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# **Lessons Learned and Challenges Ahead**

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**FEDERAL RESERVE BANK OF CHICAGO**

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- I. I would very much like to thank the Bank of Japan (BOJ) and the Institute for Monetary and Economic Studies for their kind invitation to speak here today. This has been an outstanding conference, and it's a real pleasure to be here.
  - A. And before I continue, I need to remind you that my comments here today are my own and not those of the Federal Reserve System or the Federal Open Market Committee (FOMC).
  
- II. Back in October 2010, I was participating on a policy panel at a Boston Fed conference. I distinctly remember some very wise counsel provided by Kazuo Ueda, professor of economics at the University of Tokyo and a former member of the BOJ Policy Board. In essence, he said to the rest of us, whatever you do, don't end up in the situation that Japan has faced for so long.
  - A. I have always remembered that advice.
  
- III. Today, I will focus on lessons from the U.S. experience after the Great Financial Crisis. To me, the overarching theme is that monetary policy has to be outcome-based.
  - A. All central banks have mandates — we all have inflation objectives, and the Federal Reserve has a dual mandate that includes supporting maximum employment.<sup>1</sup> Some commentators judge central banks by how good our forecasts are or how closely monetary policy follows a particular policy 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>1</sup> For more details on the Fed's dual mandate, see <https://www.chicagofed.org/research/dual-mandate/dual-mandate>.

- B. To amplify this theme, today I will discuss three lessons from the aftermath of the Great Financial Crisis that struck home for me: First, outcome-based policies are especially critical during crises — and are indispensable in the face of the zero lower bound (ZLB); second, a symmetric inflation target is a challenging objective for conservative central bankers to deliver in; 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. So, now that I've given you this executive summary, let's start with some familiar background. Financial strains began to emerge intensely in the summer of 2007, and the FOMC initiated its first policy rate cut in September of 2007. That, by the way, was my first FOMC meeting as the Chicago Fed president.
- A. As the strains intensified through the summer of 2008, the FOMC was able to respond with deeper cuts in the federal funds rate: By August 2008, the federal funds rate target had been reduced more than 300 basis points to 2 percent.
  - B. But in December 2008 — following the bankruptcy of Lehman Brothers, the ensuing financial dislocations and the intensification of recessionary dynamics — the FOMC's attempts to provide further accommodation encountered the zero lower bound.
  - C. Yet we still were enormously far from our policy objectives: Unemployment had reached nearly 7 percent and was clearly headed higher, and disinflationary forces were fierce. So unconventional policies became essential. Essentially, it was no longer business as usual for monetary, and for me the first lesson emerged.
- V. Lesson #1: Outcome-based policies become even more critical during crises and are indispensable in the face of the ZLB.
- A. Tough monetary policy challenges are not new. Economic fundamentals are subject to varying degrees of volatility over time. But there were crucial differences with the Great Financial Crisis from 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. We ran out of that cushion in December 2008.

- B. In such circumstances, it is essential to credibly commit to achieving our policy goals. Stating the goals clearly is crucial, but so are the actions that display a “do whatever it takes” mentality. This requires a willingness to take bold steps.
- C. From March 2009 through mid-2012, the FOMC employed an impressive set of unconventional monetary policy tools. The tools are by now familiarly recognized as QE1; QE2; calendar-date guidance regarding how long the federal funds rate would remain unchanged; and the maturity extension program, which was also known as Operation Twist.<sup>2</sup> (And I am deliberately omitting the special liquidity programs.)
- D. The FOMC’s actions did not occur in a straight line.
  - 1. Along the way, there were many unexpected developments, such as the Greek sovereign debt crisis, data revisions, and generally disappointing economic performance.
  - 2. Notably, in mid-2011, the FOMC displayed a desire to be finished with unconventional policies when it published its first set of “exit principles,” or how it planned to eventually unwind these nontraditional policies.<sup>3</sup>
  - 3. Within weeks, however, GDP growth in the first half of 2011 was revised down substantially and there was a dawning realization that the recovery was still challenged and that any improvements in inflation were about to reverse again.
- E. Our subsequent policy moves provide forceful examples of the benefits of outcome-based policies aimed at hitting the objectives sooner rather than later — and not doing so asymptotically.

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<sup>2</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>3</sup> Federal Open Market Committee (2011).

- F. We first clarified our objectives. In January 2012, the Bernanke FOMC explicitly stated that our inflation objective is 2 percent, as measured by the annual change in the Price Index for Personal Consumption Expenditures (PCE); and we pointed to the median of our Summary of Economic Projections (SEP) forecasts for long-run unemployment as a measure of sustainable unemployment.<sup>4</sup> And in case there was any doubt, Chairman Bernanke stated at an April 2012 press conference that our inflation objective is symmetric.<sup>5</sup>
- G. Actually, this occasion turned out to be an interesting milepost in the FOMC's journey.
1. Press conferences were relatively new then for the U.S., as was the focus on our Summary of Economic Projections.
  2. Although the FOMC participants' economic projections showed a slight deterioration of performance relative to our objectives, the Committee did not make any policy moves at that meeting. Because we had made our objectives more explicit, the press questioning was intense and implied great criticism of this lack of action.
- H. The critics probably were right. As 2012 played out, policymakers around the globe 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.
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>6</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>7</sup>
  2. I believe the explicit linking of these expansionary policies to economic outcomes was key. Indeed, this is one of the best examples of what an outcome-based policy is.
    - a) As Ben Bernanke likes to say, while QE doesn't work in theory, it does work in practice.<sup>8</sup>

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<sup>4</sup> See Federal Open Market Committee (2012c).

<sup>5</sup> Bernanke (2012).

<sup>6</sup> See Board of Governors of the Federal Reserve System (2015a) and Federal Open Market Committee (2012b).

<sup>7</sup> Federal Open Market Committee (2012a).

<sup>8</sup> Berkowitz (2014).



1. Some drop might be expected given the long period of below-target inflation and the numerous disinflationary shocks: the step-down of growth in China and related decline in global demand for commodities; new sources of energy supply and the fall in energy prices; and a stronger U.S. dollar.
- D. In this environment, five-year, five-year forward inflation compensation measured from TIPS (Treasury Inflation-Protected Securities) data fell considerably. Subsequently, the Michigan survey of long-run inflation expectations moved down to 25-year historical lows.<sup>10</sup>
- E. So there was substantial evidence of erosion of inflation expectations.
- F. I think there is another contributing institutional factor to this drop — namely, the solution to the Barro–Gordon (1983) dilemma of time-inconsistent decision-making as articulated by Ken Rogoff (1985).
1. The classic Barro–Gordon dilemma is that discretionary policy setting by benevolent central bankers who seek to bring unemployment below its sustainable natural rate<sup>11</sup> level tends to lead to above-target inflation.
  2. Rather than following a time-invariant policy rule to address the problem of discretionary policy, Rogoff suggests appointing conservative central bankers who place less weight on achieving lower unemployment. This will correct for the upward inflation bias and can deliver lower average inflation through standard period-by-period decision-making.
  3. Now, a crucial element underlying the Barro–Gordon excess inflation result is the soft-hearted policymaker’s pursuit of unemployment below the sustainable natural rate. If instead all central bankers — conservative or not — learn they should not attempt to permanently deliver unsustainable levels of unemployment, then no bias correction is needed. Indeed, I think the 1970s experience and the ensuing literature taught all monetary economists this lesson.
  4. But Rogoff-appointed conservative central bankers may be less inclined to acknowledge that 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 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.

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<sup>10</sup> These data are from the University of Michigan’s *Surveys of Consumers*.

<sup>11</sup> Here 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.

5. 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 inflation target would not be a level we fluctuate symmetrically around. Rather it would become an inflation ceiling.
  6. Moreover, the public makes inferences regarding our inflation target based on past performance and not just on 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.
- G. 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>12</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.
- H. This brings me to my third and final lesson, which is regarding risk-management.
- VII. Lesson #3: Unconventional tools are effective, but they are unconventional because we know 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, manage against the risks of the ZLB. And, as I just noted, 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 — in which we formalized these arguments in the workhorse forward-looking New Keynesian model as well as in a standard backward-looking macro model.<sup>13</sup>

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<sup>12</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.

<sup>13</sup> Evans et al. (2015).



- B. We considered a scenario in which the current natural real interest rate was low and expected to rise slowly over time, but the path for the rate was subject to random (and serially correlated) shocks. We show that to reduce the ZLB risks — instead of simply following upward the path for the equilibrium rate — optimal policy under uncertainty prescribes a lower rate path to reduce the risk that future unexpected shocks would drive the economy to the ZLB.
- C. Consider the results from the New Keynesian model shown in this chart. 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. As you can see, the projected policy path early on wasn't that different from the optimal policy prescription of this simple model.
- D. The starting point for this exercise was calibrated to economic conditions that existed in the first quarter of 2015:Q1 and an assumption that the natural real rate, or  $r^*$ , was minus one-half percent.  $r^*$  was assumed to slowly trend up over time to 1-3/4 percent — so consistent with the 3-3/4 percent forecast for the long-run nominal federal funds rate in the FOMC's Summary of Economic Projections at that time<sup>14</sup> and our 2 percent inflation target.
- E. However, as I just noted, most economists now believe the long-run real rate is lower — maybe more like 1 percent, according to the latest SEP.<sup>15</sup> The next figure displays how this new endpoint influences our results.
- F. My coauthors separately reran our exercise calibrating economic conditions to the first quarter of 2017 and assuming  $r^*$  trends up from zero to 1 percent. The solid and dashed red lines in this chart are the resulting policies with and without adjustment for uncertainty over  $r^*$ .

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<sup>14</sup> Federal Open Market Committee (2015).

<sup>15</sup> Federal Open Market Committee (2017). 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.

- G. Comparing the blue and red dotted lines, we can see that the 2017:Q1  $r^*$  assumption isn't far from where it was assumed it would be in 2015. But the lower  $r^*$  endpoint 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 that 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 a role for risk management until that time.
  - H. I must emphasize that these are very stylized models, calibrated to approximate just a few macroeconomic data and abstracting from a range of important modeling and monetary policy issues. So the results are only illustrative. 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.
- VIII. To sum things up, there are many lessons for monetary policymakers to learn from the Great Financial Crisis and its aftermath. But an overarching theme is that central bankers need to concentrate on achieving their ultimate policy mandates.
- A. Sometimes substantial challenges may require policies that wouldn't be our first choice in more normal times, and these policies may entail some uncomfortable trade-offs.
  - B. But they also may be necessary to reach our policy mandates and, if so, must be chosen. After all, these mandates are what all central banks are ultimately judged on, and we must do the best we can to meet them.

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# Lessons Learned and Challenges Ahead

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# Outcome-Based Monetary Policy

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- **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**

# 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**

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

- **Rogoff (1985) solution to Barro-Gordon (1983): Appoint conservative central banker who will not attempt  $u < u^*$**
- **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**



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

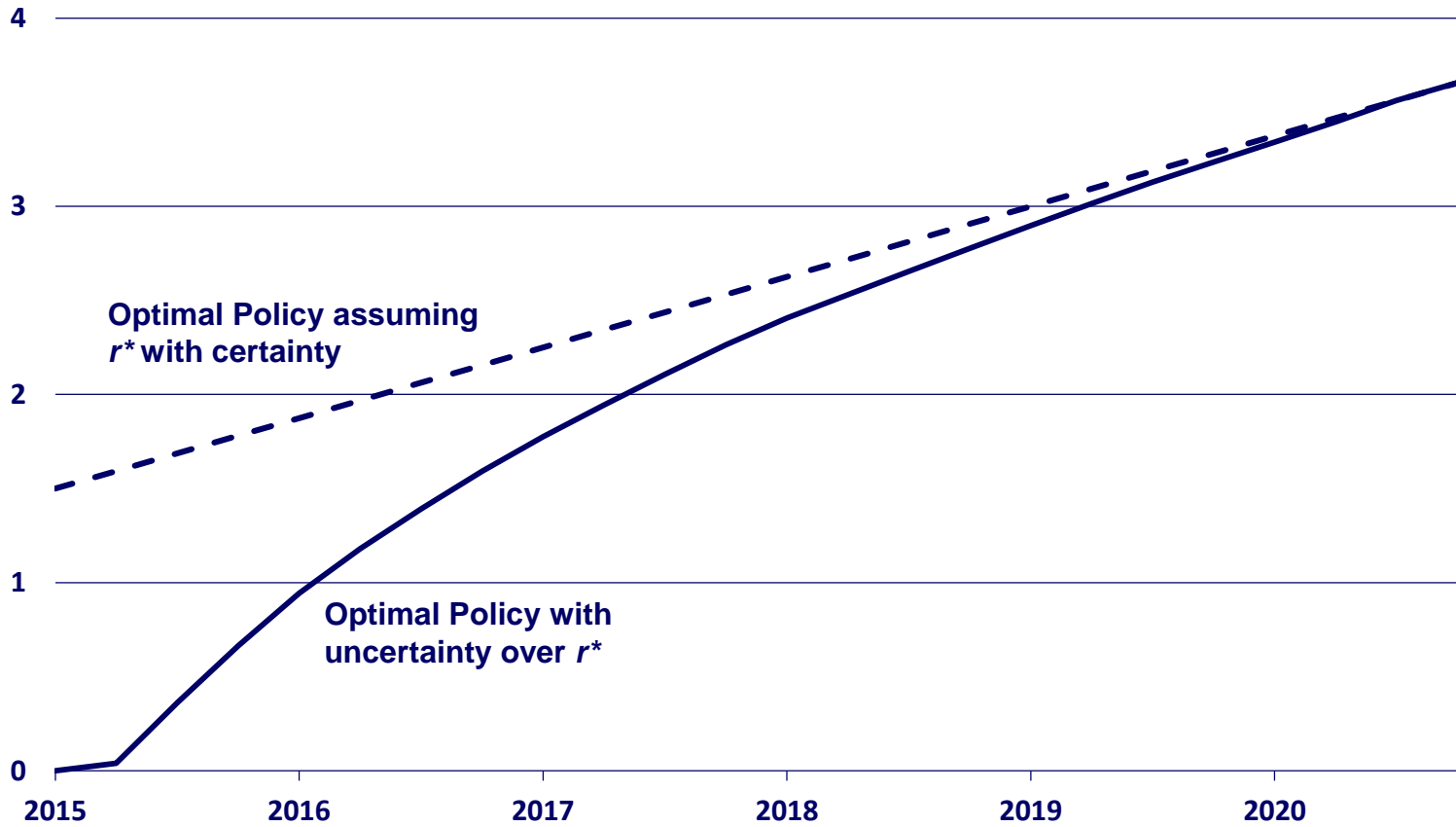
- **Unconventional policy tools effective, but second best**
- **The more likely shocks that might take you to ZLB in future, the more accommodative optimal policy today -- Evans, Fisher, Gourio, Krane (2015)**

# Optimal Policy in Forward-Looking Model

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## Federal Funds Rate

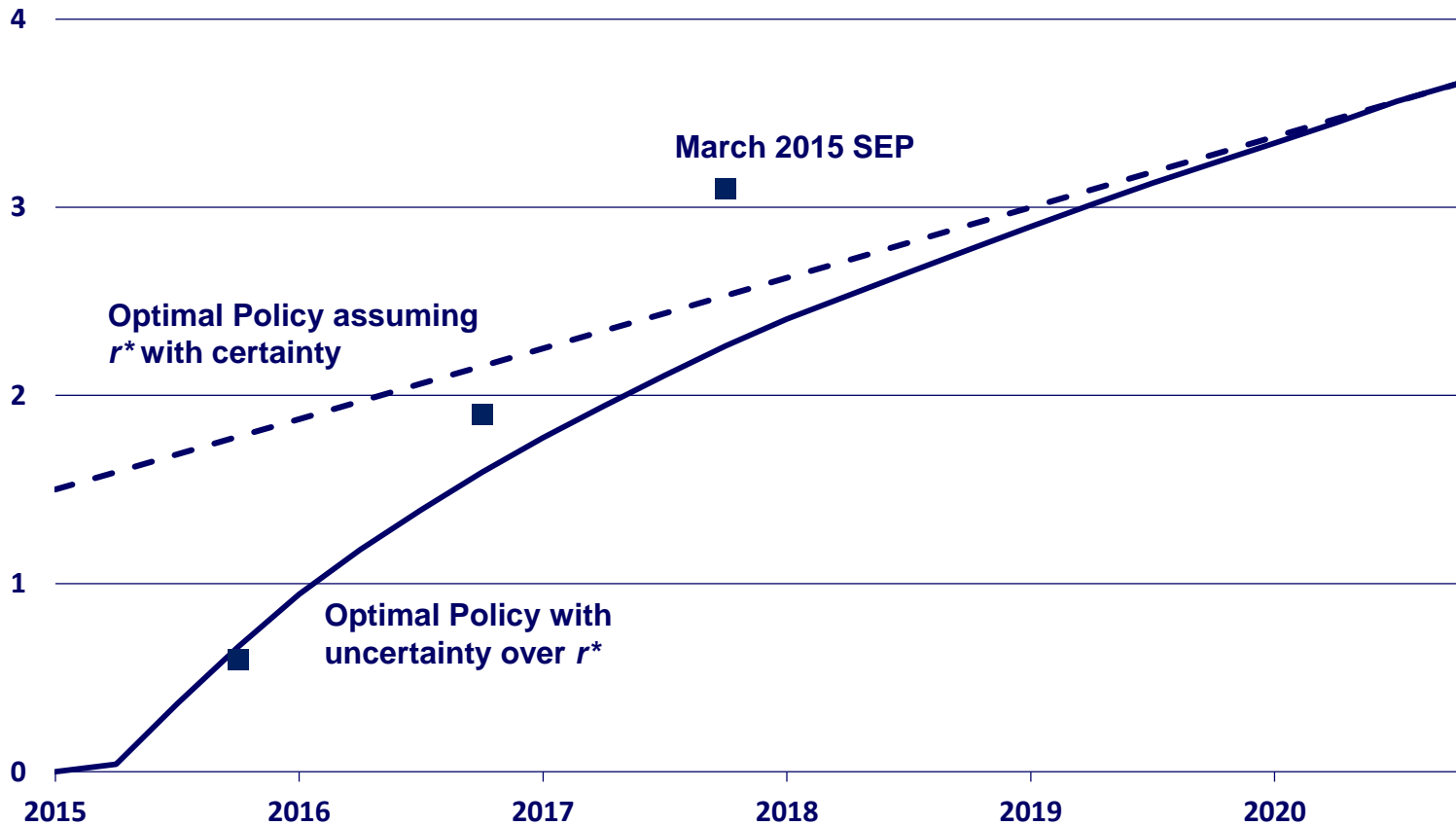
(percent)



# Optimal Policy in Forward-Looking Model

## Federal Funds Rate

(percent)

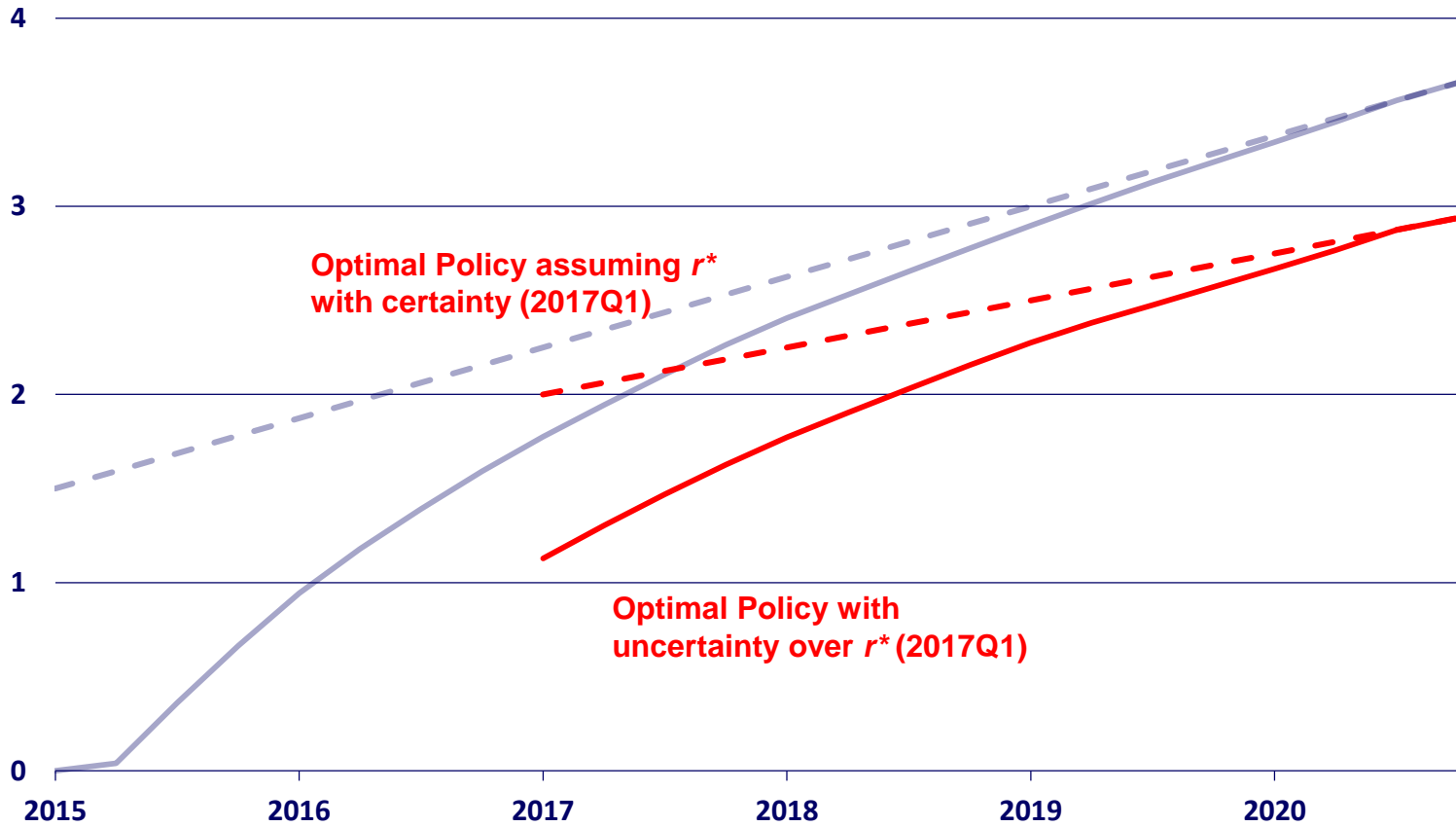


*SEP's are the median values of FOMC participants' judgment of the appropriate level of the target federal funds rate at the end of the year. Source: Federal Open Market Committee*

# Optimal Policy in Forward-Looking Model

## Federal Funds Rate

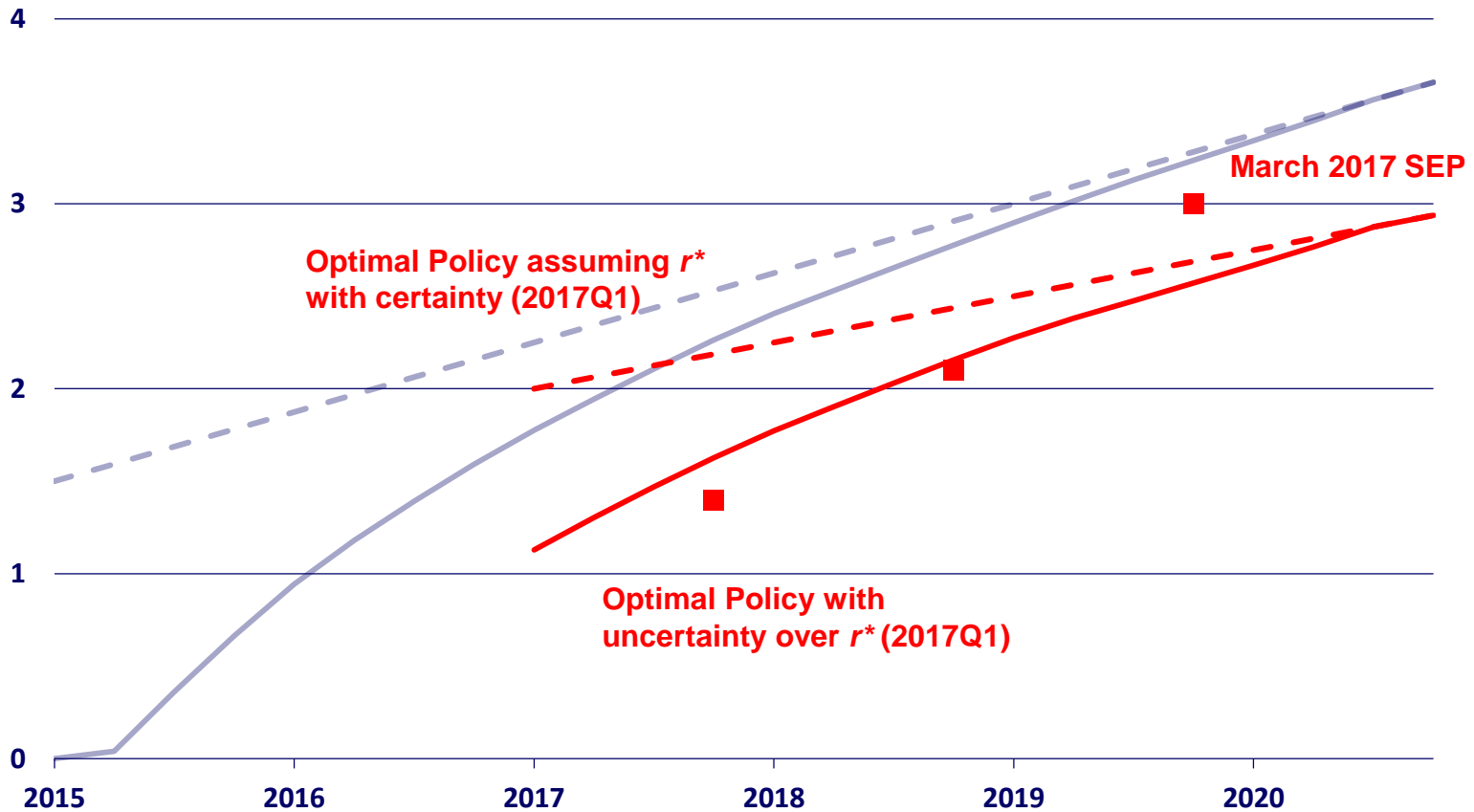
(percent)



# Optimal Policy in Forward-Looking Model

## Federal Funds Rate

(percent)



*SEP's are the median values of FOMC participants' judgment of the appropriate level of the target federal funds rate at the end of the specified calendar year. Source: Federal Open Market Committee*