

## Lael Brainard: Normalizing monetary policy when the neutral interest rate is low

Speech by Ms Lael Brainard, Member of the Board of Governors of the Federal Reserve System, at the Stanford Institute for Economic Policy Research, Stanford, California, 1 December 2015.

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Let me begin by noting that my comments today will not address the timing of liftoff for the federal funds rate.<sup>1</sup>

Recent months have seen increased anticipation of the normalization of monetary policy in the United States. Many observers interpret normalization to mean a tightening cycle similar in pace to previous cycles, such as those from 1994 to 1995 and from 2004 to 2007, with the effect of returning interest rates to the level viewed as normal in the decades before the crisis. The Federal Reserve describes normalization as "steps to raise the federal funds rate and other short-term interest rates to more normal levels."<sup>2</sup> But what do we mean by "more normal levels"? A broad deterioration in foreign growth prospects, together with greater risk sensitivity in the wake of the crisis and changes in the rate of potential output growth, may be contributing to a "new normal." The new normal is likely to be characterized by a lower level of interest rates than in the decades preceding the crisis, which counsels a cautious and gradual approach to adjusting monetary policy.

### The Benchmark Neutral Rate

The appropriate pace and target for normalizing monetary policy depend centrally on understanding the neutral rate of interest. The nominal neutral interest rate is the level of the federal funds rate that is consistent with output growing close to its potential rate with full employment and stable inflation.<sup>3</sup> The appropriate benchmark for assessing the stance of monetary policy is the gap between the policy rate and the nominal neutral rate of interest: When the federal funds rate is below the nominal neutral rate, monetary policy is accommodative, and, when it is above the neutral rate, policy is contractionary. For this reason, many monetary policy rules, such as the well-known Taylor rule, incorporate an estimate of the neutral real interest rate as a critical parameter along with the target rate of inflation.<sup>4</sup>

Although the neutral rate is a critical benchmark for monetary policy, it changes over time in response to important changes in economic conditions, necessitating corresponding adjustments in monetary policy in order to restore the economy to full employment. For instance, when there are modest adverse shocks to demand that lead to modest reductions in the shorter-run neutral rate, monetary policy can provide enough support to keep the economy at full employment simply by reducing the policy rate commensurate with the decline in the nominal neutral rate. However, when the adverse shocks to demand are sufficiently severe to push the nominal neutral interest rate substantially below zero, as they were during the Great Recession, monetary policy confronts the zero-lower-bound constraint, at which point the federal funds rate cannot fall low enough to provide the necessary degree of accommodation without becoming negative. This was the case in the United States for several years following

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<sup>1</sup> These remarks represent my own views, which do not necessarily represent those of the Federal Reserve Board or the Federal Open Market Committee.

<sup>2</sup> For example, see Board of Governors (2014, paragraph 2).

<sup>3</sup> The closely related concept of the natural rate of interest--the rate of interest at which investment and savings are equilibrated at full employment--is originally attributed to Swedish economist Knut Wicksell.

<sup>4</sup> See Taylor (1993) and Taylor (1999).

the crisis and remains true today in a number of advanced foreign economies. That is why monetary policymakers in the United States and several other major economies have been compelled to use additional unconventional tools to promote full employment and target inflation, such as forward guidance and asset purchases.

The neutral rate of interest is not directly observable, but we can back out an estimate of the neutral rate by relying on the observation that output should grow faster relative to potential growth the lower the federal funds rate is relative to the nominal neutral rate. In today's circumstances, the fact that the U.S. economy is growing at a pace only modestly above potential while core inflation remains restrained suggests that the nominal neutral rate may not be far above the nominal federal funds rate, even now. In fact, various econometric estimates of the level of the neutral rate, or similar concepts, are consistent with the low levels suggested by this simple heuristic approach.<sup>5</sup>

### **The Past and Future Neutral Rate**

In assessing the policy path ahead, the critical question is whether a low neutral rate is likely to be a "new normal" in the longer run or whether the neutral rate is soon likely to increase back to levels considered normal in the decades before the crisis. To answer this question, it is helpful to use economic forecasts, market-implied expectations, and econometric models to assess where real interest rates are expected to be in the longer run, and compare them with the levels that prevailed in the decades before the crisis. In doing so, it is important to abstract from shocks that are transitory or cyclical and thus likely to fade away over a year or two.<sup>6</sup>

Starting with economic forecasts, Blue Chip Forecasts publishes projections of the federal funds rate and consumer price index (CPI) inflation 6 to 10 years into the future, when the economy is typically expected to be near full employment. The implied Blue Chip consensus longer-run real federal funds rate averaged around 2.2 percent in the two decades preceding the crisis, which is close to the level of the intercept term in the Taylor (1993) rule, which in turn is based on empirical analysis of the period from the mid-1980s to the early 1990s. In contrast, the Blue Chip consensus longer-run rate is currently around 1.1 percent, about 1 percentage point lower than the pre-crisis average.<sup>7</sup>

Similarly, although the Federal Open Market Committee (FOMC) has not explicitly defined "normal," the central tendency or the median of the longer-run level of the federal funds rate in the Summary of Economic Projections (SEP) might reasonably be considered a rough proxy. By this proxy, forecasts of the neutral rate have moved down noticeably over the past several years. The median projection of the longer-run level of the real federal funds rate was 2-1/4 percent in January 2012, when projections of the longer-run federal funds rate were first included in the SEP. By comparison, the median projection for the longer-run real federal funds rate had fallen by 3/4 percentage point to 1-1/2 percent in the most recent SEP.<sup>8</sup>

Market measures of expected forward rates evidence a similar decline. For example, we can back out an implied 1-year real rate 10 years from now from the Treasury inflation-protected

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<sup>5</sup> See, for example, Cúrdia (2015) and Del Negro and others (2015).

<sup>6</sup> Hamilton and others (2015) use moving averages of real rates as their measure of the equilibrium real rate. Using a similar measure, in the United States, the 11-year moving average of the short-term real interest rate is now at its lowest level since the beginning of the series in the late 1950s.

<sup>7</sup> Here the longer-run real rate is defined as the consensus longer-run nominal federal funds rate minus the consensus longer-run rate of CPI inflation. Because most forecasts of economic conditions far into the future are predicated on the economy being at full employment, forecasts of relatively low actual real rates are consistent with forecasts of relatively low neutral rates.

<sup>8</sup> In the SEP, longer-run projections represent each participant's assessment of the rate to which each variable would be expected to converge under appropriate monetary policy and in the absence of further shocks to the economy.

securities, or TIPS, yield curve. The most recent readings are around 1.3 percent, close to 2 percentage points below the average rate from 1999 through 2007. Swaps prices tell a similar story. The implied expected 1-year real rate 10 years from now is currently close to 1 percent, again well below levels prior to the financial crisis.

Finally, some of the econometric models used to estimate the current neutral rate, or closely related concepts, can also be used to assess whether low neutral rates are likely to persist. While estimates will depend on the model specification, several models estimate that the neutral rate will remain low for some time to come. Laubach and Williams, for example, estimate that the natural rate, a concept closely related to the neutral rate, likely will remain near zero for the foreseeable future.<sup>9</sup>

### **Why Is the Neutral Rate Low?**

With a variety of estimates suggesting that the neutral rate of interest is likely to remain low relative to historical norms for some time, it is important to assess the underlying causes and their likely persistence. There are a host of factors that could lead the neutral rate to remain depressed in the longer run--ranging from the low level of world real interest rates, which affects the United States via the exchange rate and financial market channels, to slow-moving secular trends in the labor force and productivity, to persistent changes in risk perceptions stemming from the crisis.

Although tight domestic credit conditions and concerns about downside risks to asset prices and domestic demand were the dominant drivers early in the recovery, the foreign outlook has become increasingly important as a source of downward pressure on the neutral rate in the past few years. In addition to concerns about weak demand in Japan and the euro area, more recently foreign growth concerns have broadened to include China, which is navigating difficult structural as well as cyclical adjustments. The financial reverberations from China are adversely affecting commodity exporters and emerging markets more broadly, and weak growth trajectories are now the norm in much of the world, pushing down interest rates globally.

The broad-based reduction in interest rates in the rest of the world, by increasing demand for U.S. assets, puts upward pressure on the dollar, which in turn implies downward pressure on the U.S. neutral rate. One way to think about the spillover from abroad is how much adjustment in the federal funds rate might be necessary to insulate domestic employment from an appreciation in the dollar that is expected to persist. Let's take the roughly 15 percent real appreciation of the dollar that we have seen since June 2014. According to the Board's FRB/US model, it would require lowering the path of the federal funds rate by roughly 1 percentage point over the medium term to insulate domestic employment from the 15 percent stronger exchange rate in inflation adjusted terms. In the neighborhood of the zero lower bound, this shift down implies a delay in the date of liftoff and a shallower path for the federal funds rate over several years. In effect, this spillover from abroad implies some limitations on the extent to which U.S. monetary conditions can diverge from global conditions.

Going forward, many observers expect global growth to stabilize and eventually move higher, easing pressure on the dollar and on commodity prices and leading to a higher neutral interest rate globally.<sup>10</sup> However, as foreign economies face structural as well as cyclical adjustments, the speed at which the stabilization and recovery of foreign growth takes place is highly uncertain, and there is a risk that this influence on the neutral rate could fade very slowly. Moreover, there are downside risks to the foreign outlook.

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<sup>9</sup> Laubach and Williams define the natural rate as "the real short-term interest rate consistent with the economy operating at its full potential once transitory shocks to aggregate supply or demand have abated" (2015, p. 2).

<sup>10</sup> See, for example, chapter 1 of the IMF *World Economic Outlook* (2015).

Other factors likely pushing down the current neutral rate may prove even more persistent. Importantly, expectations that the economy's growth potential has fallen could contribute to a persistent decline in the neutral rate. Indeed, there is evidence that growth in the labor force, and perhaps productivity, have slowed persistently in recent years. After increasing noticeably over much of the post-World War II period, the labor force participation rate flattened out over the 1990s and began to decline in the early 2000s as the baby boom generation approached retirement. Most recently, the pace of decline has quickened, with the participation rate declining 1/2 percent per year, on average, over the recovery.<sup>11</sup> Productivity growth has also slowed, averaging just 1 percent per year over the recovery, about half the pace over the 50 years prior to the financial crisis.<sup>12</sup> Given this data, the Congressional Budget Office now estimates that the growth rate of potential output is only 1.7 percent currently, less than half the rate during the 50 years before 2008. Nevertheless, although there is evidence of a connection between low potential output growth and a low neutral rate, as pointed out by Hamilton and others, the relationship is not precisely estimated, which leaves considerable uncertainty about the magnitude of the effect.<sup>13</sup>

Finally, investors' risk sensitivity appears to have been altered by the experience of tail risks during the crisis, which could have a persistent depressing effect on the neutral rate. To the extent that investors or firms are more attuned to the risks associated with capital investments than before the financial crisis, it increases the premium for risky investments, or the difference in return between a risk-free investment, such as overnight reserves, and somewhat riskier investment opportunities. A higher risk premium necessitates a lower risk-free rate to encourage the same amount of riskier investments as previously. Consistent with this explanation, there is evidence that the gap between the return to capital investment and the risk free rate has risen. For example, according to dynamic stochastic general equilibrium models estimated by the Federal Reserve Board and the Federal Reserve Bank of New York, the natural rate of interest has been held down during the recovery by shocks that increase the difference between the marginal product of capital and the risk free rate, pushing down investment and reducing the level of capital.<sup>14</sup> In addition, a simple measure of the marginal product of capital suggests that the return to capital investment has not changed very much, or perhaps has even increased, over the past decade despite the decline in risk free rates.<sup>15</sup>

### **Implications for the Path of Monetary Policy**

Before addressing what a persistently low neutral interest rate might mean for the normalization of monetary policy, it is helpful to review inflation developments. Because the federal funds rate is the real rate plus the expected rate of inflation and because it is the real rate that influences economic activity, the amount of monetary accommodation represented by a given nominal level of the federal funds rate decreases as expected inflation declines. In

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<sup>11</sup> Population growth has also moved gradually lower in the United States, though the effect has not been as large as in some foreign economies, where the size of the population is now stagnant or falling.

<sup>12</sup> It is unclear how persistent recent low rates of measured productivity growth will be. While weak investment levels, particularly early on in the recovery, likely contributed to lower productivity gains, investment levels going forward could be closer to historical norms. Also, recent technological gains may eventually contribute strongly to productivity growth; see, for example, Baily, Manyika, and Gupta (2013). In addition, there is evidence that some of the contribution of technology gains to productivity growth is being understated; see, for example, Byrne and Pinto (2015), Byrne and Corrado (2015), and Byrne, Oliner and Sichel (2015).

<sup>13</sup> See Hamilton and others (2015).

<sup>14</sup> See Del Negro and others (2015). In these models, the natural rate of interest is defined as the "rate of interest that would obtain if all prices and wages had adjusted so as to bring the level of economic activity to its full-employment rate."

<sup>15</sup> See Gomme, Ravikumar, and Rupert (2015).

a low neutral rate environment, it is especially important to guard against extended periods of below-target inflation, which may lead inflation expectations to drift lower.

It is thus notable that inflation has been below our 2 percent target for 3 years. Current below-target levels of inflation in part reflect disinflationary pressures from abroad, including lower import prices and lower commodity prices, which are likely to fade over time. However, inflation has been stubbornly low, even excluding energy prices. Over the 12 months ending in October, core personal consumption expenditures, or PCE, prices, which exclude the often volatile categories of food and energy, increased 1.3 percent, and the 12-month change in core prices has been around 1-1/4 to 1-1/2 percent since the beginning of 2013. The persistent weakness in core price inflation deserves continued vigilance.

In determining the outlook for inflation, the gravitational force of long-term inflation expectations is especially important. Some survey measures of inflation expectations have declined recently. For example, the University of Michigan Surveys of Consumers median measure of inflation expectations at a 5-to-10 year horizon was 2.6 percent in November and has averaged 2.7 percent over the past year, slightly below the average reading over the past decade of 2.9 percent. Projections from the Survey of Professional Forecasters also suggest that 10-year-ahead inflation expectations edged lower this quarter, although they have remained at or very near 2 percent since the end of 2012.

Market-based measures of inflation compensation at longer-term horizons, such as inflation swaps and the difference between nominal and inflation-indexed Treasury bond yields, have declined more noticeably over the past year and a half. Although it is difficult to precisely disentangle the contribution of changes in inflation expectations, liquidity premiums, and inflation risk premiums to this downward shift, some decompositions suggest that, while expected inflation may not have declined much, market participants may be placing a somewhat greater likelihood than previously on episodes of below-potential growth being accompanied by below-target inflation. Thus, the decline in measures of inflation expectations warrants close monitoring.

The slow progress on inflation, together with the likely low level of the longer-term neutral real rate and the slow pace at which the very low shorter-term rate may move to the longer-term rate, suggest that the federal funds rate is likely to adjust more gradually and to a lower level than in previous expansions. In short, "gradual and low" is likely to be the new normal.

In addition, the combination of a low neutral real rate with slow progress on inflation suggests a greater likelihood of hitting the zero lower bound than in previous decades, when the neutral rate was probably much higher. The lower the longer-term nominal neutral rate is, the smaller in magnitude an adverse economic shock must be to push growth sufficiently below potential to necessitate a nominal federal funds rate below zero to provide accommodation. Assuming there has not been a material reduction in the frequency and severity of negative shocks since the pre-crisis period, the implication is that the probability of being constrained by the zero lower bound is greater than prior to the crisis.

Although empirical analysis suggests that unconventional tools affect the economy through the same channels as the federal funds rate, even so, there are greater costs and uncertainties associated with unconventional policies relative to changes in the federal funds rate.<sup>16</sup> As a result, policy is likely to remain more constrained at the zero lower bound than above it. As the probability of hitting the zero lower bound increases, the asymmetry in policy flexibility becomes more pronounced. Because we have more space to respond by raising rates if inflationary forces accelerate than by cutting rates if disinflationary forces emerge, when nominal neutral rates are likely to be lower on average, we should be cautious about raising rates, do so gradually, and carefully assess the effects on economic and financial conditions

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<sup>16</sup> See Engen, Laubach and Reifschneider (2015), for example.

as we go. Moreover, because the Federal Reserve's asset holdings help maintain accommodative financial conditions, it would be prudent to maintain reinvestments until the normalization of the federal funds rate is sufficiently far along to allow room to cut nominal rates if economic conditions deteriorate.

The asymmetry of policy flexibility at the zero lower bound also arises when there is uncertainty about the level of the neutral real rate. As discussed in recent papers, if there is significant uncertainty about the level of the neutral real rate, risk management considerations suggest that policymakers should respond cautiously to signs that the neutral real rate may be rising, particularly when the policy rate is close to the zero lower bound.<sup>17</sup> In the presence of uncertainty, there is a risk that the actual neutral real rate is either higher or lower than current estimates of the neutral real rate, and the stance of policy will therefore be either more accommodative or more restrictive than intended. If the actual neutral rate is higher than estimated, and policy is more accommodative than intended, the stance of policy can be readily tightened later to restrain any buildup in inflationary pressures. But, if the actual neutral real rate is lower than estimated, and the stance of monetary policy is tighter than intended, unexpected policy restraint may prove difficult to offset later with more accommodative policy because the policy rate is already close to the zero lower bound.

Finally, there is a risk that with persistently lower neutral rates, there may be greater pressures for investors to reach for yield, increasing the demand for risky assets. As a result, macroprudential policy may take on greater importance to guard against financial stability risks. Since the crisis, the Federal Reserve and other regulatory agencies have implemented a number of new rules to strengthen capital, liquidity, and risk management at the largest financial institutions. Many of these rules are "through the cycle" safeguards, meaning that they impose structurally higher standards. In addition, when the risks to financial stability increase, the Federal Reserve, in consultation with the other banking agencies, can temporarily increase the amount of capital that large banks are required to hold in order to build resilience at these institutions and to restrain undue risk-taking on a cyclical basis.

## Conclusion

A variety of evidence suggests that the longer-run neutral rate is lower now than it has been historically, and that the very low shorter-run neutral rate may adjust to it very slowly, due to a combination of weaker foreign demand growth, greater risk sensitivity as a result of the crisis, higher risk premiums for productive investment, and lower growth in potential output. The lower neutral rate means the normalization of the federal funds rate is likely to follow a more gradual and shallower path than in previous cycles, although the actual path will be determined by economic conditions. It also implies that the likelihood of the federal funds rate hitting the zero lower bound will be persistently greater than it has been previously, which could make it more difficult to achieve our objectives of full employment and 2 percent inflation. With the nominal neutral interest rate lower than in the past, and with policy options being more limited if conditions deteriorate than if inflationary pressures accelerate, the asymmetry in risk-management considerations counsels a cautious and gradual approach.

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<sup>17</sup> See the recent papers by Gust, Johannsen and López-Salido (2015) and Evans and others (2015).

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