that you wouldn't get any price, and you only get 10% pricing on the announcement, or 5% of the pricing on the announcement, and then markets would just wait and see if the committee actually did anything and then all the pricing would come on the day that they actually took the decision, so if you're super credible, all the pricing comes ahead of time and if you're not very credible all the pressure comes out of the action itself. That makes sense?

Markus Brunnermeier: If you deviate subsequently from the past but it's because of a big event like the invasion of Russia into Ukraine, you will not hurt your credibility as much...

James Bullard: Right, though I think if you don't follow through and if you don't follow through, then you have to give a reason, why aren't you following through on what you said you would do before, and if you give a good reason, then you maintain credibility, but if you give poor reason or flimsy reason, as they probably did in the 70s, then the market say Aha I see that you're just trying to jawbone the market and you're not actually gonna follow through, so now your credibility falls, and you have less credibility than you did before this.

52:59

Markus Brunnermeier: This reminds me like when Mervyn King was on the webinar said, you know it's very important that you have a good story behind it, this one, would you agree with that? Whenever you make some moves, it's not just only temporary interest rate moves but also having a good narrative and a good story behind it, for these reasons.

James Bullard: I would agree completely with Mervyn on that, I think that helps you enormously and that's part of the transparency era, is that there's a lot more talking like this seminar right here, but a lot more talking about well here's what we think we need to do, here's why, here's why this will be a good policy, and then through that process, you get good market pricing and

and a good understanding of what's happening, otherwise you'd have kind of chaos, where the two sides aren't connected.

Markus Brunnermeier: So other people often look at financial market conditions and then think of some sort of indices, which includes also risk premia and also asset prices as well, so here you focused very much on the interest rate. To what extent would you put other financial markets indices or indicators into the picture as well? And to what extent have they tightened and you would say that's not familiar how to best communicate it's better to look at certain interest rates, but would you say you take other more niche market indicators that count as well?

James Bullard: Yeah the financial market conditions, a lot of those have equity prices as a key component and I don't like to put equity prices in the same basket. A couple things about equities: one is that the US corporate sector makes a lot of its profits overseas, so when they're reporting earnings, they're reporting, not just what's going on in the US economy, but over half of it is what's going on in the global economy, and so that's a little bit of a disconnect from where we want to be, and also, I think equities are skewed toward Silicon Valley. The top— I don't know, there are different statistics on this— but the top few firms are a big part of key equity indices, and so, do you really want to tie your policy to valuations of future technologies coming from new firms in Silicon Valley? I'm not sure we really want to do that so I don't like the equity component of those indices they're very sensitive to the fact that we have our own financial stress index here at the St. Louis Fed. But that's designed to indicate when there's financial stress and talks about volatility and spreads and other factors, but I wouldn't try to target financial stress index, other than to use it as an indicator about whether we're getting into a situation where there could be a dramatic repricing in markets because of financial stress.

Markus Brunnermeier: And you would argue corporate bond issuance and lending activities, that's also very much Silicon— I mean the big companies focused on less than SMEs, and then I want to add another one if you compare the financial market conditions now to pre-covid, would say they're compatible? Like the mortgage rates, or are the mortgage rates even tighter than before...

James Bullard: What's the question?

56:48

Markus Brunnermeier: So the one question was when you look at financial market conditions, you emphasize the equity component very much, but what about corporate bond issuances, as firms have a harder time to issue corporate bonds, this time or least have to pay a higher interest rate. Is this something we should take into account as well? And if you compare the financial market conditions now with the pre-covid financial market conditions more broadly, where you compared the mortgage rates now with the pre-covid mortgage rates, would this also translate to their financial conditions, more broadly, as well, that now it is tighter?

James Bullard: What I was trying to say is I don't want to look at a financial conditions index to assess the stance of monetary policy because what that's going to say is basically that you want equities to decline and I'm not sure that that's really the right metric for the reasons that are given. Also those equity prices are of course nominal so you really have to look at the deflated equity price index on the bond issuance, corporate bond issuance, I mean a corporation can fund itself through retained earnings, it can fund itself through equity issuance or bond issuance on the margin, they should be indifferent between those, so I'm not sure you can read a lot, I

certainly pay attention to it, but I'm not sure you can rely on corporate foundations itself. I'm going to talk about just a little bit about inflation expectations and then we can go to general questions so let's go to the next slide here. So my story is all about keeping inflation expectations under control, if we keep inflation expectations under control, then actual inflation will follow one easy way to understand why that's true is that the corporations and CEOs today are talking a lot about being able to pass on price increases to their customers, but if you have a lower inflation environment they won't be able to pass on those those price increases to their customers and there won't be inflation in the economy so that's very much the dynamic that we want to get to. If you look at the five year inflation compensation measure from the TIPS market it's 3.36 as of April 19. Expected inflation and actual inflation should be closely related, if you think of the New Keynesian Phillips curve. It says inflation equals beta times expected inflation beta is a number close to one, so basically actual inflation and expected inflation should move one for one according to theory. You've got another term in there, but it has a small coefficient on it so basically the expected and actual inflation should be closely related. They're diverging right now, and this is going to have to be resolved so I've got this picture here. Oh, the next slide. Which is this picture, so I love this picture. I'd like to get your take on it, Markus. So this goes back to 2003, this is the core PCE inflation rate the gold line measured from one year earlier and the five year breakeven inflation rate, the blue line. Strictly speaking, you wouldn't think that these had to be closely related, but the New Keynesian analysis says that they should be closely related. The breakeven inflation rate in particular is CPI based and has food and energy in it. So, but these are you know correlations about .64, so I would say, this is a huge victory for the new Keynesian Phillips curve. But if you look at the far right hand side of this after the pandemic recession here, you see that they're diverging, core PCE inflation is 5.4% latest reading, and five year breakeven inflation rate is moving up, so this picture tells me that either expected inflation is going to have to go a lot higher or core PCE inflation is going to have to come down, and somehow this is going to have to be resolved, and if it gets resolved by expected inflation going higher, that's going to be very hard to fix in the future, and that's why the Fed should move quickly now to get the expected inflation lower than the core PCE inflation rate, which will fall behind and come back down to 2%, so I think that this is the part of the game that's the most important, right here is the circle area over to the right hand part of this chart.

1:01:55

You can look at survey measures of inflation expectations and other types of measures, they're all certainly near term over the next five years, or three years, they're all showing you know much higher numbers that we've seen in the past and so basically, the same story is being told that inflation expectations aren't exactly unmoored at this point, but they're threatening to become unmoored, as you can see that blue line is at the very highest value that it is anywhere else in this chart, so this is a threatening moment for inflation expectations. That's the thing that we have to get under control will be back down to 2%.

Markus Brunnermeier: Do you think inflation expectations are a continuous process, or is it like something at some point it snaps and it's broken?

James Bullard: I think it's continuous and the credibility of Fed is continuously evolving as well, and it does depend on the actual data that's coming in, so that's all determined in general equilibrium, but this is what you want to watch here, I think, is that the market is saying according to this anyway that inflation over the next five years, headlines CPI inflation over the next five years, will be three and a third percent which maybe is something that's still anchored but if it starts to go quite a bit higher from here, it would become unanchored and you'd have a lot, it might take 10 or 15 years to get that under control.

Markus Brunnermeier: And a lot of the bond prices are driven by the correlation between stocks and bonds, and traditionally it's the case that the correlation was even negative over the last decade, since we have the inflation targeting framework, but if this goes a little bit wacky, then we might see large bond movement purely from this correlation between stocks and bonds changing, and that might affect the five year breakeven inflation rate as well. Do you see any problems coming up on that front or any things we have to watch out for?

James Bullard: I think that's right: the bond market right now is not looking like a very safe place to be with rates rising, so traditionally I think many investors felt like they could park their investment money in the bond market temporarily while they were sizing up other types of investments that they wanted to make. With rates rising sharply and the Fed having to act aggressively to keep inflation under control, it's a difficult environment for that sort of strategy and you're hearing a lot of talk about that in financial markets, so they'll have to use other methods, I guess, to allocate their investment dollars.

Markus Brunnermeier: And the five year breakeven inflation rate, do you think the activity of the Fed buying TIPS, or buying regular treasuries, do think that will impact the regular breakeven rate...

James Bullard: Maybe the Fed shouldn't be buying in the TIPS market. I think that's meant to be relatively passive but I would prefer to get just a straight read out of the breakeven inflation rates and not have us be in there, but I don't think we're the marginal component of that.

1:05:37

Markus Brunnermeier: So I think that's a very important point you're making that you know the inflation expectations are losing inflation expectation, or the anchor is more continuous variable, and that gives actually more room to protect it, otherwise it's a discontinuous variable if it breaks, you only see the ex-post them and it's hard to re-anchor.

James Bullard: Yeah that's why I'm saying it's more about you know, in the 70s and 80s, there was a lot of game theory about establishing Fed credibility, you had Kydland/Prescott, and Barro/Gordon and the subsequent literature, and that was all game theoretic literature. Once you have inflation credibility, then you can go to an inflation target, then you go to something like a new Keynesian model but that's local analysis around a credible steady state so I would like to get people to think more in terms of the game theory literature, where you need to establish credibility, you need to do enough to drive inflation expectations back to 2% and reestablish the Fed credibility.

Markus Brunnermeier: On the other end, so you look very much at the bond traders' expectations, if you look at household expectations for the Michigan survey and all of this, I think the increase is more dramatic there. Which expectations would you emphasize the most? If it is consumption, I guess the households expectations are more important or firms' expectations for wage setting and elements like that. So where do you see the emphasis, we want to look at various expectations, of course, but which ones would you emphasize more?

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01:14:15.900 --> 01:14:22.230

James Bullard: Yeah, I consistently want to emphasize the TIPS market even though, you know, I am aware of the idiosyncratic pieces of the TIPS market but I like that, because it's sensitive

to incoming data, and so, for what I do day to day, I'm seeing like what did the TIPS market think about this or that? How are they assessing the situation and, of course, markets aren't always right and I understand that, too, but the survey based measures, I think, are harder to take seriously. I think, for instance, they tend to align by political party, they tend to be different for men and women, for instance. I'm not completely convinced that everybody that's answering a survey really has a dog in the hunt, so to speak, on whether inflation is 3% or 5%. Nevertheless, I would look at them and, if you look at those charts, they are generally speaking, they're all up so I think there again you're getting the same message that people are expecting higher inflation at least over the near term and that could devolve into just permanently higher inflation expectations and economy, and that would be very difficult to get out of the economy. We can go to the next slide. I think this is the last slide so yeah. So this is the summary slide I've given the two interpretations of behind the curve: one is that we're quite a ways behind the curve, the second, though, is that we're not as far behind, as it appears, because we've been doing a lot of forward guidance, we have a lot of credibility and not all of the inflation is inflation that is persistent enough that the Fed will have to actually act against it and so those factors make it so that we're not as far behind, as it appears, but still we would have to— the last part there, the last bullet says we still have to increase the policy rate to ratify the for guidance as previously been given and if we don't do that, our credibility would slip so you can go to the final slide here.

1:10:11

Markus Brunnermeier: And let me just ask you, one thing you didn't mention it all, which was second round effects and the wage/price spirals, you don't see this at all and you're worried about that. Is this something we should watch out for?

James Bullard: Yeah I think wage price spirals are not an equilibrium, are not a cause of inflation, so I think that's a symptom of inflation. If you have an economy like Turkey, which has 63% inflation, wages and household incomes are going to have to go up by 63% per year somehow in order to maintain their standard of living, and if they don't, then the standard of living is going to be declining, but that's not causing the inflation in Turkey. That inflation in Turkey is due to the monetary policy that they've been wedded to over the last decade or more. So I think the same is true for countries with less significant inflation issues. You have to look to the Central Bank, and not to the labor market to understand where inflation is coming from and who can do something about the inflation.

Markus Brunnermeier: Because there's some voices out there saying okay, we should see some wage increases, but as long as they're just compensation for loss of purchasing power from the past inflation it's fine, as long as that don't translate into a into a wage increase process, sometimes also translating expected wage increase in the future, it might be okay to contain inflation. But you would focus much more on the price setters, on the firms, rather than the wage bargaining element?

James Bullard: I think what happened in the 1980s when inflation came under control is you had, in the corporate sector, you had low cost producers come in and take market share away from others, and produce sort of basic products at a low cost, and that was very popular in the 1980s. I would say Walmart was sort of a poster child for that and then that took away pricing power from other parts of the market and the inflation came to an end. I mean I don't fault workers, workers are just trying to get the very best outcome that they can for themselves and for their families, so if they can switch shops and get paid more, all the more power to them, I think that's great. But the question is whether the corporate sector thinks that they can pass on

price increases to their customers, or do they think they're going to lose market share, if they do that, perhaps permanently, and if you get that dynamic going, then, and then the inflation comes to an end, so I would emphasize that side of the picture, a lot more household side of the picture.

Markus Brunnermeier: Then coming back to the interest rates, so there's some questions by Sharmin and others. If there's a runoff of the MBS of 50 billion let's say and treasuries another 50 billion, what do you estimate how much will this affect the interest rates going forward?

1:13:45

James Bullard: On the balance sheet?

Markus Brunnermeier: A runoff on the balance sheet for MBS, mortgage backed securities and treasuries, let's say 50 billion each, is that priced in in the interest rate or you will see, there will be more elasticity, I mean do you have some elasticity estimates for that?

James Bullard: I think it's partially priced in, and I think the remainder will come when we actually start to take action, because again we don't have perfect credibility on this so didn't all get priced in right away, but certainly anticipated by markets. I think the estimates of exactly how big these effects are all over the map, we do have a survey by one of our staff economists here, Chris Neely has come out in the journal of economics literature is forthcoming and that paper is a comprehensive survey of quantitative easing, quantitative tightening, and its effect in financial markets around the world. But what you'll find is that the confidence bounds around these estimates are quite wide. I do think it has some impact, and I do think if all else equal, it's a curve steeper and so maybe some of that has been priced in just recently when it became more apparent that the committee was contemplating acting sooner on balance sheet runoff and then previously thought.

Markus Brunnermeier: So some question which came up earlier was you essentially viewed the U.S. very much like a closed economy. But of course moving interest rates will also affect the exchange rate of the dollar, with respect to other economies in particular, if there are disruptions in other parts of the world, as well as flight to safety into the dollar as well. To what extent are exchange rate considerations playing into the decision making, as well, and how is it different from 73 and 84, the dollar was very different. In the mid 80s, the dollar had a huge boom as well, was this part of the story, which you know helped or was it hurting the economy, in your view? And this dollar strength is a consideration to take into account as well?

James Bullard: Yeah I'm happy to take it into account, but when i've looked at charts trade weighted value that dollar, okay the dollar's, maybe a little stronger now but it's not all that different from where it's been over the last you know five to seven years according to that chart. So I think when people are talking about this issue, of course, it is very important to traders if they're actually trading in various currencies, but from a macro perspective it's not clear to me that the dollar is, particularly different valuation globally than it was, let's say, five years ago on average over that five year period so and then if you look at Japan, okay well Japan is sticking with their yield curve control policy in the face of the Fed being far more aggressive in trying to contain inflation, so traders are trading on that and so you've got a big change in the yen-dollar exchange rate, so I think for individual countries, you can you can tell a story. And US-Europe, of course, you got the war going on, special factors and so on, so I mean I'm happy to look at it, but I'm not really seeing anything right now that makes me think that that's a dominant factor for what policy should be right.

1:17:44

Markus Brunnermeier: And do see essentially this huge fiscal stimulus, causing the inflation and now running off this fiscal stimulus, how to bring inflation down as well, do you think that's just one component, but the major component to look at.

James Bullard: Yeah, I guess if we had this seminar last year, and I did get asked in let's say the first quarter of 2021 would there be high inflation in 2021, I said well all the ingredients are there. If you're a monetarist the M2 has exploded, and so the money growth is there. If you're a fiscal policy, a fiscalist on inflation, well there's been a huge amount of fiscal action, including the December 2020 package passed by Congress, and then the March 2021 package amounting to \$3 trillion dollars or so, so lots of fiscal action. If you were a Phillips curve person, then we also had a very tight Labor market as well that was likely to get tighter and so we thought that was the cause of inflation, we were going to have that in 2021 so all those things converge in 2021 so, no matter which theory that it was your favorite theory, it was all pointing to higher inflation and indeed we ended up getting higher inflation now. The hope would be that the fiscal part would fade over time and we're taking away a lot of the monetary accommodation and so you will be able to get inflation back to target. The risk is all about inflation expectations becoming unmoored. If that happens, it will be much harder to get inflation under control, but, but I think we're moving appropriately to take care of that.

Markus Brunnermeier: Great thanks a lot Jim it was fascinating to hear your perspective and all the theory is pointing in the same direction, that's probably comforting, in particular, if you want to be a policymaker, and it's easy to make decisions, but for an academic it's makes it harder to identify which theory is the right one, I guess, and perhaps we see it now when goes in the opposite direction, perhaps, that would be some differentiation and that we can discriminate because of theories a little bit.

James Bullard: That's right, the problem with being a researcher, is that the world doesn't provide the right data.

Markus Brunnermeier: Yes, one has to be clever to look from the right angle to get the right answers. Thanks again and we stay in touch and thanks for being with us and also all the participants and hope to see you again in two weeks. Next week, there will be no webinar so I will see you again in two weeks.

James Bullard: Very good, love it, alright

Markus Brunnermeier: Take care.