

**FOMC participants' median projections paint a picture of an economy growing near its potential rate, at or near full employment, with inflation firming and closing in on price stability.**

- While not everyone on the Committee would agree with that characterization, it's close enough to at least ask what the appropriate level of the real funds rate would be when the economy is at full employment and price stability.
- The answer, of course, is obvious. The real funds rate should be at its equilibrium level,  $r^*$ .
- That would have been the end of the story in so-called "normal times," but not today. Chair Yellen says something different and unique is occurring in the wake of the financial crisis/Great Recession period: Persistent headwinds have been holding the economy back.

**In these circumstances, we need to define two measures of  $r^*$ .**

- Participants report their estimates of the funds rate "in the longer run," which they currently put at 3% in nominal terms and 1% in real terms. We refer to this as "the longer-run," or "normal," equilibrium real funds rate.
- But circumstances today are not "normal," so Yellen defines the equilibrium real rate as the rate consistent with full employment and price stability today, in the presence of persistent headwinds.
- We refer to Yellen's concept as the "short-run" equilibrium real rate. Her estimate is about zero, lower than the longer-run level, to offset the ongoing persistent headwinds.

**When participants talk about "normalization," we interpret them as referring to the process of raising the real funds rate to its longer-run equilibrium level. That was simpler in normal times.**

- The real funds rate was expected to converge to the equilibrium level (the estimate of which was quite stable) as the economy converged to full employment and price stability.
- We had macroeconomic regularities to build on and simple policy rules to provide guidance.

**Normalization is very different and more uncertain in today's world of two  $r^*$ s.**

- Today, normalization should be thought of as a three step process. First, start to remove accommodation.
- Second, with that process under way, move the policy rate to the estimate of the short-run equilibrium funds rate.
- Third, follow the short-run  $r^*$  upward as headwinds recede and the short-run  $r^*$  converges over time to the longer-run  $r^*$ .
- Unfortunately, in practice, we have no guidance about how the short-run  $r^*$  will evolve over time.

The economy is close enough to full employment and price stability that it is time to ask: What is the appropriate monetary policy for an economy in this case? That sounds simple: the real funds rate should be at its equilibrium level. After all, the equilibrium real funds rate is defined as the real funds rate consistent with the maintenance of full employment and price stability. But answering that question today is anything but simple.

The first complication is that FOMC participants use the term "equilibrium funds rate" in two different ways, which produce two different numbers. Second, despite essentially being at full employment and close to price stability, monetary policy today remains modestly accommodative.

As I discuss these complications, I explain why there is very limited guidance today from estimated models, policy rules, or other econometric research about the appropriate pace of rate hikes. For many on the Committee, this uncertainty counsels a cautious approach, probing to see whether the economy can withstand even a gradual rise in rates.

### **Close Enough to Assume the Economy Is at Full Employment and Price Stability**

To sharpen the discussion, we will initially assume the economy is growing at its potential rate and is at full employment and price stability. This is not much of an exaggeration, as the economy is currently close to this description. First, the participants' median projection of actual growth is 2% and their median projection of growth "in the longer run" (aka potential GDP) is also 2%.<sup>1</sup> Second, the unemployment rate today is 4.9% and participants' median projection of the unemployment rate "in the longer run" (aka the NAIRU) is 4.8%. Third, while core PCE inflation is below 2%, the median participants' projections for core PCE inflation are 1.7% this year and 1.9% and 2% for the following two years.

### **A Tale of Two $r^*$ s**

At full employment and price stability, by definition, the real funds rate should be at its equilibrium level,  $r^*$ . This rate is determined by the underlying structure of the economy and cannot be influenced by monetary policy. Absent shocks that drive the economy away from full employment and price stability, the FOMC should maintain the real funds rate at its equilibrium rate.

Of course, there is always uncertainty around estimates of  $r^*$ . But today, there is an additional complication: FOMC participants refer to two different concepts of  $r^*$ , often without clearly explaining why there are two  $r^*$ s and to which concept they are referring. The first concept of this equilibrium real funds rate is the one with which we are most familiar, because it is the measure that we used most commonly before the financial crisis and the Great Recession—what we refer to as the longer-run, or normal, concept of  $r^*$ . The estimate of this rate has always carried a lot of uncertainty and, in addition, had been declining for some time before the Great Recession. Estimates have continued to decline during the recovery, including in those in FOMC participants' last set of projections. Participants' median projection of the funds rate in the longer run is 3%, or 1% in real terms.

---

<sup>1</sup> Participants often refer to their 2% growth forecast as being a bit above trend. We agree. CBO's estimate of trend in 2016 is near 1½%.

But there is apparently something different about the post-financial crisis/Great Recession period; it is anything but normal. What's different, as emphasized by former Chair Bernanke and current Chair Yellen, is the presence of persistent "headwinds" that are holding the economy back. These headwinds arose from the financial crisis and the ensuing recession. Though initially expected to be temporary, these headwinds appear to have been persistent during the recovery.<sup>2</sup> As a result, today the short-run equilibrium real funds rate—what we call the "short-run"  $r^*$ —is lower than its longer-run, or normal, value as a result of the need to offset the effect of the persistent headwinds on growth.<sup>3</sup>

### **Yellen, Headwinds and the Short-Run $r^*$**

The Board staff gave a presentation to the FOMC in October 2015 in which they distinguished the short-run and longer-run "concepts" of  $r^*$  and reported that "a variety of empirical models of the U.S. economy and a range of econometric techniques" indicated that the short-run  $r^*$  was currently close to zero. And that's the estimate that Yellen reports.

To understand why the short-run  $r^*$  is below the longer-run  $r^*$  and why the two measures are expected to converge over time, it is useful to write the short-run real equilibrium funds rate as  $r^*-h$ , where  $r^*$  is the longer-run  $r^*$  and  $h$  is how much lower the real fund rate is today, relative to its longer-run level, to offset the headwinds and to be consistent with operating at full employment and price stability. As the headwinds dissipate and the economy returns to normal,  $h$  will go to zero and the short-run  $r^*$  will converge to its longer-run level. In Yellen's words:<sup>4</sup>

We expect the rate to remain, for some time, below levels that are anticipated to prevail in the longer run because headwinds weighing on the economy mean that the interest rate needed to keep the economy operating near its potential is low by historical standards. These headwinds...could persist for some time. But, if they gradually fade over the next few years as we expect, then the interest rate required to keep the economy operating at an even keel should move higher as well.

---

<sup>2</sup> The staff began to distinguish between "short-run" and "medium-term" concepts of the real equilibrium funds rate at the [December 2004 FOMC meeting](#). Previously they just talked about the equilibrium real funds rate. The two concepts of  $r^*$  differed in terms of their time horizon: "The short-run equilibrium rate is defined to be the rate that, if sustained, would be projected to close the output gap in twelve quarters. The medium-run measure is defined to be the rate projected to prevail in seven years under the assumption that monetary policy will act to eliminate economic slack in three years and to hold output at potential thereafter." The staff believed that the short-run measure provided more guidance to the Committee about what the appropriate near-term path of the funds rate might be, while, of course, insisting they were not making a policy recommendation. Of course, that is technically true: Each participant's projected paths would depend on how he or she interpreted the objectives of monetary policy and what his or her forecast was. But the short-run concept as described in the December 2004 Bluebook is not the same as Yellen's and Laubach and Williams' short-run  $r^*$ . Yellen's and Laubach and Williams' short-run  $r^*$  measures are defined more like the definition of the medium term concept described above, except that it is the real funds rate that would prevail in the medium-term, but under the unique circumstance of the post-Great recession recovery, in the presence of headwinds.

<sup>3</sup> In a footnote to her March 2015 speech, Yellen uses the terms short-run and  $r^*$  to distinguish the two concepts of the equilibrium real funds rate. See Janet Yellen, "[Normalizing Monetary Policy: Prospects and Perspectives](#)," March 27, 2015. The staff also did so in their presentation to the FOMC on two "concepts" of the equilibrium funds rate at the [October 27-28 FOMC meeting](#).

<sup>4</sup> See "[Transcript of Chair Yellen's Press Conference](#)," June 15, 2016.

## What's Really Holding the Economy Back?

References to headwinds from the recession can be found in as early as the August 2011 FOMC minutes. At a press conference in September 2013, then-Chairman Bernanke provided a list of the specific headwinds that he saw as restraining growth and likely to do so for a time. Yellen set out much the same list in a March 2015 speech:<sup>5</sup>

These headwinds include tighter underwriting standards and restricted access to some forms of credit; the need for households to reduce their debt burdens; contractionary fiscal policy at all levels of government after the initial effects of the fiscal stimulus package had passed; and elevated uncertainty about the economic outlook that made firms hesitant to invest and hire, and households reluctant to buy houses, cars, and other discretionary goods.

She also said that “the overall force of these headwinds appears to have diminished considerably over the past year or so.” But even as those specific headwinds faded, the unusual downward pressure on GDP growth did not appear to fade. So Yellen updated the list. The headwinds were then identified as “economic and financial developments abroad, subdued household formation, and meager productivity growth.”<sup>6</sup> That’s the problem with lists of headwinds when one doesn’t fully understand what’s holding the economy back—the list just keeps changing.

But Yellen has also presented a list free, and frankly more compelling, story of how we know this time is different and the equilibrium real rate is lower than in normal times:<sup>7</sup>

While the overall level of real activity now appears to be much closer to its potential than it was a year or two ago, the economy in an “underlying” sense remains quite weak by historical standards, for the simple reason that the increases in hiring and output that have been achieved thus far have required exceptionally low levels of short- and longer-term interest rates, reflecting a highly accommodative stance of monetary policy. Interest rates have been, and remain, very low, and if underlying conditions had truly returned to normal, the economy should be booming.

---

<sup>5</sup> See Chair Janet L. Yellen, “[Normalizing Monetary Policy: Prospects and Perspectives](#),” At the “The New Normal Monetary Policy,” a research conference sponsored by the Federal Reserve Bank of San Francisco, San Francisco, California, March 27, 2015.

<sup>6</sup> Chair Janet L. Yellen, “[Semiannual Monetary Policy Report to the Congress](#),” Before the Committee on Banking, Housing, and Urban Affairs, U.S. Senate, Washington, D.C., June 21, 2016.

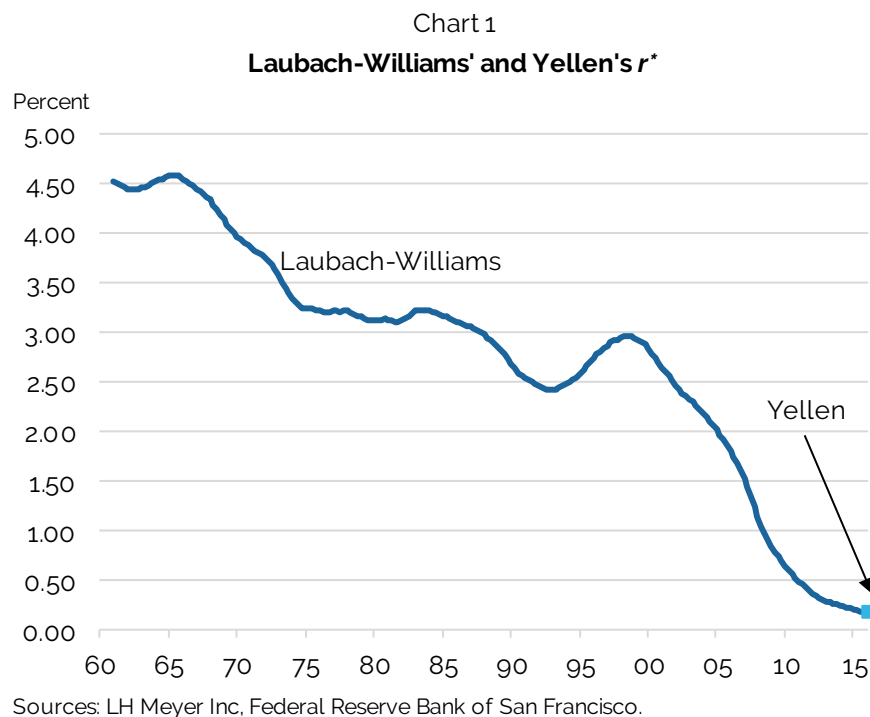
<sup>7</sup> See Chair Janet L. Yellen, “[Normalizing Monetary Policy: Prospects and Perspectives](#),” at the “The New Normal Monetary Policy,” a research conference sponsored by the Federal Reserve Bank of San Francisco, San Francisco, California, March 27, 2015. Andrew Haldane, chief economist at the Bank of England, also offered a list-free story in a 2015 speech, based on the experience after the Great Depression. He talked about “psychological scarring” from a dramatic financial crisis, which he refers to as “dread risk” rather than headwinds. Such dread risk, he argues, can lead to “an overestimation of the probability of a repeat disaster” and, in turn, become a weight on the following recovery. See Andrew Haldane, “[Stuck](#),” Bank of England, June 29, 2015. Anna Schwartz and Milton Friedman made a similar point in their classic, *A Monetary History of the United States*. They wrote that the Great Depression: “instilled an exaggerated fear of continued economic instability, of the danger of stagnation, of the possibility of recurrent unemployment.” See Friedman, M and Schwartz, A (1963), *A Monetary History of the United States, 1867-1960*.

## Enter Laubach and Williams

Yellen's estimate of the short-run  $r^*$  is "close to zero." Where does that estimate come from and how does it relate to the funds rate "in the longer run?" When Yellen first offered her estimate that (the short-run)  $r^*$  was zero, she cited research by Thomas Laubach (now Director of the Division of Monetary Affairs at the Board) and John Williams (now President of the San Francisco Fed) as an "example" of an estimate of the short-run  $r^*$  today and said her estimate was effectively the same as theirs. But they actually wrote that paper in 2001, well before the financial crisis and Great Recession and well before headwinds were mentioned by Bernanke and Yellen.

But there's a story here. When Yellen first said that  $r^*$  was zero, I was surprised, to say the least. My question immediately was how this estimate related to participants' projections of  $r^*$  and where she got this estimate.<sup>8</sup> Did she ask the gods, or in this case, the Board staff? And, with respect to her estimate (which became clear was a short-run, not a longer-run estimate), how did she know that it was zero? Or, as I like to put it, how did she know how large  $h$  was?

I like to say that she had that answer because, just before I left the Board, I asked the staff to develop a model of a time-varying  $r^*$ . I had been assuming  $r^*$  was a constant 2½%, consistent with estimates by the Board staff and prescriptions from Taylor-like policy rules that the staff regularly provided the FOMC. At the same time, the staff cautioned that theory suggests that  $r^*$  must be time-varying. So I asked the staff to model a time-varying  $r^*$  and develop an estimate of what it is today and how it has evolved over time.



<sup>8</sup> Yellen, in her footnote citing the work of Laubach and Williams, noted there were other studies that concluded  $r^*$  was higher, in the 1% to 2% range. But she then explained that the other studies estimated the longer-run  $r^*$ , and that rate would be the equilibrium real funds rate only when the headwinds dissipated and disappeared.

Two young staffers at the time, Thomas Laubach and John Williams, took up the challenge.<sup>9</sup> Chart 1 shows Laubach and Williams time series for  $r^*$ , and Yellen's estimate.<sup>10</sup> So that's how Yellen "knew" that the short-run  $r^*$  was zero!

At the time the Laubach and Williams paper was published, their estimate of  $r^*$  was reasonably in line with my thinking and near the staff's estimate, about 2½%. But what happened during the Great Recession and the recovery changed my mind about what they had in fact estimated. Their estimate of  $r^*$  fell sharply and steadily during this period, now all the way to near zero. It became correlated with the unemployment rate, and showed characteristics that appeared more cyclical than structural. Their estimate, as a result, did not change my view about the level of what we now calling the longer-run, or normal,  $r^*$ . But they turned out to be remarkably prescient. They had developed an empirical model that would, some 15 years later, provide Chair Yellen with an estimate of  $r^*$  that captured (but did not identify) the persistent forces that she believes have been weighing on the economy in the post-Great Recession period—the short-run  $r^*$ .

### **Cyclical, Persistent, and Permanent Shocks**

To understand why Laubach-Williams  $r^*$  is lower than the normal, or longer-run, estimate of  $r^*$ , think of shocks affecting the economy and impinging on the real funds rate as falling into three categories—cyclical, persistent, and permanent. All estimates of  $r^*$  must remove the effects of cyclical shocks (those that cause temporary deviations of output from potential). These shocks typically last for a couple of years. A second category of shocks are those that are permanent. For most of history, one only needed to purge the movements in the real funds rate that resulted from cyclical shocks in order to estimate the longer-run real equilibrium funds rate. Movements in the longer-run equilibrium rate were attributable to lower-frequency structural changes in the economy; for example, changes in the rate of growth in potential output. Laubach and Williams account for this longer-run force in their model.

In normal times, that is all we had to worry about. But in this period, headwinds represent a third category of shocks, those that might not be permanent but still might be highly persistent. We will refer to those shocks as "persistent" shocks, as opposed to cyclical shocks and "permanent" shocks. Laubach and Williams' empirical methodology eliminated the cyclical source of changes in the real funds rate, but did not identify or fully remove the persistent shocks.<sup>11</sup> That's why their estimate of  $r^*$  conforms today to Yellen's conception and estimate of  $r^*$ , the short-run  $r^*$ .

---

<sup>9</sup> Finance and Economics Discussion Series 2001-56, "[Measuring the Natural Rate of Interest](#)," Thomas Laubach and John C. Williams, November 2001.

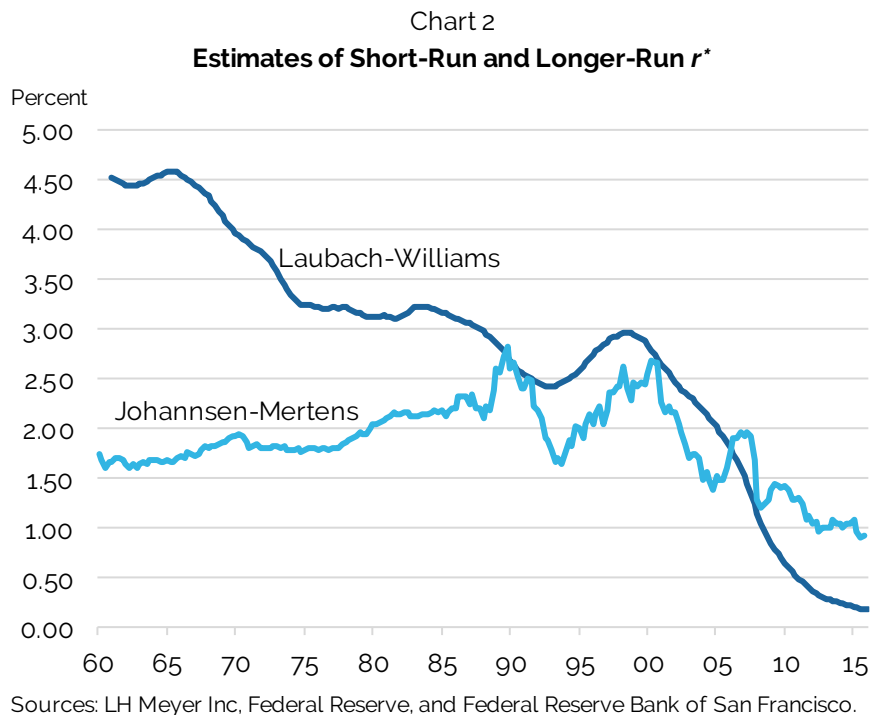
<sup>10</sup> Yellen's estimate of the short run  $r^*$  first appeared in her March 2015 speech. See Chair Janet L. Yellen, "[Normalizing Monetary Policy: Prospects and Perspectives](#)," At the "The New Normal Monetary Policy," a research conference sponsored by the Federal Reserve Bank of San Francisco, San Francisco, California, March 27, 2015.

<sup>11</sup> A fundamental question in the empirical methodology employed by Laubach and Williams is how much to smooth the data that will underpin the estimate of  $r^*$ . Their decision ended up leaving in shocks that were more persistent than cyclical, but expected to be temporary, rather than permanent.

## The Longer-Run or Normal Equilibrium Real Funds Rate

There is near-universal agreement that the longer-run  $r^*$  has declined from the late 1990s up to the present. Since 2012:Q1, FOMC participants' median projection has declined from 2¼% to 1% (in real terms).

In Chart 2 we show the estimate of the longer-run, or normal, real funds rate reported in a recent Fed publication by Johannsen and Mertens, along with Laubach-Williams estimate of the short-run  $r^*$ .<sup>12</sup> We believe that the Johannsen-Mertens series used an empirical methodology that better purges  $r^*$  of both the cyclical and more persistent that cyclical shocks, better isolating a measure of the longer-run  $r^*$ .<sup>13</sup> We use their series for the longer-run  $r^*$  because it was referenced in the February 2016 Monetary Policy Report.<sup>14</sup>



The Johannsen-Mertens series shows that  $r^*$  was near 2½% in the late 1990s and early 2000's, and has fallen to 1% today, consistent with participants' median projection and our projection today. The Laubach-Williams measure of the short-run  $r^*$  fell below the Johannsen-Mertens measure in the period following the financial crisis and the beginning of the ensuing recession and fell to near zero by 2011 and remains near zero today.

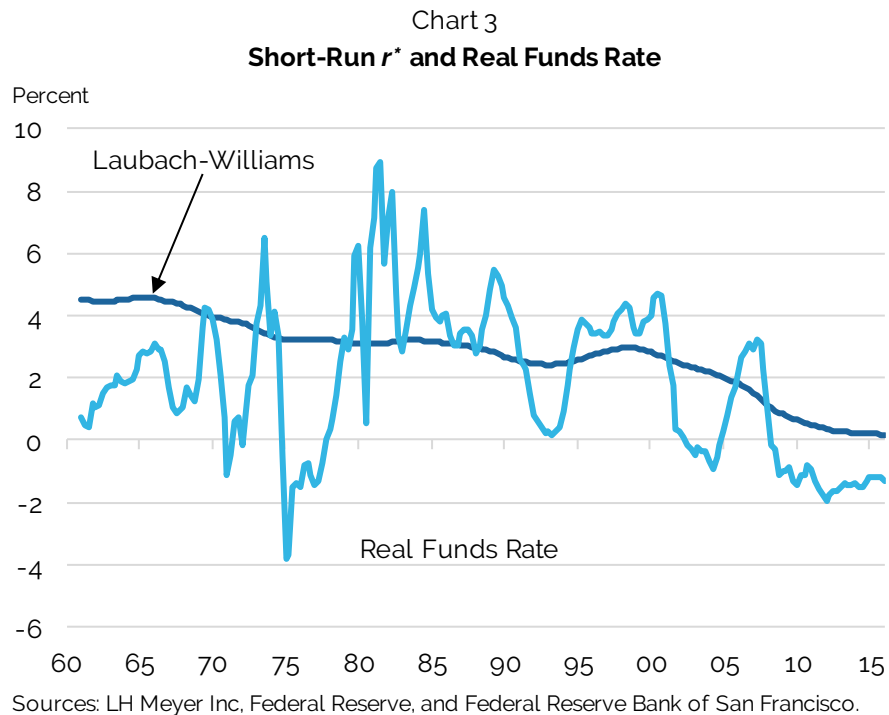
<sup>12</sup> Benjamin K. Johannsen and Elmar Mertens. "[The Expected Real Interest Rate in the Long Run: Time Series Evidence with the Effective Lower Bound.](#)" FEDS Notes. Washington: Board of Governors of the Federal Reserve System, February 9, 2016.

<sup>13</sup> Johannsen and Mertens report several measures of the longer-run  $r^*$ , both filtered estimate and smoothed data that use the entire sample to estimate the long run equilibrium real rate. The latter are, well, smoother, and don't capture as much of the variation in the data. They also use versions that adjust for the effective zero bound and that do not make such an adjustment. There is little difference in the estimates of the longer-run  $r^*$  between the two filtered series.

<sup>14</sup> I admit, I am drawn to the Johannsen-Mertens measure of the longer-run equilibrium rate in part because it conforms rather well to the series I estimated and is maintained at LH Meyer.

## Monetary Policy is Modestly Stimulative Today

Whether monetary policy is stimulative or neutral has to be judged by where the real funds rate is relative to the short-run  $r^*$ . The short-run  $r^*$  is the measure of  $r^*$  that is consistent with full employment and price stability today; in other words, the “neutral” rate today.



As shown in Chart 3, the actual real funds rate today is about 1¼ percentage points below the estimate of the short-run  $r^*$ , “modestly accommodative” in Yellen’s words, notwithstanding that the economy today is near or at full employment and we believe closing in on 2% inflation.<sup>15</sup> She explains why:

Although the economy is now fairly close to the FOMC’s goal of maximum employment, I view our modestly accommodative stance of policy as appropriate for several reasons. First, with inflation continuing to run below our objective, a mild undershooting of the unemployment rate considered to be normal in the longer run could help move inflation back up to 2 percent more quickly. Second, a stronger job market could also support labor market improvement along other dimensions, including greater labor force participation. A third reason relates to the risks associated with the constraint on conventional monetary policy when the federal funds rate is near zero. If inflation were to move persistently above 2 percent or the economy were to become notably overheated, the Committee could readily increase the target range for the federal funds rate. However, if inflation were to remain persistently low or the expansion were to falter, the FOMC would be able to provide only a limited amount of additional stimulus through conventional means.

<sup>15</sup> See Chair Janet L. Yellen, “[Current Conditions and the Outlook for the U.S. Economy](#),” at The World Affairs Council of Philadelphia, Philadelphia, Pennsylvania, June 6, 2016.



## Monetary Policy with Two $r^*$ 's: Not A Clue?

The challenge of setting monetary policy in a world of two  $r^*$ 's is very different and far more challenging and uncertain than the world I grew up in. There are few empirical guidelines to inform our judgment about the pace at which the funds rate should rise to keep the economy at full employment and price stability.

In normal times, it was simpler (though never simple) to project the path of the funds rate. We had macroeconomic regularities to build on. We had an estimate of the longer-run, or normal, equilibrium real funds rate. We had simple policy rules to guide us.

Today, we appreciate that the real funds rate should be below its normal or longer-run equilibrium level, even when the economy is at full employment and price stability, as a result of the need to offset headwinds. And the real funds rate today is even below the estimate of the short-run  $r^*$ . We have an estimate of the short-run  $r^*$  by Laubach and Williams, but their model cannot provide a prescription for the funds rate going forward. It doesn't have a clue! The current estimate is based on the current data. The model will only give an estimate of what the short-run  $r^*$  will be tomorrow when we get to tomorrow. This is another example of "wait and see."

To add further to the uncertainty, Laubach and Williams, in an update of their 2001 paper in 2015, raise the possibility that the short-run  $r^*$  today may be the new normal, today's longer-run  $r^*$ . This possibility is suggested by the failure of their estimate of  $r^*$  to begin to increase as the economy has improved. That goes against the spirit of the headwinds story.

## Normalization Today: A Three-Step Program

Normalization today is a three-step process. First, the FOMC must decide when to begin, today when to begin normalization "again." Second, to remove the prevailing accommodation, the FOMC should gradually raise the funds rate to its short-run equilibrium level, 1% in real terms, or 2% in nominal terms. Third, the FOMC should follow the short-run  $r^*$  upward as it moves toward and converges its longer-run value as the headwinds dissipate and finally disappear.

Easier said than done. First, given the asymmetry of costs of going too soon and too late, the objective of lowering the unemployment rate below the NAIRU, and, apparently, the resulting tolerance for some modest and temporary overshoot of the 2% inflation objective, it is harder to make the judgment of when it is appropriate to start normalization (step one).

Second, in any case, once started or restarted, the Committee should move gradually and cautiously to 2% or whatever the updated estimate of the short-run  $r^*$  is, without a presumption that the funds rate will need to move above that. With respect to the pace, under the FOMC's projected path of the funds rate, it will not get to 2% until mid-2018 and, by then, there will, of course, be an updated estimate of the short-run  $r^*$  from the Laubach and Williams model.

Third, once at the updated estimate of the short-run  $r^*$ , follow the short-run  $r^*$  higher, while, of course, observing whether the strategy is effective in maintaining full employment and price stability or achieving whatever path of the unemployment and inflation the Committee sees as consistent with its near term objectives. If the short-run  $r^*$  has been increasing, keep an eye the estimate of the longer-run  $r^*$ , and follow the short-run  $r^*$  upward as it converges to the longer-run  $r^*$ .

---

Here are links to recent commentaries:

[Fed Views: Don't Overreact: The Fed Won't!](#)

[Unexpectedly Weak GDP Points to More Caution by FOMC](#)

[FOMC Statement Comment: More Upbeat about the Data, Fewer Worries](#)

[Macro Views: Same Forecast, Lower Rates](#)

Larry Meyer  
202.794.7358  
larry@lhmeier.com

Jacqueline Dolson  
202.794.7357  
jacqueline@lhmeier.com

Ken Meyer  
650.761.4707  
ken@lhmeier.com

lhmeier.com

**LHMeyer Macro Team**

Larry Meyer  
David Stockton  
Kevin Burgett  
Derek Tang

**Senior Advisers**

Jonathan Wright  
Larry Goldstein  
Alan Krueger

---

Disclaimer: the forecasts provided herein are based upon sources believed by Monetary Policy Analytics Inc. D/B/A LH Meyer, to be reliable and to be developed from models which are generally accepted as methods for producing economic forecasts. LH Meyer cannot guarantee the accuracy or completeness of the information upon which this Report and such forecasts are based. This Report does not purport to disclose any risks or benefits of entering into particular transactions and should not be construed as advice with regard to any specific investment or instance. The opinions and judgments expressed within this Report made as of this date are subject to change without notice.  
Copyright © 2016 Monetary Policy Analytics Inc.