

For release on delivery  
1:15 p.m. EDT (12:15 p.m. CDT)  
September 12, 2016

The “New Normal” and What It Means for Monetary Policy

Remarks by

Lael Brainard

Member

Board of Governors of the Federal Reserve System

at

The Chicago Council on Global Affairs

Chicago, Illinois

September 12, 2016

In the months ahead, my colleagues and I will continue to assess what policy path will best promote the sustained attainment of our goals. With that in mind, I would like to start by describing the contours of today's economy that will be particularly important in shaping the appropriate path of policy before reviewing recent developments. These contours represent noteworthy departures from the "old normal" that prevailed in the decades prior to the financial crisis. I would argue that policy today must rely less on the old normal as a guidepost and instead be sensitive to the contours that shape today's "new normal."<sup>1</sup>

### **Key Features of the "New Normal"**

Because monetary policy is forward looking, policymakers must assess how key features of the economic environment are most likely to influence the future path of the economy and shape policy accordingly. At a time when our assessment of the economy is evolving, several features of the "new normal"--some of which are interrelated--appear particularly noteworthy for our policy deliberations:

#### *1. Inflation Has Been Undershooting, and the Phillips Curve Has Flattened*

First, for the past several decades, policymakers relied on the empirical relationship between unemployment and inflation embodied in the Phillips curve as a key guidepost for monetary policy. The Phillips curve implied that as labor market slack diminished and the economy approached full employment, upward pressure on inflation would result. However, since 2012, inflation has tended to change relatively little--both absolutely and relative to earlier decades--as the unemployment rate has fallen

---

<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.

considerably.<sup>2</sup> At a time when the unemployment rate has fallen from 8.2 percent to 4.9 percent, inflation has undershot our 2 percent target now for 51 straight months.<sup>3</sup> In other words, the Phillips curve appears to be flatter today than it was previously.

With the Phillips curve appearing to be a less reliable guidepost than it has been in the past, the anchoring role of inflation expectations remains critically important. On expected similar to realized inflation, recent developments suggest some reasons to be concerned more about undershooting than overshooting. Although some survey measures have remained well anchored at 2 percent, consumer surveys have moved to the lower end of their historical ranges and have not risen sustainably.<sup>4</sup> Meanwhile, market-based measures of inflation compensation have declined noticeably over the past two years at longer-term horizons, and have shown little improvement despite the recent stabilization in the price of oil and the exchange rate. Thus, we cannot rule out that the sustained period of undershooting the inflation target along with global disinflationary pressures are weighing on inflation expectations.

Recognition of these developments is reflected in the evolution of the forecasts of Federal Open Market Committee (FOMC) participants in the Summary of Economic Projections (SEP) from June 2012 to June 2016. The SEP forecasts have shown repeated mark downs of the central tendency of the projection for core PCE (personal consumption expenditures) inflation, and the attainment of 2 percent at the upper end of the range has been pushed out repeatedly from 2012 initially to 2017 most recently.

---

<sup>2</sup> See Blanchard (2016), Kiley (2015b), and Brainard (2015a),

<sup>3</sup> The inflation information refers to core PCE (personal consumption expenditures) inflation measured on a 12-month average basis.

<sup>4</sup> For example, over the past 12 months, median 5-to-10 year-ahead inflation expectations from the University of Michigan Surveys of Consumers were 1/4 percentage point below the average over the prior 10 years.

The apparent flatness of the Phillips curve together with evidence that inflation expectations may have softened on the downside and the persistent undershooting of inflation relative to our target should be important considerations in our policy deliberations. In particular, to the extent that the effect on inflation of further gradual tightening in labor market conditions is likely to be moderate and gradual, the case to tighten policy preemptively is less compelling.

*2. Labor Market Slack Has Been Greater than Anticipated*

Second, and related, although we have seen important progress on employment, this improvement has been accompanied by evidence of greater slack than previously anticipated. This uncertainty about the true state of the economy suggests we should be open to the possibility of material further progress in the labor market. Indeed, with payroll employment growth averaging 180,000 per month this year, many observers would have expected the unemployment rate to drop noticeably rather than moving sideways, as it has done. It is true that today's unemployment rate of 4.9 percent is only 0.1 percentage point from the median SEP participant's estimate of the longer-run level of unemployment. However, the natural rate of unemployment is uncertain and can vary over time. Indeed, in the SEP, the central tendency of the projection for the longer-run natural rate of unemployment has come down significantly, from a range of 5.2 to 6.0 percent in June 2012 to 4.7 to 5.0 percent in June 2016--a reduction of 1/2 to 1 percentage point.<sup>5</sup> We cannot rule out that estimates of the natural unemployment rate may move even lower.

---

<sup>5</sup> For information from current and previous SEPs, see <http://www.federalreserve.gov/monetarypolicy/fomccalendars.htm>.

In addition, the unemployment rate is not the only gauge of labor market slack, and other measures have been suggesting there is some room to go. The share of employees working part time for economic reasons, for example, has remained noticeably above its pre-crisis level. Of particular significance, the prime-age labor force participation rate, despite improvement this year, remains about 1-1/2 percentage points below its pre-crisis level, suggesting room for further gains. While it is possible that the current low level of prime-age participation reflects ongoing pre-crisis trends, we cannot rule out that it reflects a lagged and still incomplete response to a very slow recovery in job opportunities and wages.<sup>6</sup>

This possibility is reinforced by the continued muted recovery in wage growth. Although wage growth has picked up to about a 2-1/2 percent pace in recent quarters, this pace is only modestly above that which prevailed over much of the recovery and well below growth rates seen prior to the financial crisis.<sup>7</sup>

My main point here is that in the presence of uncertainty and the absence of accelerating inflationary pressures, it would be unwise for policy to foreclose on the possibility of making further gains in the labor market.

---

<sup>6</sup> For analyses of the determinants of labor force participation, see Aaronson and others (2014), Erceg and Levin (2014), and Council of Economic Advisers (2016).

<sup>7</sup> Over the 12 months ending in August 2016, average hourly earnings increased 2.4 percent. Over the 12 months ending in June, the employment cost index for private-sector workers also increased 2.4 percent. The more volatile compensation per hour measure for the business sector has increased at an annual rate of 2.6 percent over the past eight quarters. From the fourth quarter of 2009 to the fourth quarter of 2014, these measures all increased at an average annual rate of around 2 percent. From the fourth quarter of 2003 to the fourth quarter of 2007, the compensation per hour and employment cost index measures increased at an average annual rate of around 3-1/2 percent. Average hourly earnings for all workers were not available for this period.

3. *Foreign Markets Matter, Especially because Financial Transmission is Strong*

Third, disinflation pressure and weak demand from abroad will likely weigh on the U.S. outlook for some time, and fragility in global markets could again pose risks here at home.<sup>8</sup> In Europe, recovery continues, but growth is slow and inflation is very low. Low growth and a flat yield curve are contributing to reduced profitability and a higher cost of equity financing for banks, which in turn could impair bank lending, one of the main transmission channels of monetary policy in the euro area's bank-centric financial system. A low growth, low inflation environment also makes progress on fiscal sustainability difficult and leaves countries with high debt-to-gross domestic product (GDP) ratios vulnerable to adverse demand shocks. Against this backdrop, uncertainty about Britain's future relationship with the European Union could damp business sentiment and investment in Europe.

Japan remains greatly challenged by weak growth and low inflation. Indeed, it is striking that despite active and creative monetary policies in both the euro area and Japan, inflation remains below target levels. The experiences of these economies highlight the risk of becoming trapped in a low-growth, low-inflation, low-inflation-expectations environment and suggest that policy should be oriented toward minimizing the risk of the U.S. economy slipping into such a situation.

---

<sup>8</sup> The International Monetary Fund (IMF) has repeatedly marked down its forecast of world economic growth in recent years. From April 2014 to July of this year, for example, the IMF revised down 2015 growth from 3.9 percent to 3.1 percent. And from April 2015 to July of this year, the IMF revised down 2016 growth from 3.8 percent to 3.1 percent. See the IMF's World Economic Outlook at <http://www.imf.org/external/ns/cs.aspx?id=29>.

Downside risks are also present in emerging market economies, where growth has slowed rapidly in recent years.<sup>9</sup> Most importantly, China is undergoing a challenging transition from a growth model based on investment, exports, and debt-fueled state-owned enterprises to one driven by consumption, services, and dynamic private businesses. Because of the adjustment costs along this transition path and demographic trends, Chinese growth will likely continue to slow. Given that China has experienced very high growth in corporate debt, this downshift could pose risks. Importantly, Chinese authorities have made some progress on clarifying their policy stance, and capital outflows have slowed in recent months. Nonetheless, considerable uncertainty remains, and further volatility cannot be ruled out. The importance of Chinese growth and stability to many emerging market economies and to global markets more broadly implies that these risks have global implications.

Headwinds from abroad should matter to U.S. policymakers because recent experience suggests global financial markets are tightly integrated, such that disturbances emanating from Chinese or euro-area financial markets quickly spill over to U.S. financial markets. The fallout from adverse foreign shocks appears to be more powerfully transmitted to the U.S. than previously. Indeed, recent research suggests that changes in expectations regarding the path of policy in the United States relative to other major economies lead to exchange rate movements that appear to be several times bigger than they were several years ago.<sup>10</sup> The fact that many advanced economies are suffering from deficient demand and have policy rates at or near the zero bound and that the U.S.

---

<sup>9</sup> Emerging market growth, as weighted by a country's share of U.S. exports, has decreased from an average pace of 5-1/4 percent from the fourth quarter of 2009 to the fourth quarter of 2012 to a little over 2 percent last year.

<sup>10</sup> See Curcuro (forthcoming). The confidence intervals around the estimated effects are quite large.

dollar is a favored safe-haven asset may imply that adverse foreign demand shocks have a particularly strong effect on the value of the dollar, effectively transmitting the weakness to the U.S. economy.<sup>11</sup>

In turn, U.S. activity and inflation appear to be importantly influenced by these exchange rate movements. In particular, estimates from the FRB/US model suggest that the nearly 20 percent appreciation of the dollar from June 2014 to January of this year could be having an effect on U.S. economic activity roughly equivalent to a 200 basis point increase in the federal funds rate. Interestingly, it appears that this effect showed through in decreased business investment activity and stagnant manufacturing output, while the anticipated effect on net exports may have been somewhat dampened by depressed demand for imports of capital goods, among other factors.

#### *4. The Neutral Rate Is Likely to Remain Very Low for Some Time*

Fourth, perhaps most salient for monetary policy, it appears increasingly clear that the neutral rate of interest remains considerably and persistently lower than it was before the crisis. Over the current expansion, with a federal funds rate at, or near, zero and the additional support provided by asset purchases and reinvestment, GDP growth has averaged a very modest rate upward of 2 percent, and inflation has averaged only 1-1/2 percent. Ten years ago, based on the underlying economic relationships that prevailed at the time, it would have seemed inconceivable that real activity and inflation would be so subdued given the stance of monetary policy. To reconcile these developments, it is difficult not to conclude that the current level of the federal funds rate is less accommodative today than it would have been 10 years ago. Put differently, the

---

<sup>11</sup> See Caballero, Farhi, and Gourinchas (2015).



amount of aggregate demand associated with a given level of the interest rate is now much lower than before the crisis.

In the early stages of the recovery, most observers thought that the cyclical headwinds restraining demand and lowering the neutral rate would dissipate, and that the neutral rate would move gradually back to the pre-crisis norm of 2 percent. But seven years into the expansion and with little sign of a significant acceleration in activity, the low neutral rate looks likely to persist. Indeed, developments over the past year confirm that the underlying causes will be with us for some time.<sup>12</sup> Foreign consumption and investment are weak, while foreign demand for savings is high, along with an elevated demand for safe assets. Productivity growth, which increased at an average annual rate of nearly 2-1/2 percent from 1950 to 2000, has increased only 1/2 percent on average over the past five years, and demographics also suggest a persistent slowing of the labor force.

Recognition of the reduction in the long-run neutral federal funds rate is perhaps the most consequential change in the SEP forecasts. In the four years between June 2012 and June 2016, the estimate of the long-run federal funds rate has declined from 4.25 percent to 3.0 percent--nearly one-third. Over one-third of that adjustment has occurred between December 2015 and June 2016. It is notable that this recent step-down in the SEP estimate has coincided with a period of easing in financial conditions and a stabilization in the exchange rate as market participants have taken into account changes in the perceived FOMC policy reaction function.

---

<sup>12</sup> For a fuller description of the likely contributors to a persistent low neutral rate, see Brainard (2015b) and Goodfriend (2016).

Several econometric models and estimates from market participants suggest the current real neutral rate is at or close to zero, and any increase is likely to be shallow and slow.<sup>13</sup> These estimates imply that it may require a relatively more modest adjustment in the policy rate to return to neutral over time than previously anticipated.

#### *5. Policy Options Are Asymmetric*

The four features just discussed that define the new normal make it likely that we will continue to grapple with a fifth new reality for some time: the ability of monetary policy to respond to shocks is asymmetric. With policy rates near the zero lower bound and likely to return there more frequently even if the economy only experiences shocks similar in magnitude to those experienced pre-crisis, due to the low level of the neutral rate, there is an asymmetry in the policy tools available to respond to adverse developments. Conventional changes in the federal funds rate, our most tested and best understood tool, cannot be used as readily to respond to downside shocks to aggregate demand as it can to upside shocks. While there are, of course, other policy options, these alternatives have constraints and uncertainties that are not present with conventional policy.<sup>14</sup> From a risk-management perspective, therefore, the asymmetry in the conventional policy toolkit would lead me to expect policy to be tilted somewhat in favor of guarding against downside risks relative to preemptively raising rates to guard against upside risks.

---

<sup>13</sup> See, for example, Laubach and Williams (2015); Del Negro, Giannoni, and Smith (2016); Cúrdia (2015); Lubik and Matthes (2015); Kiley (2015a); and Johannsen and Mertens (2016) for econometric estimates of the neutral rate, or the closely related concept of the natural rate of interest. See the Federal Reserve Bank of New York's most recent Survey of Market Participants ([https://www.newyorkfed.org/markets/survey\\_market\\_participants.html](https://www.newyorkfed.org/markets/survey_market_participants.html)) and Survey of Primary Dealers ([https://www.newyorkfed.org/markets/primarydealer\\_survey\\_questions.html](https://www.newyorkfed.org/markets/primarydealer_survey_questions.html)) for forecasters' estimates of the current neutral rate.

<sup>14</sup> See Reifschneider (2016).

Because a persistently low neutral rate implies less room for conventional monetary policy to adjust to adverse developments, it will be important to assess whether our current policy tools are adequate to respond to negative shocks and, if not, what adjustments would be most appropriate. There is a growing literature on such policy alternatives, such as raising the inflation target, moving to a nominal income target, or deploying negative interest rates.<sup>15</sup> These options merit further assessment. However, they are largely untested and would take some time to assess and prepare. For the time being, the most effective way to address these concerns is to ensure that our policy actions align with our commitment to achieving the existing inflation target, which the Committee has recently clarified is symmetric around 2 percent--and not a ceiling--along with maximum employment.

### **Recent Developments Suggest Gradual Progress**

Against the backdrop of these five features of the new normal that are most salient for conditioning policy, I will briefly summarize my take on recent economic developments and their implications for policy. The economy has seen welcome progress on some fronts in recent months, supported by the cautious approach taken by the Committee and a corresponding easing in financial conditions: The labor market has continued to improve, consumer confidence has remained high, and we have navigated past near-term risks from abroad.

Overall, the recent data on the labor market and aggregate spending suggest that we are continuing to move toward full employment, but that progress has been, and likely will be, somewhat gradual. This year, monthly job gains have averaged 180,000, below

---

<sup>15</sup> See Romer (2011), Blanchard, Dell’Ariccia and Mauro (2010), Ball (2014), Haldane (2015), Bernanke (2015), and Goodfriend (2016).

last year's pace but still sufficient to reduce labor market slack. The slowing pace of job gains has been associated with a flattening out in the unemployment rate over the past year, along with a heartening 1/2 percentage point increase in the prime-age labor force participation rate. These developments suggest that an improving job market has made joining, or remaining in, the labor force increasingly attractive, and may imply that the labor market has room for further improvement.

Recent spending data suggest a pickup in third-quarter growth. In particular, real consumer spending increased at nearly a 4 percent annual pace over the three months ending in July, driven by continued job growth, buoyant consumer sentiment, and rising household wealth. Nonetheless, spending in other sectors has been disappointing. Weak foreign growth and the net appreciation of the dollar over the past two years have weighed heavily on net exports, corporate profitability, business investment, and manufacturing production. Business investment has declined in each of the past three quarters, and the latest data on housing permits suggest that residential investment slowed noticeably in the middle of this year. As a result, economic activity over the past three quarters has been disappointing, with growth in GDP and gross domestic income each averaging less than 1 percent, a significant step-down from the same period in 2015.

Looking ahead, the stabilization of the dollar and oil prices suggests that growth in these components should move higher over the second half of the year. Indeed, exports, which have declined since the end of 2014, moved slightly higher last quarter, and the number of oil drilling rigs in operation has begun to edge up after sharp declines over the past two years, a positive sign for business investment. In addition, inventory

investment, which edged lower last quarter, should step up over the second half of the year to a level more in line with continued moderate increases in final sales.

We have also seen signs of progress on our inflation mandate. In July, the 12-month change in core PCE prices was 1.6 percent, higher than a year ago, but still noticeably below our 2 percent target. The stabilization of the dollar and oil prices should lead inflation to move back toward our target in coming quarters. Non-oil import prices, which fell steadily from the end of 2014 through the first quarter of this year, edged up in the second quarter and, if the dollar remains steady, should continue to rise going forward. Continued progress in inflation will also depend on inflation expectations remaining well anchored and not drifting lower. The evidence here is mixed, as I noted earlier.

### **Policy Implications**

The five features of the current economic landscape that I have highlighted lean roughly in the same direction: In today's new normal, the costs to the economy of greater-than-expected strength in demand are likely to be lower than the costs of significant unexpected weakness. In the case of unexpected strength, we have well-trying and tested tools and ample policy space in which to react. Moreover, because of Phillips curve flattening, the possibility of remaining labor market slack, the likely substantial response of the exchange rate and its depressing effect on inflation, the low neutral rate, and the fact that inflation expectations are well anchored to the upside, the response of inflation to unexpected strength in demand will likely be modest and gradual, requiring a correspondingly moderate policy response and implying relatively slight costs to the economy. In the face of an adverse shock, however, our conventional policy toolkit is

more limited, and thus the risk of being unable to adequately respond to unexpected weakness is greater. The experience of the Japanese and euro-area economies suggest that prolonged weakness in demand is very difficult to correct, leading to economic costs that can be considerable.

This asymmetry in risk management in today's new normal counsels prudence in the removal of policy accommodation. I believe this approach has served us well in recent months, helping to support continued gains in employment and progress on inflation. I look forward to assessing the evolution of the data in the months ahead for signs of further progress toward our goals, bearing in mind these considerations.

## References

- Aaronson, Stephanie, Tomaz Cajner, Bruce Fallick, Felix Galbis-Reig, Christopher Smith, and William Wascher (2014). “Labor Force Participation: Recent Developments and Future Prospects,” *Brookings Papers on Economic Activity*, Fall, pp. 197-275, [www.brookings.edu/~media/projects/bpea/fall-2014/fall2014bpea\\_aaronson\\_et\\_al.pdf](http://www.brookings.edu/~media/projects/bpea/fall-2014/fall2014bpea_aaronson_et_al.pdf).
- Ball, Laurence (2014). “The Case for a Long-Run Inflation Target of Four Percent,” IMF Working Paper WP/14/92. Washington: International Monetary Fund, June, <https://www.imf.org/external/pubs/ft/wp/2014/wp1492.pdf>.
- Bernanke, Ben S. (2015). “Monetary Policy in the Future,” speech delivered at the “Rethinking Macro Policy III” conference sponsored by the International Monetary Fund, Washington, April 15, <https://www.brookings.edu/blog/ben-bernanke/2015/04/15/monetary-policy-in-the-future>.
- Blanchard, Olivier (2016). “The U.S. Phillips Curve: Back to the 60s?” Policy Brief 16-1. Washington: Peterson Institute of International Economics, January, <https://www.piie.com/publications/pb/pb16-1.pdf>.
- Blanchard, Olivier, Giovanni Dell’Ariccia, and Paolo Mauro (2010). “Rethinking Macroeconomic Policy,” IMF Staff Position Note 10/03. Washington: International Monetary Fund, February 12, <https://www.imf.org/external/pubs/ft/spn/2010/spn1003.pdf>.
- Brainard, Lael (2015a). “Economic Outlook and Monetary Policy,” speech delivered at “North America’s Place in a Changing World Economy,” 57th National Association for Business Economics Annual Meeting, Washington, October 12, [www.federalreserve.gov/newsevents/speech/brainard20151012a.htm](http://www.federalreserve.gov/newsevents/speech/brainard20151012a.htm).
- (2015b). “Normalizing Monetary Policy When the Neutral Interest Rate Is Low,” speech delivered at the Stanford Institute for Economic Policy Research, Stanford, Calif., December 1, [www.federalreserve.gov/newsevents/speech/brainard20151201a.htm](http://www.federalreserve.gov/newsevents/speech/brainard20151201a.htm).
- Caballero, Ricardo J., Emmanuel Farhi, and Pierre-Olivier Gourinchas (2015). “Global Imbalances and Currency Wars at the ZLB,” NBER Working Paper Series 21670. Cambridge, Mass.: National Bureau of Economic Research, October, [www.nber.org/papers/w21670](http://www.nber.org/papers/w21670).
- Council of Economic Advisers (2016). *The Long-Term Decline in Prime-Age Male Labor Force Participation*. Washington: Executive Office of the President of the United States, June, [https://www.whitehouse.gov/sites/default/files/page/files/20160620\\_cea\\_primeage\\_male\\_lfp.pdf](https://www.whitehouse.gov/sites/default/files/page/files/20160620_cea_primeage_male_lfp.pdf).

Curcuru, Stephanie (forthcoming). “The Sensitivity of the USD Exchange Rate to Changes in Monetary Policy Expectations,” IFDP Notes. Washington: Board of Governors of the Federal Reserve System.

Cúrdia, Vasco (2015). “Why So Slow? A Gradual Return for Interest Rates,” Federal Reserve Bank of San Francisco, FRBSF Economic Letter 2015-32. San Francisco: FRBSF, October 12, [www.frbsf.org/economic-research/publications/economic-letter/2015/october/gradual-return-to-normal-natural-rate-of-interest](http://www.frbsf.org/economic-research/publications/economic-letter/2015/october/gradual-return-to-normal-natural-rate-of-interest).

Del Negro, Marco, Marc Giannoni, and Micah Smith (2016). “The Macro Effects of the Recent Swing in Financial Conditions,” Federal Reserve Bank of New York, *Liberty Street Economics* (blog), May 25, <http://libertystreeteconomics.newyorkfed.org/2016/05/the-macro-effects-of-the-recent-swing-in-financial-conditions.html#.V0Wty-TYj4g>.

Erceg, Christopher J., and Andrew T. Levin (2014). “Labor Force Participation and Monetary Policy in the Wake of the Great Recession,” *Journal of Money, Credit and Banking*, vol. 46 (S2, October), pp. 3-49.

Goodfriend, Marvin (2016). “The Case for Unencumbering Interest Rate Policy at the Zero Bound,” speech delivered at “Designing Resilient Monetary Policy Frameworks for the Future,” a symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyo., Aug. 26-27, <https://www.kansascityfed.org/~media/files/publicat/sympos/2016/econsymposium-goodfriend-paper.pdf?la=en>.

Haldane, Andrew (2015). “How Low Can You Go?” speech delivered at the Portadown Chamber of Commerce, Northern Ireland, September 18, [www.bankofengland.co.uk/publications/Pages/speeches/2015/840.aspx](http://www.bankofengland.co.uk/publications/Pages/speeches/2015/840.aspx).

Johannsen, Benjamin K., and Elmar Mertens (2016). “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, [www.federalreserve.gov/econresdata/notes/feds-notes/2016/the-expected-real-interest-rate-in-the-long-run-time-series-evidence-with-the-effective-lower-bound-20160209.html](http://www.federalreserve.gov/econresdata/notes/feds-notes/2016/the-expected-real-interest-rate-in-the-long-run-time-series-evidence-with-the-effective-lower-bound-20160209.html).

Kiley, Michael T. (2015a). “What Can the Data Tell Us about the Equilibrium Real Interest Rate?” Finance and Economics Discussion Series 2015-077. Washington: Board of Governors of the Federal Reserve System, August, <http://dx.doi.org/10.17016/FEDS.2015.077>.

----- (2015b). “Low Inflation in the United States: A Summary of Recent Research,” FEDS Notes. Washington: Board of Governors of the Federal Reserve System, November 23, [www.federalreserve.gov/econresdata/notes/feds-notes/2015/low-inflation-in-the-united-states-a-summary-of-recent-research-20151123.html](http://www.federalreserve.gov/econresdata/notes/feds-notes/2015/low-inflation-in-the-united-states-a-summary-of-recent-research-20151123.html).



- Laubach, Thomas, and John C. Williams (2015). "Measuring the Natural Rate of Interest Redux," Working Paper Series 2015-16. San Francisco: Federal Reserve Bank of San Francisco, October, [www.frbsf.org/economic-research/files/wp2015-16.pdf](http://www.frbsf.org/economic-research/files/wp2015-16.pdf).
- Lubik, Thomas A., and Christian Matthes (2015). "Calculating the Natural Rate of Interest: A Comparison of Two Alternative Approaches," Economic Brief 15-10. Richmond, Va.: Federal Reserve Bank of Richmond, October, [https://www.richmondfed.org/~media/richmondfedorg/publications/research/economic\\_brief/2015/pdf/eb\\_15-10.pdf](https://www.richmondfed.org/~media/richmondfedorg/publications/research/economic_brief/2015/pdf/eb_15-10.pdf).
- Reifschneider, David (2016). "Gauging the Ability of the FOMC to Respond to Future Recessions," Finance and Economics Discussion Series 2016-068. Washington: Board of Governors of the Federal Reserve System, <http://dx.doi.org/10.17016/FEDS.2016.068>.
- Romer, Christina D. (2011). "Dear Ben: It's Time for Your Volcker Moment," *New York Times*, October 29, [www.nytimes.com/2011/10/30/business/economy/ben-bernanke-needs-a-volcker-moment.html?\\_r=0](http://www.nytimes.com/2011/10/30/business/economy/ben-bernanke-needs-a-volcker-moment.html?_r=0).