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# **Monetary Policy Challenges in a New Inflation Environment**

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**FEDERAL RESERVE BANK OF CHICAGO**

The views expressed today are my own and not necessarily  
Those of the Federal Reserve System or the FOMC.

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- I. I would like to thank the Money Marketeters for their kind invitation to speak here again today.
  - A. And before I continue, I need to remind you that my comments this evening are my own and not necessarily those of the Federal Reserve System or the Federal Open Market Committee (FOMC).
- II. It has been just over five years since I was last here. At that time I offered my thoughts on monetary policy in a talk with the riveting title “Monetary policy: Recurring themes.”<sup>1</sup>
  - A. To refresh your memory, in 2012 the Federal Open Market Committee was grappling with the zero lower bound (ZLB) on the federal funds rate. I argued then that we should consider forward guidance for the federal funds rate that was based on numerical thresholds for the unemployment rate and inflation. I believed such an outcome-based policy could ensure we added enough monetary stimulus to boost employment while also providing a safeguard against inflation rising too high.
  - B. Of course, times are much different now. The real economy is performing well, and we essentially have met our employment mandate. The FOMC has begun to remove accommodation, increasing the federal funds rate four times since late 2015. But inflation has remained stubbornly below our 2 percent objective.<sup>2</sup> How should this subpar outcome influence our policy strategy?

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<sup>1</sup> Evans (2012).

<sup>2</sup> In January 2012, the FOMC set 2 percent inflation—measured by the annual change in the Price Index for Personal Consumption Expenditures (PCE)—as the explicit inflation target consistent with our price stability mandate. See Federal Open Market Committee (2012c).

- III. Today, I want to focus more on this recurring theme that monetary policy has to be outcome-based.

## Outcome-Based Monetary Policy

- **Lesson 1: Outcome-based policies are especially critical during crises and indispensable at the ZLB**
- **Lesson 2: Symmetric inflation target is a challenging objective for conservative central bankers**
- **Lesson 3: Risk-management against ZLB likely a key best-practice consideration for some time**

- A. All central banks have mandates: All have inflation objectives, and the Federal Reserve has a dual mandate that includes supporting maximum employment.<sup>3</sup> Some commentators judge central banks by how good our forecasts are or how closely monetary policy follows a particular rule. Although these are instructive ingredients for the policy process, they are not the ultimate goal. Our goal is to hit our objectives. Therefore, to judge success, the appropriate metric is how actual outcomes for inflation and employment measure up against our mandated policy goals.

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<sup>3</sup> For more details on the Fed's dual mandate, see <https://www.chicagofed.org/research/dual-mandate/dual-mandate>.

- B. Today I will discuss three lessons around this theme that struck home for me from our experience in the aftermath of the Great Financial Crisis: First, outcome-based policies are especially critical during crises—and they are indispensable in the face of the zero lower bound; second, a symmetric inflation target is a challenging objective for conservative central bankers to deliver on; and third, given the ZLB, risk-management likely will remain a key best-practice consideration for policy decision-making for some time to come.
- IV. Lesson 1: Let's start with the lesson that outcome-based policies become even more critical during crises and are indispensable in the face of the ZLB.

### Lesson 1: Outcome-based policies especially critical during crises, indispensable at the ZLB

- ***Do whatever it takes mentality***
  
- **2012: Explicit linkage to economic outcomes**
  - **Open ended QE3: Continue purchases until substantial improvement in labor market**
  
  - **Threshold forward guidance: Funds rate at ZLB as long as unemployment rate above 6-1/2 percent and inflation no higher than 2-1/2 percent**

- A. Tough monetary policy challenges are not new. Economic fundamentals are subject to varying degrees of volatility over time. But there were crucial differences between the Great Financial Crisis and previous episodes.
1. First, there were the historically large magnitudes of the shortfalls from our policy objectives.

2. Second, the earlier episodes began with the policy rate high enough above zero that there was a large enough cushion for cutting rates to successfully combat disinflationary forces. This time, however, we ran out of that cushion in December 2008, when policy rates were reduced to their zero lower bound.
- B. In such circumstances, it is essential to credibly commit to achieving our policy goals. Stating the goals clearly is crucial, but so are actions that display a “do whatever it takes” mentality. This requires a willingness to take bold steps.
  - C. You all are familiar with the impressive set of unconventional monetary policy tools the FOMC used after hitting the ZLB: for instance, QE1, QE2, calendar-date forward guidance, and the maturity extension program.<sup>4</sup> (And I am deliberately omitting the special liquidity programs.) But these still were not sufficient to meet our policy mandates.
  - D. By 2012, the FOMC, as well as other policymakers around the globe, had recognized the need for further actions to achieve their policy objectives. At the Fed, we made what I think were two of our most important and successful nontraditional policy moves that year.
    1. The first was our open-ended QE3, which began in September 2012 and committed us to purchase long-term assets until we saw evidence of substantial improvement in the labor market.<sup>5</sup> The second was our December 2012 forward guidance that stated we would hold the fed funds rate at the ZLB at least as long as unemployment was above 6.5 percent and while inflation didn’t exceed 2.5 percent.<sup>6</sup>
    2. I believe the explicit linking of these expansionary policies to economic outcomes was key to their success. And it makes them outstanding examples of outcome-based policies.
      - a) *Now, as former Federal Reserve Chair Ben Bernanke likes to say, while QE doesn’t work in theory, it does work in practice.*<sup>7</sup>

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<sup>4</sup> For further details on the quantitative easing (QE) programs (or large-scale asset purchases), forward guidance, and the maturity extension program, see the Board of Governors of the Federal Reserve System (2013, 2015a, 2015b).

<sup>5</sup> See Federal Open Market Committee (2012b).

<sup>6</sup> See Federal Open Market Committee (2012a).

<sup>7</sup> Berkowitz (2014).

- b) The FOMC was pretty confident that QE3 and the thresholds-based forward guidance would provide stimulus. But there was substantial uncertainty over how and when these policies would affect the economy. So by linking the policies' open-ended duration to progress toward our policy mandates, we assured markets we were committed to doing whatever it took to improve outcomes. This bolstered the important self-reinforcing linkages between more positive private sector expectations and better current economic outcomes.
- 3. In my opinion, these policies successfully demonstrated strong commitment to our objectives—and they produced results.
  - a) Unemployment began to fall more quickly than anticipated in 2013, and as a result we were able to scale back the QE3 purchases beginning in late 2013 and forward guidance in March 2014. Today, we have essentially returned to full employment in the U.S.—indeed, at 4.3 percent, the unemployment rate is somewhat below the range FOMC participants see as the long-run normal level.
- E. What comes next for outcome-based monetary policy?
  - 1. To be sure, gross domestic product (GDP) growth was weak in the first quarter. But that seems to have been transitory, and the data in hand point to a strong rebound in the second quarter.
    - a) Last week, the FOMC released its quarterly Summary of Economic Projections (SEP).<sup>8</sup> The median participant sees GDP growth of 2.2 percent for 2017 and a slightly more modest pace of expansion in 2018 and 2019.
    - b) The unemployment rate is expected to be about 4-1/4 percent throughout the projection period, so moderately below its longer-run level of 4.6 percent.

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<sup>8</sup> See Federal Open Market Committee (2017a) for the most recent summary.

2. Unfortunately, low inflation has been more stubborn. From 2009 to the present, core PCE inflation has generally underrun 2 percent—and often by substantial amounts.<sup>9</sup> This is eight full years below target. This is a serious policy outcome miss.
  - a) We made some noticeable progress toward our inflation goal when it rose from 1.4 percent in 2015 to 1.7 percent in 2016. But, as of last April, core PCE inflation had slipped to 1-1/2 percent, and last week's Consumer Price Index (CPI) data do not bode well for PCE inflation in May. Furthermore, this slowdown has occurred as some of the earlier headwinds holding down inflation—declining energy prices, a stronger dollar, and resource slack—have receded.
  - b) The median FOMC participant forecasts core PCE inflation to be 1.7 percent (this is two-tenths below the March projection) but then sees it rising to our 2 percent target by the end of 2018.<sup>10</sup>
3. My inflation outlook is not quite as sanguine as this projection. I also see downside risks to this outlook. So I believe we need to demonstrate a strong commitment to hitting our symmetric inflation objective sooner rather than later. That is, we need to pursue an outcome-based policy to actually help us achieve our inflation goal.

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<sup>9</sup> While our objective is in terms of overall PCE inflation, core inflation—which strips out the volatile food and energy sectors—is a better gauge of sustained inflationary pressures.

<sup>10</sup> Federal Open Market Committee (2017a).

- V. This leads me to Lesson 2: A symmetric inflation target can be a tough policy objective for conservative central bankers to deliver on.

## Lesson 2: Symmetric inflation target challenging for conservative central bankers

- **Barro-Gordon (1983): Benevolent central bankers generate an inflationary bias**
- **Rogoff (1985) Solution: Appoint conservative central bankers**
- **Lesson learned in the 1970s: Don't try to permanently deliver  $u < u^*$**
- **Conservative central banker may deliver  $\pi < \pi^*$  on average => public may think  $\pi^*$  a ceiling**

- A. In addition to core inflation underrunning 2 percent for some time, there has been accumulating evidence since the summer of 2014 that long-run inflation expectations have drifted down.
1. Here, the declines in TIPS (Treasury Inflation-Protected Securities) inflation breakevens and consumer surveys are particularly telling.
  2. And, clearly, lower inflation expectations make it all the more difficult for the central bank to achieve its inflation objective.
- B. Low energy prices, the lack of international inflationary pressures, and the low core inflation experience certainly have contributed to this drop in expectations. But I think there is an institutional factor in play, too. Namely, it is difficult for some central bankers to tolerate above-target inflation even for limited and controlled periods of time. When the public recognizes this low-inflation bias, it forms expectations accordingly.



- C. Here, I am thinking of the solution to the Barro–Gordon (1983) dilemma of time-inconsistent decision-making as articulated by Ken Rogoff (1985). This theory emerged to explain how a well-intentioned Federal Reserve could end up delivering the excessively high inflation we experienced in the 1970s.
1. In the classic Barro–Gordon world, benevolent central bankers seek to bring the unemployment rate below its sustainable natural rate,<sup>11</sup> and they set policy with discretion every period. This policy strategy produces a bias toward excessively low unemployment. The public understands this bias, and adjusts its expectations accordingly. In the Barro–Gordon analysis, this combination of policy bias and public expectations generates above-target inflation.
  2. This outcome is something that central bankers wish to avoid. But how do you do so? Many economists and policymakers think the solution lies in central banks following policy rules rather than discretion. But Professor Kenneth Rogoff provided a different solution that didn't involve policy rules.
  3. Rogoff suggests appointing conservative central bankers who place less weight on achieving lower unemployment. This will correct for the upward inflation bias that Barro and Gordon noted and can deliver lower average inflation through standard period-by-period decision-making.
  4. Now, a crucial element underlying the Barro–Gordon excess inflation result is that soft-hearted policymakers will try to pursue unemployment below the sustainable natural rate. But if central bankers learn they should not attempt to permanently deliver unsustainable levels of unemployment, then no bias correction is needed.
- D. Indeed, I think the economic literature and actual inflation experience of the 1970s and '80s taught all monetary economists this lesson.
- E. I spent my formative high school and college years in the 1970s, when inflation ranged between 6 percent and 10 percent. And then I spent my formative years as a monetary economist in the disinflations of the 1980s and 1990s.

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<sup>11</sup> The natural rate of unemployment refers to the rate of unemployment that would predominate over the longer run in the absence of shocks to the economy.

1. During most of this time, the direction of monetary policy was always pretty clear: Inflation was much too high—well above any sensible inflation objective—and monetary policy tried to engineer lower inflation whenever it was opportune.
  2. And there were some truly substantial Fed tightenings to bring inflation down, some of which were associated with painful recessions.<sup>12</sup> Cumulatively, the FOMC's resolve to pursue low and stable inflation in the Volcker–Greenspan era was strong and obvious—and it was successful.
- F. So, central bankers appear to have learned to avoid the Barro–Gordon inflationary bias. Indeed, the May 2003 FOMC statement<sup>13</sup> even explicitly acknowledged a new two-sided risk, as inflation then was flirting with uncomfortably low levels.
- G. After a brief respite from 2004 to 2008, we have again been living with the risk of too-low inflation. Unlike the 1970s, '80s, and '90s, when policymakers were starting from inflation and inflation expectations that were too high, today we are starting from a position in which they are too low.
- H. But given this history, Rogoff-appointed conservative central bankers may find it difficult to believe there is no bias to correct. Indeed, think how often you hear economists and policymakers say that discretionary policy leads to excess inflation without also stating the precondition that the public believes policymakers are pursuing unsustainably low unemployment. This misreading would lead conservative central bankers to pursue overly restrictive conditions on average and deliver lower-than-optimal inflation.
- I. To state this a bit differently, conservative central bankers will find it difficult to ever deliver inflation above the policy objective. In this case, our 2 percent target would not be a level around which inflation fluctuates symmetrically. Instead, it would become a ceiling for inflation.

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<sup>12</sup> Romer dates and Rudebusch's 1988 event are good examples of substantial policy tightenings. See Romer and Romer (1989) and Rudebusch (1995).

<sup>13</sup> Federal Open Market Committee (2003).

1. Moreover, the public makes inferences regarding the inflation target based on our past performance, not just on our words. When they see inflation below 2 percent for eight-plus years, they might logically think 2 percent is a ceiling. If so, the public would likely push down their expectations for average inflation over the longer run, making it all the more difficult for the central bank to achieve its inflation objective.
- J. The current situation is even more difficult when we recognize that lower U.S. productivity and labor force growth have reduced long-run output growth. Along with massive global demand for safe assets, these trends result in lower equilibrium real interest rates.<sup>14</sup> Lower equilibrium real rates and lower expected inflation add up to lower nominal policy rates in the steady state. All told, monetary policy will likely have less headroom to provide adequate rate cuts when large disinflationary shocks hit the economy. In other words, the risks of returning to the ZLB may be higher than we would like for some time.
- K. This brings me to my third and final lesson, which is regarding risk-management.

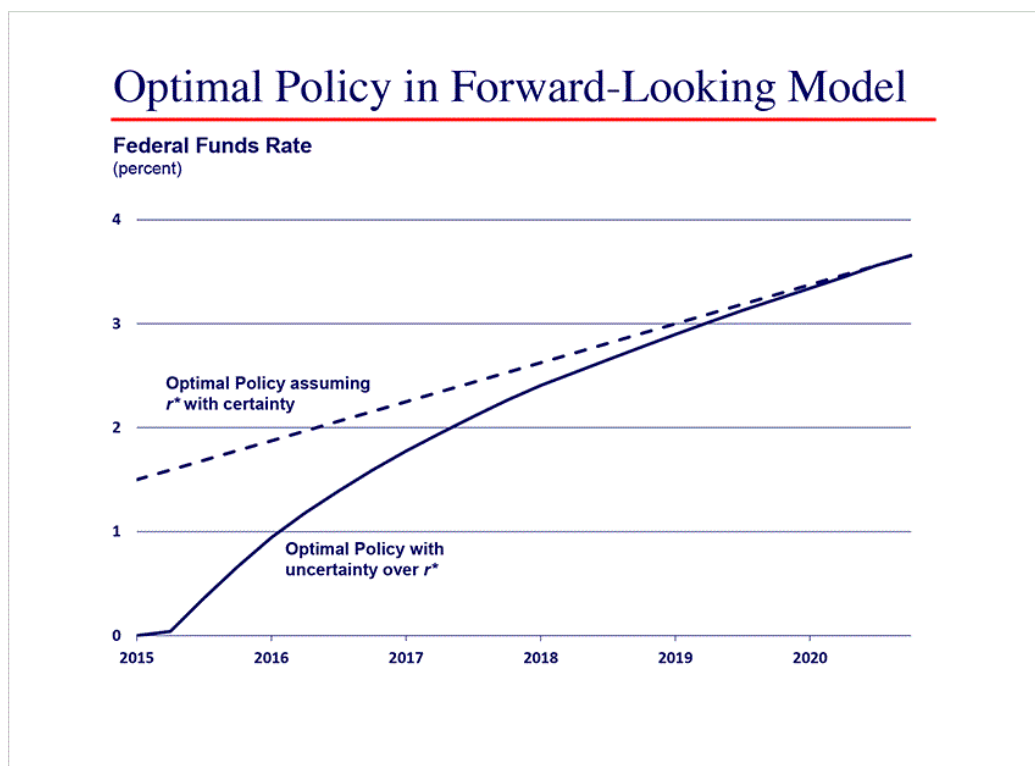
### **Lesson 3: Risk-management against ZLB likely to be key consideration for some time**

- **Unconventional policy tools effective, but second best**
- **The more likely shocks that might take you to ZLB in future, the more accommodative optimal policy today  
-- Evans, Fisher, Gourio, Krane (2015)**

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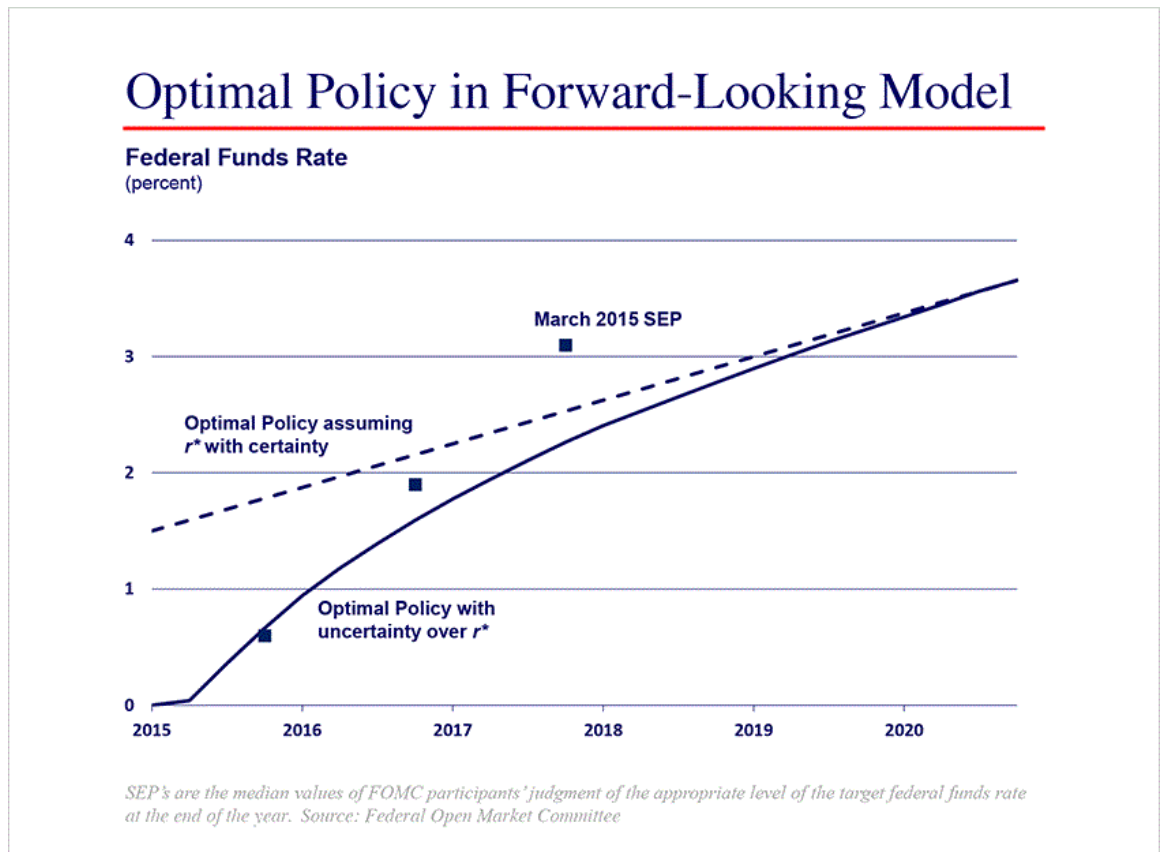
<sup>14</sup> Equilibrium real interest rates are the rates consistent with the full employment of the economy's productive resources. The equilibrium interest rate is sometimes called the "natural" or "neutral" interest rate.

- VI. Lesson 3: Unconventional tools are effective, but they are unconventional because conventional tools are stronger. So the more likely we are to encounter shocks that might take us to the ZLB in the future, the stronger we should lean policy ex ante in the direction of accommodation—that is, we need to manage against the risks of the ZLB. And with a greater risk of low equilibrium real rates, we now might be facing more elevated ZLB risks than in earlier times.
- A. Back in 2015 I wrote a Brookings conference paper with three of my colleagues at the Chicago Fed—Jonas Fisher, François Gourio, and Spencer Krane. We formalized these risk-management arguments in the workhorse forward-looking New Keynesian model, as well as in a second standard backward-looking macro model.<sup>15</sup>

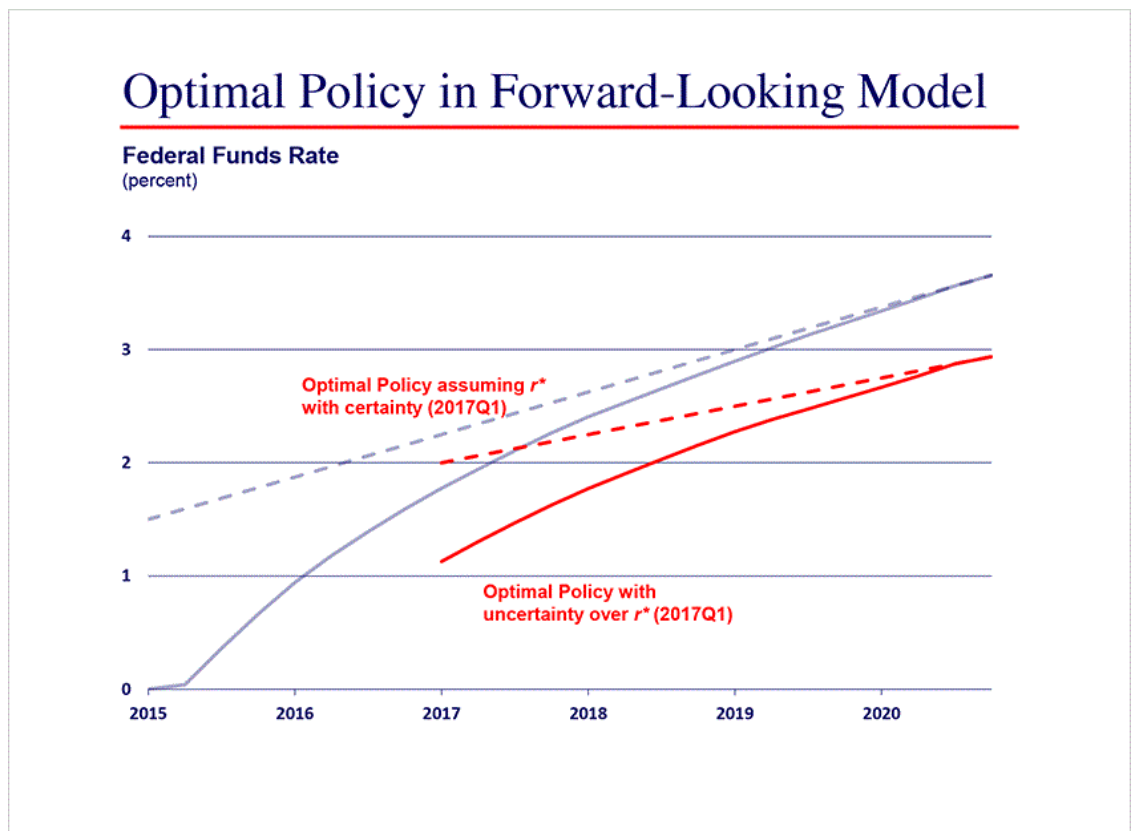


<sup>15</sup> Evans et al. (2015).

- B. We considered a scenario in which the current natural real interest rate, or  $r^*$ , was temporarily low and expected to rise slowly over time. But the actual path for the rate was subject to random (and serially correlated) shocks. This means that a bad shock could drive you to the ZLB. If  $r^*$  was known with certainty, the optimal policy would set the policy rate to follow upward the path for the equilibrium rate. But with an uncertain  $r^*$  and concerns about ZLB risks, we show that optimal policy prescribes a lower rate path to reduce the risk that future unexpected shocks would drive the economy to the ZLB.
- C. The chart displays the results from the New Keynesian model. The dashed line shows the optimal nominal rate if policymakers and the private sector assumed there would be no future shocks to the path for the real rate. The solid line shows the optimal policy that accounts for uncertain shocks that may drive the economy to the ZLB. This risk-management adjustment is quite large, particularly early in the simulations.



1. For reference, the squares here are the median end-of-year forecasts for the federal funds rate from the March 2015 SEP.<sup>16</sup> As you can see, the median SEP policy path for 2015–16 wasn't that different from the optimal policy prescription of this simple model.
- D. In this exercise, the starting point was calibrated to economic conditions that existed in the first quarter of 2015 and we assumed that the natural real rate was minus one-half percent and would slowly trend up over time to 1-3/4 percent. Given our 2 percent inflation objective, this is consistent with the 3-3/4 percent forecast for the long-run nominal federal funds rate in the FOMC's March 2015 Summary of Economic Projections.<sup>17</sup>
- E. However, today, a little over two years later, most economists now believe the long-run real rate in the U.S. is lower—maybe more like 1 percent, according to the June 2017 SEP.<sup>18</sup> The next figure displays how this new endpoint influences our results.

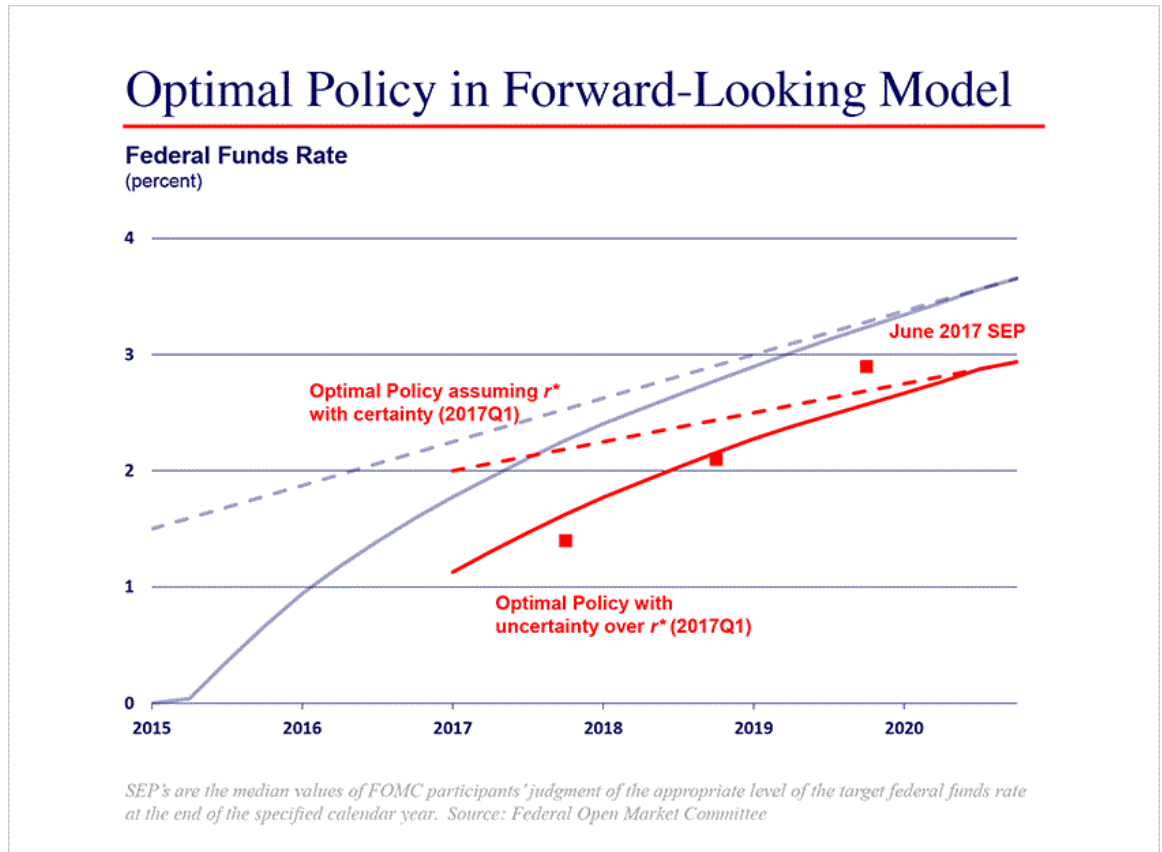


<sup>16</sup> Federal Open Market Committee (2015).

<sup>17</sup> Ibid.

<sup>18</sup> Federal Open Market Committee (2017a). The 1 percent real rate is inferred from the SEP median long-run nominal federal funds rate forecast of 3 percent and the FOMC's 2 percent inflation target.

- F. Fisher, Gourio, and Krane (2017) separately reran our Brookings exercise calibrating economic conditions to the first quarter of 2017 and assuming  $r^*$  trends up from zero to 1 percent. As before, the solid and dashed red lines in this chart are the resulting policies with and without adjustment for uncertainty over  $r^*$ .



- G. Look at how in 2017Q1 the blue and red dotted lines are pretty close. So our current starting point isn't far from the 2015 exercise. But the new lower  $r^*$  endpoint of 1 percent means higher odds of hitting the ZLB. Hence, the adjustment for risk-management—the difference between the dashed and solid lines—is even greater now than it was at this point in the 2015 simulations. Note, too, that the solid and dashed lines do not converge until the policy rate is nearly back to neutral, meaning the role for risk-management persists until that time.
- H. I should emphasize that these are very stylized models, calibrated to approximate just a few macroeconomic data. The analysis abstracts from a range of important modeling and monetary policy issues. So the results are only illustrative.

1. Nevertheless, they do suggest that ZLB risks associated with a low long-run value of the natural rate of interest have the potential to influence risk-management considerations for some time during the policy rate normalization process.
2. Taking extra care to avoid the substantial costs of hitting the ZLB increases the odds for achieving the central bank's policy goals.

VII. Let me conclude with a brief discussion of the current monetary policy environment.

- A. As you know, the Committee voted to increase the target range for the federal funds rate to 1 to 1-1/4 percent.<sup>19</sup> In the most recent Summary of Economic Projections, the median participant thought that appropriate policy would incorporate one more 25 basis point rate hike in 2017—bringing the total for this year to three—and then three more increases in each of 2018 and 2019.<sup>20</sup> And as Chair Yellen stated in her press conference's opening remarks, the Committee expects to begin gradually reducing the size of the Fed's balance sheet sometime this year.<sup>21</sup>
- B. It remains to be seen whether there will be two rate hikes this year, or three, or four—or exactly when we start paring back reinvestments of maturing assets. Regardless, the important feature is that the current environment supports very gradual rate hikes and slow preset reductions in our balance sheet.
- C. I have already touched on the reasons why I support this approach. To recap,
  1. I view slow removal of accommodation as necessary support to symmetrically achieving our 2 percent inflation goal in a timely fashion. We have to assure the public that we recognize the new low-inflation environment and that we are not overly conservative central bankers who see our inflation target as a ceiling.
  2. And given we may be facing more elevated ZLB risks for some time, risk-management considerations argue for tilting toward accommodative policies that help reduce the risk of returning to the ZLB.

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<sup>19</sup> Federal Open Market Committee (2017b).

<sup>20</sup> Federal Open Market Committee (2017a).

<sup>21</sup> Yellen (2017).



- D. Much ink will be spilled on the importance of two, versus three, versus four rate increases this year and subplots regarding our balance sheet policy. I don't want to get hung up over small differences. Ultimately, our exact actions will appropriately be driven by how events transpire to influence the outlook for achieving our policy goals. This steadfast adherence to meeting the Federal Reserve's mandated objectives will be the overarching determinant of monetary policy.

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