FRBSF ECONOMIC LETTER

2012-34 | November 13, 2012

The Federal Reserve's Unconventional Policies

BY JOHN C. WILLIAMS

After the federal funds rate target was lowered to near zero in 2008, the Federal Reserve has used two types of unconventional monetary policies to stimulate the U.S. economy: forward policy guidance and large-scale asset purchases. These tools have been effective in pushing down longer-term Treasury yields and boosting other asset prices, thereby lifting spending and the economy. The following is adapted from a presentation by the president and CEO of the Federal Reserve Bank of San Francisco at the University of California, Irvine, on November 5, 2012.

The subject of my talk is the unconventional monetary policies pursued by the Federal Reserve over the past four years. In my time today, I'll cover three big questions. First, why has the Fed turned to unconventional monetary policies? Second, what effects are these policies having on the economy? And, third, what potential risks do they pose?

The limits of conventional monetary policy

Let me start with the first question, why unconventional monetary policy? Back in late 2008, our country was facing the worst financial crisis and recession since the Great Depression. Real gross domestic product, the broadest measure of how much we produce as a nation, plummeted at an annual rate of 8.9% in the fourth quarter of 2008. The economy was in free fall and the unemployment rate was soaring. In response, in December 2008, the Fed's monetary policy body, the Federal Open Market Committee, or FOMC, cut the target federal funds rate—our conventional instrument of monetary policy—essentially to zero.

The federal funds rate is the short-term interest rate that is normally the FOMC's primary lever used to influence the economy and inflation. When we want to stimulate the economy, we lower the target fed funds rate. This causes other interest rates—like rates on car loans and mortgages—to decline. And it boosts the value of the stock market as investors equalize risk-adjusted returns across their portfolios. In response to lower borrowing costs and the resulting improvement in financial conditions, households and businesses are more willing to spend, creating greater demand for goods and services. This increase in demand in turn causes businesses to increase production and hire more workers. When we want to slow the economy so it doesn't overheat and create inflationary pressures, we raise the fed funds rate and everything works in the opposite direction. That's conventional monetary policy in a nutshell.

Given the economy's dire straits during the recession, standard rules of thumb for monetary policy suggested that the funds rate should be cut to well below zero (see Rudebusch 2009 and Chung et al. 2012). But that was impossible. Why can't interest rates be pushed well below zero? Well, one simple reason is that currency—the cash in your wallet—pays no interest. Think about it. If bank accounts paid

negative interest—that is, if people were charged to keep their money in a bank—then depositors could take money out of their accounts and keep it as hard cash. That would save them the interest expense. Economists refer to this floor on interest rates as the zero lower bound.

Meanwhile, the economic outlook was grim. So, given the inability to cut interest rates well below zero, we began to explore alternative ways to ease credit conditions and thereby stimulate the economy. We also had an eye on inflation, which was heading lower, thereby creating a situation in which deflation might be a threat. I will focus specifically on two types of unconventional monetary policies that the Fed and other central banks put in place around that time. The first is what we at the Fed call forward policy guidance. The second is what we call large-scale asset purchases, but which are popularly known as quantitative easing, or QE.

Forward policy guidance

The first type of unconventional monetary policy that I will discuss is forward policy guidance. Let me start with some background. After each monetary policy meeting, the FOMC releases a statement describing the state of the economy and the reasons for our policy decision about our target for the federal funds rate (see Williams 2012b for a description of monetary policy statement evolution over the past two decades). In addition, the statement often contains language discussing economic risks and where the FOMC thinks monetary policy may be headed (see Rudebusch and Williams 2008). It's interesting to note that the statement language typically has bigger effects on financial conditions than the federal funds rate decision itself (see Gürkaynak, Sack, and Swanson 2005). That's not that surprising. After all, the current level of the federal funds rate only tells what the overnight interest rate is right now. But the FOMC's statement language hints at where those short-term rates are likely to be in the future. That's much more relevant information for households, businesses, and investors. They are typically borrowing for expenditures such as cars, homes, or business capital spending, which are generally financed over a longer term.

Although the FOMC has used versions of forward guidance at various times in the past, the use of the policy statement to provide more explicit information about future policy took a quantum leap forward in the summer of 2011. With the fed funds rate stuck near zero, forward guidance provided a tool to influence longer-term interest rates and financial market conditions. Forward guidance achieves its effects by influencing market expectations for the future path of interest rates. Let me give a concrete example. Around the middle of 2011, private-sector economists expected that the FOMC would start raising the fed funds rate in about nine months to a year, according to surveys of professional forecasters and financial market indicators (see Swanson and Williams 2012).

The introduction of forward guidance in the August 2011 FOMC statement succeeded in shifting market expectations regarding the future path of the federal funds rate. Specifically, the FOMC stated that it "anticipates that economic conditions...are likely to warrant exceptionally low levels for the federal funds rate at least through mid-2013." That statement communicated that the FOMC would probably keep the fed funds rate near zero for at least two more years, longer than many private-sector economists had been thinking. As a result of this shift in expectations, yields on Treasury securities fell by between one- and two-tenths of a percentage point. This may not sound like a big change. But in terms of the effects of monetary policy, those were actually big drops. In fact, this was about as big a fall in interest rates as would normally come from cutting the federal funds rate by three-quarters or even a full percentage

point (see Gürkaynak, Sack, and Swanson 2005 and Chung et al. 2012). And, the ripple effect through financial markets lowered the cost of credit for all kinds of borrowers, not just the U.S. Treasury.

The use of forward policy guidance has now become a key monetary policy tool. Since August 2011, the FOMC has extended forward guidance twice. In January 2012, the FOMC said it would keep the fed funds rate exceptionally low "at least through late 2014." Just this September, it extended its guidance further, "at least through mid-2015." The FOMC also said it would maintain low rates "for a considerable time after the economic recovery strengthens." In other words, it indicated it intends to keep short-term rates low even as the economy improves to make sure this recovery takes hold. I should note that the Fed is not alone in using forward guidance. Other central banks provide forward policy guidance in a variety of ways.

Although forward policy guidance has proven to be a very useful policy tool, it's not a perfect substitute for the kind of monetary stimulus that comes from lower interest rates. One issue is that, for the forward guidance policy to work as desired, the public has to believe that the FOMC will really carry out the policy as it says it will. But, the Fed doesn't have the ability to tie its hands that way. This point was made by Finn Kydland and Edward Prescott in the late 1970s. Let me explain. For forward policy guidance to have its maximum effect, the Fed must commit to keeping the short-term policy rate lower than it otherwise would to compensate for the fact that the short-term interest rate cannot be lowered today. But when the time comes to carry out the commitment made in its forward guidance, it may no longer want to do so. For instance, it might be hard to resist raising rates earlier than promised to head off an increase in inflation (see Adam and Billi 2007). So, even when central bankers say they will keep rates unusually low for a set time, the public may worry that the central bank will raise rates earlier to fight budding inflation pressures (Evans 2010 is an exception; see Walsh 2009 for discussion).

Another challenge for forward guidance is that the public may have different expectations about the future of the economy and monetary policy than the central bank. Expectations are crucial for forward guidance to be effective. If the public doesn't understand the central bank's intended policy path, then forward guidance may not work so well (see Reifschneider and Roberts 2006 and Williams 2006). Therefore, clear communication of policy to the public is a key challenge. This isn't always easy. The public and the media tend to gloss over the nuances of policy and take away simple sound bites.

Large-scale asset purchases

Let me now turn to the second form of unconventional monetary policy, large-scale asset purchases. The goal of large-scale asset purchases, or LSAPs, is the same as for conventional policy actions and forward guidance: to drive down longer-term interest rates, and thereby boost economic growth. How do LSAPs work? First, let me tell you when they wouldn't work. In a hypothetical world of perfect financial markets, LSAPs would have essentially no effect on asset prices or the economy. In such a world, the price of an asset depends solely on its expected future returns, adjusted for risk. If the price of a specific asset deviated from this level, arbitrageurs would swoop in to take advantage of the discrepancy, knowing that the price would inevitably return to its proper level. Suppose the Fed were to step in and buy large amounts of an asset class, say, for example, Treasury securities. In that case, other investors would freely sell their holdings and rebalance their portfolios accordingly. But, asset prices would not change at all. And there would be no impact on the broader economy.

The reason LSAPs work is that financial markets are not perfect. Decades ago, James Tobin and Franco Modigliani pointed out that markets are to a certain degree segmented. Some investors, such as pension funds, have "preferred habitats" for their investments. For example, a pension fund might prefer longer-term securities to hedge its longer-term liabilities. Thus, the supply and demand of assets in these habitats can affect prices because that pension fund is not going to start buying short-term securities just because the prices of longer-term securities rise.

Now, if the Fed buys significant quantities of longer-term Treasury securities or mortgage-backed securities, then the supply of those securities available to the public falls. As supply falls, the prices of those securities rise and their yields decline. The effects extend to other longer-term securities. Mortgage rates and corporate bond yields fall as investors who sold securities to the Fed invest that money elsewhere. Hence, LSAPs drive down a broad range of longer-term borrowing rates. And lower rates get households and businesses to spend more than they otherwise would, boosting economic activity.

LSAPs can also affect interest rates by signaling that the central bank is determined to ease monetary conditions (see Bauer and Rudebusch 2012, Christensen and Rudebusch 2012, and Krishnamurthy and Vissing-Jorgensen 2011). Effectively, the central bank is putting its money where its mouth is. Thus, LSAPs reinforce forward guidance. For this reason, I view these two types of unconventional monetary policy as complementary.

The use of LSAPs goes back to a 1961 initiative with the catchy name of Operation Twist, an effort by the Fed and the Kennedy Administration to drive down longer-term interest rates. More recently, in late 2008 and 2009, the Fed purchased over $1.7 trillion of longer-term Treasury bonds and mortgage-backed securities, a program often referred to as QE1. In November 2010, the FOMC announced an additional $600 billion of longer-term bond purchases—QE2. And, two months ago, we got QE3 when the FOMC announced that the Fed would buy an additional $40 billion in mortgage-backed securities every month until the outlook for the job market improves substantially.

Other central banks have also carried out large-scale asset purchase programs. The Bank of Japan began a large-scale asset purchase program in 2001. In its most recent program, launched in 2010, it has bought roughly $1.1 trillion in Japanese government bonds and other assets. In March 2009, the Bank of England announced an LSAP program that was later raised to the equivalent of roughly $600 billion in purchases mostly of British government bonds. Both of these central banks have continued and expanded their asset purchase programs in the past year.

The effects of unconventional monetary policy on the economy

A great deal of research has analyzed the effects of forward policy guidance and large-scale asset purchases on financial conditions and the economy. As I mentioned before, forward policy guidance has proven to be effective at lowering expectations of future interest rates (see Swanson and Williams 2012 and Woodford 2012). Similarly, the evidence shows that LSAPs have been effective at improving financial conditions as well.

To be precise, the estimated impact of a $600 billion LSAP program, such as QE2, is to lower the 10-year Treasury yield by between 0.15 and 0.20 percentage point (see, for example, Williams 2011, Krishnamurthy and Vissing-Jorgensen 2011, Hamilton and Wu 2012, Swanson 2011, Gagnon et al. 2011,

and Chen, Curdia, and Ferrero 2012). It is around the same magnitude as the effects of forward policy guidance, and about how much the yield on 10-year Treasury securities typically responds to a cut in the fed funds rate of three-quarters to one percentage point (see Chung et al. 2012 and Gürkaynak, Sack, and Swanson 2005). So, by that metric, LSAPs have big effects on longer-term Treasury yields.

By pushing down longer-term Treasury yields, forward guidance and LSAPs have rippled through to other interest rates and boosted other asset prices, lifting spending and the economy. For example, mortgage rates have fallen below 3½%, apparently the lowest level since at least the 1930s. Thanks in part to those rock-bottom rates, we're at long last seeing signs of life in the housing market. Likewise, cheap auto financing rates have spurred car sales. And historically low corporate bond rates encourage businesses to start new projects and hire more workers.

In addition, low interest rates help to support asset prices, such as the value of people's homes and their retirement funds. All else equal, households are more likely to consume if their wealth is growing rather than falling. Stronger asset prices support consumption because they make people feel wealthier and more confident. And that in turn helps boost the economy.

Finally, although it's not our main intention, these unconventional policies have also had an effect on the dollar versus foreign currencies. When interest rates in the United States fall relative to rates in other countries, the dollar tends to decline as money flows to foreign markets with higher returns. One estimate is that a $600 billion program like QE2 causes the dollar to fall by roughly 3 or 4% (see Neely 2011). That helps stimulate the U.S. economy by making American goods more competitive at home and abroad.

I've argued that forward guidance and LSAPs invigorate the economy by lowering interest rates and improving financial conditions more generally. But just how big are these effects? That's not easy to answer. Financial markets react instantly to FOMC announcements, so it's relatively easy to gauge the financial impact of any policy move. By contrast, monetary policy actions affect economic growth, employment, and inflation gradually over time. Thus, the broad economic effects of monetary policy are not immediately obvious. Moreover, data on unemployment and gross domestic product are only collected monthly or quarterly. Many factors besides monetary policy affect these variables. In any particular data release, it's devilishly hard to separate the contribution of monetary policy from other factors.

To control for these other factors, a researcher must use a macroeconomic model. In some of my own research with staff at the Federal Reserve Board, we used the Board's large-scale macroeconomic model, which has hundreds of economic relationships built in, for this purpose (see Chung et al. 2012). We estimated that the Fed's $600 billion QE2 program lowered the unemployment rate by about 0.3 percentage point compared with what it would have been without the program. We also estimated that the program raised GDP by a little over half a percentage point and inflation by 0.2 percentage point. When we considered the combined effects of QE1 and QE2, we found that these programs had a peak effect of reducing the unemployment rate by 1½ percentage points. In addition, we found that these programs probably prevented the U.S. economy from falling into deflation.

Other researchers using different macroeconomic models have found roughly similar effects, although there is a lot of uncertainty surrounding these estimates (see Chen, Curdia, and Ferrero 2012, Kiley 2012,

Fuhrer and Olivei 2011, Baumeister and Benati 2010, and Curdia and Ferrero 2011). Part of the uncertainty stems from the fact that changes in longer-term interest rates due to LSAPs may be atypical. That is, they may affect the economy differently than do changes in longer-term interest rates in normal times. That would make the past relationship between longer-term interest rates and the economy less informative for estimating the effects of unconventional monetary policy.

Risks and uncertainty

Although the evidence shows that the Fed's unconventional policy actions have been effective at lowering interest rates and stimulating economic growth, it's also clear that there remains a great deal of uncertainty about the effects of these policies. After decades of using the fed funds rate as the main tool of monetary policy, Fed policymakers have plenty of confidence in this instrument. We know it works and we're pretty good at estimating how much it works. By contrast, with unconventional monetary policies, we're in waters that have not been extensively charted. We don't know all the consequences. There is uncertainty about the magnitude of the effects on the economy, as I've already discussed. In addition, there is a concern that these policies carry with them risks of unintended negative consequences. Let me go over a few of those concerns.

One concern is that the Fed's very low rate policies may be building up inflationary pressures that we can't yet see (see Williams 2012a). Of course, this risk is not peculiar to unconventional policies. It exists whenever monetary policy is very expansionary. Although this is a risk, it's important to note in the current context that inflation has been very low during this period of unconventional policies, and it remains so. Moreover, the public's inflation expectations remain well anchored. So, we are not seeing signs of rising inflation on the horizon. Japan's experience with unconventional policies is informative as well. Japan has had undesirably low inflation since the 1990s despite the Bank of Japan's very large quantitative easing programs.

Nonetheless, whenever a stimulatory monetary policy is in place, there is always a risk of inflation rising too high. Let me emphasize that the Fed has the tools to combat such a threat if it were to materialize. We can raise interest rates, slowing economic growth. And we can reverse the asset purchase programs, selling assets back into the market if needed.

A second concern is that these policies may be contributing to excessive risk-taking in financial markets as investors seek higher yields in the low-rate environment. I take this concern seriously. We monitor indicators of financial market conditions very closely, looking for signs of imbalances or excesses. In addition, in our role as bank supervisors, we carefully watch for signs of inappropriate risk-taking. We are always on the lookout for indications that the low-rate environment is creating dangers for the banking system. That said, as of today, most indications still point to an environment of heightened risk aversion rather than reckless risk-taking in our financial system. Memories of 2008 are simply too close for most financial market participants to go out on a limb. If that situation were to change significantly, we could modify our unconventional policies to mitigate undesired effects on risk-taking.

I've highlighted the uncertain effects of unconventional policies and some concerns about undesired consequences of these policies. But, the presence of uncertainty does not mean that we shouldn't be using these tools. That is the point that William Brainard analyzed 45 years ago in his classic paper on optimal policy under uncertainty. The answer Brainard (1967) found was that a policy tool with

uncertain effects should not be discarded. However, it should be employed more cautiously than policy tools that have more certain effects. This insight applies to the current situation. The Fed has been deliberate in using its unconventional policies over the past few years. We've carefully weighed the benefits of these policies on improving economic growth against potential risks and uncertainties.

Conclusion

Let me offer some final thoughts. Unconventional monetary policies such as forward guidance and large-scale asset purchases give central banks effective instruments when the traditional policy interest rate is near zero. The Fed and other central banks have been actively using these policies. In the United States, these policies have had meaningful effects on longer-term interest rates and other financial conditions. The precise impact on unemployment, GDP, and inflation is harder to determine. But the available evidence suggests they have been effective in stimulating growth without creating an undesirable rise in inflation. Conducting monetary policy always involves striking the right balance between the benefits and risks of a policy action. As the FOMC statement makes clear: "In determining the size, pace, and composition of its asset purchases, the Committee will, as always, take appropriate account of the likely efficacy and costs of such purchases."

John C. Williams is president and chief executive officer of the Federal Reserve Bank of San Francisco.

References

Adam, Klaus, and Robert M. Billi. 2007. "Discretionary Monetary Policy and the Zero Lower Bound on Interest Rates." *Journal of Monetary Economics* 54(3), pp. 728–752.

Bauer, Michael, and Glenn D. Rudebusch. 2012. "The Signaling Channel for Federal Reserve Bond Purchases." FRB San Francisco Working Paper 2011-21. http://www.frbsf.org/publications/economics/papers/2011/wp11-21bk.pdf

Baumeister, Christiane, and Luca Benati. 2010. "Unconventional Monetary Policy and the Great Recession." European Central Bank Working Paper 1258. http://www.ecb.int/pub/pdf/scpwps/ecbwp1258.pdf

Brainard, William. 1967. "Uncertainty and the Effectiveness of Policy." *American Economic Review* 57(2), pp. 411–425. http://www.jstor.org/stable/1821642

Chen, Han, Vasco Curdia, and Andrea Ferrero. 2012. "The Macroeconomic Effects of Large-Scale Asset Purchase Programmes." *The Economic Journal* 122(564), pp. F289–F315. http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0297.2012.02549.x/abstract

Christensen, Jens, and Glenn Rudebusch. 2012. "The Response of Interest Rates to U.S. and U.K. Quantitative Easing." *The Economic Journal* 122(564), pp. F385–F414. http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0297.2012.02554.x/abstract

Chung, Hess, Jean-Philippe Laforte, David Reifschneider, and John C. Williams. 2012. "Have We Underestimated the Likelihood and Severity of Zero Lower Bound Events?" *Journal of Money, Credit, and Banking* 44(s1), pp. 47–82. http://onlinelibrary.wiley.com/doi/10.1111/j.1538-4616.2011.00478.x/abstract

Curdia, Vasco, and Andrea Ferrero. 2011. "How Much Will the Second Round of Large-Scale Asset Purchases Affect Inflation and Unemployment?" *Liberty Street Economics* (blog), FRB New York, May 4. http://libertystreeteconomics.newyorkfed.org/2011/05/how-much-will-the-second-round-of-large-scale-asset-purchases-affect-inflation-and-unemployment.html

Evans, Charles. 2010. "Monetary Policy in a Low-Inflation Environment: Developing a State-Contingent Price-Level Target." Remarks to the FRB Boston's 55th Economic Conference, October 16. http://www.chicagofed.org/webpages/publications/speeches/2010/10_16_boston_speech.cfm

Fuhrer, Jeffrey C., and Giovanni P. Olivei. 2011. "The Estimated Macroeconomic Effects of the Federal Reserve's Large-Scale Treasury Purchase Program." FRB Boston Public Policy Brief 11-2. http://www.bos.frb.org/economic/ppb/2011/ppb112.pdf

Gagnon, Joseph, Matthew Raskin, Julie Remache, and Brian Sack. 2011. "The Financial Market Effects of the Federal Reserve's Large-Scale Asset Purchases." *International Journal of Central Banking* 7(1), pp. 3–43. http://www.ijcb.org/journal/ijcb11q1a1.htm

Gürkaynak, Refet S., Brian Sack, and Eric T. Swanson. 2005. "Do Actions Speak Louder Than Words? The Response of Asset Prices to Monetary Policy Actions and Statements." *International Journal of Central Banking* 1(1), pp. 55–93. http://www.ijcb.org/journal/ijcb05q2a2.htm

Hamilton, James D., and Jing Cynthia Wu. 2012. "The Effectiveness of Alternative Monetary Policy Tools in a Zero Lower Bound Environment." *Journal of Money, Credit, and Banking* 44(s1), pp. 3–46. http://onlinelibrary.wiley.com/doi/10.1111/j.1538-4616.2011.00477.x/abstract

Kiley, Michael T. 2012. "The Aggregate Demand Effects of Short- and Long-Term Interest Rates." Federal Reserve Board Finance and Economics Discussion Series 2012-54. http://www.federalreserve.gov/pubs/feds/2012/201254/201254abs.html

Krishnamurthy, Arvind, and Annette Vissing-Jorgensen. 2011. "The Effects of Quantitative Easing on Interest Rates: Channels and Implications for Policy." *Brookings Papers on Economic Activity* 43(2), pp. 215–287. http://www.brookings.edu/~/media/Files/Programs/ES/BPEA/2011_fall_bpea_papers/2011_fall_bpea_conference_krishnamurthy.pdf

Kydland, Finn E., and Edward C. Prescott. 1978. "Rules Rather than Discretion: The Inconsistency of Optimal Plans." *Journal of Political Economy* 85(3), pp. 473–492. http://www.jstor.org/stable/1830193

Neely, Christopher. 2011. "The Large-Scale Asset Purchases Had Large International Effects." FRB St. Louis Working Paper 2010-018D. http://research.stlouisfed.org/wp/more/2010-018

Reifschneider, David L., and John M. Roberts. 2006. "Expectations Formation and the Effectiveness of Strategies for Limiting the Consequences of the Zero Bound." *Journal of the Japanese and International Economies* 20(3), pp. 314–337.

Rudebusch, Glenn D. 2009. "The Fed's Monetary Policy Response to the Current Crisis." *FRBSF Economic Letter* 2009-17 (May 22). http://www.frbsf.org/publications/economics/letter/2009/el2009-17.html

Rudebusch, Glenn D., and John C. Williams. 2008. "Revealing the Secrets of the Temple: The Value of Publishing Central Bank Interest Rate Projections." In *Asset Prices and Monetary Policy*, ed. J.Y. Campbell. Chicago: University of Chicago Press, pp. 247–284. http://www.frbsf.org/economics/economists/grudebusch/SecretsShort-NBER-ch6-2008.pdf

Swanson, Eric T. 2011. "Let's Twist Again: A High-Frequency Event-Study Analysis of Operation Twist and Its Implications for QE2." *Brookings Papers on Economic Activity* (Spring). http://www.brookings.edu/~/media/Files/Programs/ES/BPEA/2011_spring_bpea_papers/2011a_bpea_swanson.pdf

Swanson, Eric T., and John C. Williams. 2012. "Measuring the Effect of the Zero Lower Bound on Medium- and Longer-Term Interest Rates." FRB San Francisco Working Paper 2012-02. http://www.frbsf.org/publications/economics/papers/2012/wp12-02bk.pdf

Walsh, Carl. 2009. "Using Monetary Policy to Stabilize Economic Activity." In *Financial Stability and Macroeconomic Policy*, Proceedings of the FRB Kansas City Economic Policy Symposium. Kansas City: FRB Kansas City, pp. 245–296. http://www.kansascityfed.org/publicat/sympos/2009/papers/Walsh.09.11.09.pdf

Williams, John C. 2006. "Monetary Policy in a Low Inflation Economy with Learning." In *Monetary Policy in an Environment of Low Inflation*, Proceedings of the Bank of Korea International Conference 2006. Seoul: Bank of Korea, pp. 199–228. http://www.frbsf.org/publications/economics/papers/2006/wp06-30bk.pdf

Williams, John C. 2011. "Unconventional Monetary Policy: Lessons from the Past Three Years." *FRBSF Economic Letter* 2011-31 (October 3). http://www.frbsf.org/publications/economics/letter/2011/el2011-31.html

Williams, John C. 2012a. "Monetary Policy, Money, and Inflation." *FRBSF Economic Letter* 2012-21 (July 9). http://www.frbsf.org/publications/economics/letter/2012/el2012-21.html

Williams, John C. 2012b. "Opening the Temple." *Federal Reserve Bank of San Francisco 2011 Annual Report*, April. http://www.frbsf.org/publications/federalreserve/annual/2011/2011_Annual_Report_Essay.pdf

Woodford, Michael. 2012. "Methods of Policy Accommodation at the Interest-Rate Lower Bound." Presented at "The Changing Policy Landscape," 2012 FRB Kansas City Economic Policy Symposium, Jackson Hole, WY. http://kansascityfed.org/publicat/sympos/2012/mw.pdf

Recent issues of *FRBSF Economic Letter* are available at http://www.frbsf.org/publications/economics/letter/

2012-33	Did the Housing Boom Affect Mortgage Choices? http://www.frbsf.org/publications/economics/letter/2012/el2012-33.html	Furlong / Takhtamanova
2012-32	Credit Access Following a Mortgage Default http://www.frbsf.org/publications/economics/letter/2012/el2012-32.html	Hedberg / Krainer
2012-31	Is China Due for a Slowdown? http://www.frbsf.org/publications/economics/letter/2012/el2012-31.html	Malkin / Spiegel
2012-30	The Economic Outlook and Federal Reserve Policy http://www.frbsf.org/publications/economics/letter/2012/el2012-30.html	Williams
2012-29	The Financial Crisis and Inflation Expectations http://www.frbsf.org/publications/economics/letter/2012/el2012-29.html	Trehan / Zorrilla
2012-28	Uncertainty, Unemployment, and Inflation http://www.frbsf.org/publications/economics/letter/2012/el2012-28.html	Leduc / Liu
2012-27	Assessing State Business Climate Indexes http://www.frbsf.org/publications/economics/letter/2012/el2012-27.html	Neumark / Kolko / Cuellar Mejia
2012-26	Small Business Loans and Small Bank Health http://www.frbsf.org/publications/economics/letter/2012/el2012-26.html	Laderman
2012-25	Consumer Debt and the Economic Recovery http://www.frbsf.org/publications/economics/letter/2012/el2012-25.html	Krainer
2012-24	Asia's Role in the Post-Crisis Global Economy http://www.frbsf.org/publications/economics/letter/2012/el2012-24.html	Glick / Spiegel
2012-23	Pricey Oil, Cheap Natural Gas, and Energy Costs http://www.frbsf.org/publications/economics/letter/2012/el2012-23.html	Hale / Nechio
2012-22	The Outlook and Monetary Policy Challenges http://www.frbsf.org/publications/economics/letter/2012/el2012-22.html	Williams
2012-21	Monetary Policy, Money, and Inflation http://www.frbsf.org/publications/economics/letter/2012/el2012-21.html	Williams
2012-20	U.S. Fiscal Policy: Headwind or Tailwind? http://www.frbsf.org/publications/economics/letter/2012/el2012-20.html	Lucking / Wilson

For release on delivery
12:15 p.m. EDT
October 17, 2016

Why Are Interest Rates So Low? Causes and Implications

Remarks by

Stanley Fischer

Vice Chairman

Board of Governors of the Federal Reserve System

at the

Economic Club of New York

New York, New York

October 17, 2016

I am grateful to the Economic Club of New York for inviting me to speak today. My subject is the historically low level of interest rates, a topic not far from the minds of many in this audience and of many others in the United States and all over the world.[1]

Notwithstanding the increase in the federal funds rate last December, the federal funds rate remains at a very low level. Policy rates of many other major central banks are lower still--even negative in some cases, even in countries long famous for their conservative monetary policies. Long-term interest rates in many countries are also remarkably low, suggesting that participants in financial markets expect policy rates to remain depressed for years to come. My main objective today will be to present a quantitative assessment of some possible factors behind low interest rates--and also of factors that could contribute to higher interest rates in the future.

Now, I am sure that the reaction of many of you may be, "Well, if you and your Fed colleagues dislike low interest rates, why not just go ahead and raise them? You are the Federal Reserve, after all." One of my goals today is to convince you that it is not that simple, and that changes in factors over which the Federal Reserve has little influence--such as technological innovation and demographics--are important factors contributing to both short- and long-term interest rates being so low at present.

There are at least three reasons why we should be concerned about such low interest rates. First, and most worrying, is the possibility that low long-term interest rates are a signal that the economy's long-run growth prospects are dim. Later, I will go into

---

[1] I am grateful to John Roberts and Robert Tetlow of the Federal Reserve Board staff for their assistance. Views expressed are mine and are not necessarily those of the Federal Reserve Board or the Federal Open Market Committee.

more detail on the link between economic growth and interest rates. One theme that will emerge is that depressed long-term growth prospects put sustained downward pressure on interest rates. To the extent that low long-term interest rates tell us that the outlook for economic growth is poor, all of us should be very concerned, for--as we all know--economic growth lies at the heart of our nation's, and the world's, future prosperity.

A second concern is that low interest rates make the economy more vulnerable to adverse shocks that can put it in a recession. That is the problem of what used to be called the *zero lower bound* on interest rates. In light of several countries currently operating with negative interest rates, we now refer not to the zero lower bound, but to the *effective lower bound*, a number that is close to zero but negative. Operating close to the effective lower bound limits the room for central banks to combat recessions using their conventional interest rate tool--that is, by cutting the policy interest rate. And while unconventional monetary policies--such as asset purchases, balance sheet policies, and forward guidance--can provide additional accommodation, it is reasonable to think these alternatives are not perfect substitutes for conventional policy. The limitation on monetary policy imposed by low trend interest rates could therefore lead to longer and deeper recessions when the economy is hit by negative shocks.

And the third concern is that low interest rates may also threaten financial stability as some investors reach for yield and compressed net interest margins make it harder for some financial institutions to build up capital buffers. I should say that while this is a reason for concern and bears continual monitoring, the evidence so far does not suggest a heightened threat of financial instability in the post-financial-crisis United States stemming from ultralow interest rates. However, I note that a year ago the Fed did

issue warnings--successful warnings--about the dangers of excessive leveraged lending, and concerns about financial stability are clearly on the minds of some members of the Federal Open Market Committee, FOMC.

Those are three powerful reasons to prefer interest rates that are higher than current rates. But, of course, Fed interest rates are kept very low at the moment because of the need to maintain aggregate demand at levels that will support the attainment of our dual policy goals of maximum sustainable employment and price stability, defined as the rate of inflation in the price level of personal consumption expenditures (or PCE) being at our target level of 2 percent.

That the actual federal funds rate has to be so low for the Fed to meet its objectives suggests that the equilibrium interest rate--that is, the federal funds rate that will prevail in the longer run, once cyclical and other transitory factors have played out--has fallen.[2] Let me turn now to my main focus, namely an assessment of why the equilibrium interest rate is so low.

To frame this discussion, it is useful to think about the real interest rate as the price that equilibrates the economy's supply of saving with the economy's demand for investment. To explain why interest rates are low, we look for factors that are boosting saving, depressing investment, or both.[3] For those of you lucky enough to remember the economics you learned many years ago, we are looking at a point that is on the IS curve--

---

[2] More formally, my Federal Reserve colleagues Thomas Laubach and John Williams (2003) have developed a statistical procedure that decomposes the movement in interest rates into the contribution of long-run and short-run factors. They conclude that the long-run component of the level of the real federal funds rate is currently very low--around 1/4 percent--compared with a pre-2000 average of 2-1/2 percent. Other assessments have reached similar conclusions. See Holston, Laubach, and Williams (forthcoming); Johannsen and Mertens (2016); and Kiley (2015). However, it is important to note that there is a great deal of statistical uncertainty around all of these estimates.

[3] While the analysis that follows relates to interest rates in the long run, these factors are also important determinants of interest rates in the short run.

the investment-equals-saving curve. And because we are considering the long-run equilibrium interest rate, we are looking at the interest rate that equilibrates investment and saving when the economy is at full employment, as it is assumed to be in the long run.

I will look at four major forces that have affected the balance between saving and investment in recent years and then consider some that may be amenable to the influence of economic policy.

The economy's growth prospects must be at the top of the list. Among the factors affecting economic growth, gains in productivity and growth of the labor force are particularly important. Second, an increase in the average age of the population is likely pushing up household saving in the U.S. economy. Third, investment has been weak in recent years, especially given the low levels of interest rates. Fourth and finally, developments abroad, notably a slowing in the trend pace of foreign economic growth, may be affecting U.S. interest rates.

To assess the empirical importance of these factors in explaining low long-run equilibrium interest rates, I will rely heavily on simulations that the Board of Governors' staff have run with one of our main econometric models, the FRB/US model. This model, which is used extensively in policy analyses at the Fed, has many advantages, including its firm empirical grounding, and the fact that it is detailed enough to make it possible to consider a wide range of factors within its structure.

Going through the four major forces I just mentioned, I will look first at the effect that slower trend economic growth, both on account of the decline in productivity growth as well as lower labor force growth, may be having on interest rates. Starting with

productivity, gains in labor productivity have been meager in recent years. One broad measure of business-sector productivity has risen only 1-1/4 percent per year over the past 10 years in the United States and only 1/2 percent, on average, over the past 5 years. By contrast, over the 30 years from 1976 to 2005, productivity rose a bit more than 2 percent per year. Although the jury is still out on what is behind the latest slowdown in productivity gains, prominent scholars such as Robert Gordon and John Fernald suggest that smaller increases in productivity are the result of a slowdown in innovation that is likely to persist for some time.[4]

Lower long-run trend productivity growth, and thus lower trend output growth, affects the balance between saving and investment through a variety of channels. A slower pace of innovation means that there will be fewer profitable opportunities in which to invest, which will tend to push down investment demand. Lower productivity growth also reduces the future income prospects of households, lowering their consumption spending today and boosting their demand for savings. Thus, slower productivity growth implies both lower investment and higher savings, both of which tend to push down interest rates.[5]

---

[4] See Gordon (2016) and Fernald and Wang (2015).

[5] These effects are what we would expect from our textbook models; they are also at work in the FRB/US model being used here. The empirical evidence on the link between trend growth and long-run equilibrium interest rates is mixed. Laubach and Williams (2003) find evidence of a link that is consistent with the predictions of models such as FRB/US. However, in their well-known paper, Hamilton et al. (2016) conclude that while "the theoretical presumption that there is a link between aggregate growth and real rates is very strong," the empirical link between the real equilibrium interest rate and real GDP growth is weak. As stressed by Hamilton et al. there a great deal of uncertainty over the relationship between growth and interest rates, likely, in part because of the multitude of shocks to which the economy is subject. A structural model, such as FRB/US, provides one method of estimating the link between growth and interest rates by examining the reaction of the interest rate to a clearly defined shock to the trend growth rate. However, this reaction occurs within the model economy, and is therefore subject to the particular structure and assumptions of the FRB/US model.

In addition to a slower pace of innovation, it is also likely that demographic changes will weigh on U.S. economic growth in the years ahead, as they have in the recent past. In particular, a rising fraction of the population is entering retirement. According to some estimates, the effects of this population aging will trim about 1/4 percentage point from labor force growth in coming years.[6]

Lower trend increases in productivity and slower labor force growth imply lower overall economic growth in the years ahead. This view is consistent with the most recent Summary of Economic Projections of the FOMC, in which the median value for the rate of growth in real gross domestic product (GDP) in the longer run is just 1-3/4 percent, compared with an average growth rate from 1990 to 2005 of around 3 percent.[7]

We can use simulations of the FRB/US model to infer the consequences of such a slowdown in longer-run GDP growth for the equilibrium federal funds rate. Those simulations suggest that the slowdown to the 1-3/4 percent pace anticipated in the Summary of Economic Projections would eventually trim about 120 basis points from the longer-run equilibrium federal funds rate.[8]

Let me move now to the second major development on my list. In addition to its effects on labor force growth, the aging of the population is likely to boost aggregate household saving. This increase is because the ranks of those approaching retirement in the United States (and in other advanced economies) are growing, and that group typically has above-average saving rates.[9] One recent study by Federal Reserve

---

[6] See, for example, Aaronson et al (2014).
[7] See Board of Governors of the Federal Reserve System (2016).
[8] Details of the simulations are included in an Appendix to the speech.
[9] See Gagnon, Johannsen, and Lopez-Salido (2016); Rachel and Smith (2015); and Carvalho, Ferrero, and Necchio (2016).

economists suggests that population aging--through its effects on saving--could be pushing down the longer-run equilibrium federal funds rate relative to its level in the 1980s by as much as 75 basis points.[10]

In addition to slower growth and demographic changes, a third factor that may be pushing down interest rates in the United States is weak investment. Analysis with the FRB/US model suggests that, given how low interest rates have been in recent years, investment should have been considerably higher in the past couple of years. According to the model, this shortfall in investment has depressed the long-run equilibrium federal funds rate by about 60 basis points.

Investment may be low for a number of reasons. One is that greater perceived uncertainty could also make firms more hesitant to invest. Another possibility is that the economy is simply less capital intensive than it was in earlier decades.[11]

Fourth on my list are developments abroad: Many of the factors depressing U.S. interest rates have also been working to lower foreign interest rates. To take just one example, many advanced foreign economies face a slowdown in longer-term growth prospects that is similar to that in the United States, with similar implications for equilibrium interest rates in the longer run. In the FRB/US model, lower interest rates abroad put upward pressure on the foreign exchange value of the dollar and thus lower net exports. FRB/US simulations suggest that a reduction in the equilibrium federal funds rate of about 30 basis points would be required to offset the effects in the United States of a reduction in foreign growth prospects similar to what we have seen in the United States.

---

[10] See Gagnon, Johannsen, and Lopez-Salido (2016), figure 12.
[11] See Summers (2014, 2015, 2016). See also Hilsenrath and Davis (2016).

The first figure shows the effects of these four factors. You will see that each factor is considered separately; there is no attempt to add them together. That is because the broad factors we are considering here could well overlap--particularly the link between slower growth and the remaining three factors. Still, the comparison gives us a notion of the relative importance of some of the leading explanations for the decline in interest rates.

I started by noting the costs of low interest rates, including the limits on the ability of monetary policy to respond to recessions, and possible risks to financial stability. Now that we have some notion of where lower interest rates might be coming from, I want to turn to the question of what might contribute to raising longer-run *equilibrium* interest rates.[12]

One development that would boost the equilibrium interest rate would be a further waning in the investor precaution that seems to have been holding back investment--in Keynesian terms, an improvement in animal spirits. The first bar in the second slide illustrates the effects on the longer-run equilibrium federal funds rate of an increase in business-sector investment equal to 1 percent of GDP. As can be seen, such a rebound in investment would raise the equilibrium funds rate by 30 basis points, according to the FRB/US model. In addition, higher investment would improve the longer-run growth prospects of the U.S. economy, although the effects in this particular case are fairly small, with real GDP growth about 0.1 percentage point higher on account of the higher investment.

---

[12] By emphasizing "longer-run *equilibrium*" interest rates, I am excluding monetary policy (which is unlikely to have major effects on the equilibrium real interest rate), and thereby also relating to concerns about monetary policy being the only game in town.

Over the years, many economists--some of them textbook authors--have noted that expansionary fiscal policy could raise equilibrium interest rates.[13] To illustrate this possibility, the next two bars on the slide show the estimated effect on interest rates of two possible expansionary fiscal policies, one that boosts government spending by 1 percent of GDP and another that cuts taxes by a similar amount. According to the FRB/US model, both policies, if sustained, would lead to a substantial increase in the equilibrium federal funds rate. Higher spending of this amount would raise equilibrium interest rates by about 50 basis points; lower taxes would raise equilibrium rates by 40 basis points. I should note that the FRB/US model does not contain a great deal of detail about taxes and government spending. These are thus the effects of very broad changes in income taxes and government spending, and not those of any specific, detailed, policy measures.

It is important to emphasize that these estimates are from just one model and other models may give different results. Still, I think these implications of fiscal policy measures are qualitatively correct--they are a standard result in many models, including the simplest textbook IS-LM model.

Stimulative fiscal policies such as these could be beneficial if the economy confronted a recession. Of course, it would be important to ensure that any fiscal policy changes during a recession did not compromise long-run fiscal sustainability.

Government policies that boost the economy's long-run growth rate would be an even better means of raising the equilibrium interest rate. This is a point I have also made in the past.[14] While there is disagreement about what the most effective policies

---

[13] See, for example, Kocherlakota (2015, 2016) and Summers (2016).
[14] For instance, in Fischer, 2016.

would be, some combination of more encouragement for private investment, improved public infrastructure, better education, and more effective regulation is likely to promote faster growth of productivity and living standards--and also to reduce the probability that the economy and, particularly, the central bank will in the future have to contend with the effective lower bound.

In summary, a variety of factors have been holding down interest rates and may continue to do so for some time. But economic policy can help offset the forces driving down longer-run equilibrium interest rates. Some of these policies may also help boost the economy's growth potential.

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. 197-255, www.brookings.edu/~/media/projects/bpea/fall-2014/fall2014bpea_aaronson_et_al.pdf.

Board of Governors of the Federal Reserve System (2016), "Federal Reserve Board and Federal Open Market Committee Release Economic Projections from the September 20-21 FOMC Meeting," press release, September 21, https://www.federalreserve.gov/newsevents/press/monetary/20160921b.htm.

Carvalho, Carlos, Andrea Ferrero, and Fernanda Nechio (2016). "Demographics and Real Interest Rates: Inspecting the Mechanism," Working Paper Series 2016-05. San Francisco: Federal Reserve Bank of San Francisco, April, http://www.frbsf.org/economic-research/files/wp2016-05.pdf.

Fernald, John, and Bing Wang (2015). "The Recent Rise and Fall of Rapid Productivity Growth," FRBSF Economic Letter 2015-04. San Francisco: Federal Reserve Bank of San Francisco, February, www.frbsf.org/economic-research/files/el2015-04.pdf.

Fischer, Stanley (2016). "Remarks on the U.S. Economy," speech delivered at "Program on the World Economy," a conference sponsored by The Aspen Institute, Aspen, Colo., August 21, https://www.federalreserve.gov/newsevents/speech/fischer20160821a.htm.

Gagnon, Etienne, Benjamin K. Johannsen, and David Lopez-Salido (2016). "Understanding the New Normal: The Role of Demographics," Finance and Economics Discussion Series 2016-080. Washington: Board of Governors of the Federal Reserve System, October, www.federalreserve.gov/econresdata/feds/2016/files/2016080pap.pdf.

Gordon, Robert J. (2016). *The Rise and Fall of American Growth: The U.S. Standard of Living since the Civil War.* Princeton, N.J.: Princeton University Press.

Hamilton, James D., Ethan S. Harris, Jan Hatzius, and Kenneth D. West (2015). "The Equilibrium Real Funds Rate: Past, Present, and Future." NBER Working Paper no. 21476 (August). http://www.nber.org/papers/w21476.pdf

Hilsenrath, Jon and Bob Davis (2016). "Tech Boom Creates Too Few Jobs," *Wall Street Journal*, vol. 168, no. 88 (October 13, 2016), p. 1.

Holston, Kathryn, Thomas Laubach, and John C. Williams (forthcoming). "Measuring the Natural Rate of Interest: International Trends and Determinants," in Richard

Clarida and Lucrezia Reichlin, organizers, *NBER International Seminar on Macroeconomics 2016.* Amsterdam: *Journal of International Economics* (Elsevier).

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.

Kiley, Michael T. (2015). "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, September, http://dx.doi.org/10.17016/FEDS.2015.077.

Kocherlakota, Narayana (2015). "Public Debt and the Long-Run Neutral Real Interest Rate," speech delivered at Northwestern University, Evanston, Ill., September 8, https://www.minneapolisfed.org/news-and-events/presidents-speeches/public-debt-and-the-long-run-neutral-real-interest-rate-20150908.

-------- (2016). "Write Your Congressperson! (If You Want Higher Interest Rates)," *Kocherlakota's Thoughts on Policy* (blog), January 19, https://sites.google.com/site/kocherlakota009/home/policy/thoughts-on-policy/1-19-16.

Laubach, Thomas, and John C. Williams (2003). "Measuring the Natural Rate of Interest," *Review of Economics and Statistics,* vol. 85 (November), pp. 1063-70.

Rachel, Lukasz, and Thomas D. Smith (2015). "Secular Drivers of the Global Real Interest Rate," Staff Working Paper 571. London: Bank of England, December, www.bankofengland.co.uk/research/Documents/workingpapers/2015/swp571.pdf.

Summers, Lawrence H. (2014). "U.S. Economic Prospects: Secular Stagnation, Hysteresis, and the Zero Lower Bound," *Business Economics*, vol. 49 (April), pp. 65-73.

-------- (2015). "Demand Side Secular Stagnation," *American Economic Review*, vol. 105 (May), pp 60-65.

-------- (2016). "The Age of Secular Stagnation: What It Is and What to Do about It," *Foreign Affairs*, vol. 95 (March/April), pp. 2-9, https://www.foreignaffairs.com/articles/united-states/2016-02-15/age-secular-stagnation.

Appendix

Here we review the simulations that underlie the estimates of the effects of various economic disturbances for their implications for the long-run equilibrium real federal funds rate, using simulations of the staff's FRB/US model. We first provide background on the methodology we use. We then review the nature of the shocks that are discussed in the speech and show the effects of those shocks on the long-run federal funds rate. Finally, we provide details about the results shown in the figures.

1. Background

Our point of departure is a definition of the equilibrium interest rate that corresponds with the *neutral rate of interest*. In particular, we use the definition of the neutral rate of interest that Chair Yellen used in a 2015 speech: "the real rate consistent with the economy achieving maximum employment and price stability over the medium term," which, in an elaboration in a footnote, is said to be "usually thought of as independent of the cyclical disturbances that routinely buffet the economy . . . [that] fade away after a few years."[1] The sort of disturbances being captured under the rubric of shifts in r* are thus rarer and more persistent than the usual business cycle phenomena and are associated with the "various adjustment processes that are unusually drawn out by historical standards . . . [and have] slow-moving influences on both aggregate demand and supply."[2] This definition corresponds reasonably closely with the (possibly time-varying) intercept of a Taylor-type rule in that the standard arguments of the

---

[1] See Yellen (2015a), paragraph 15 and footnote 4.

[2] See Yellen (2015a), footnote 4. Other definitions of the neutral rate used by the Chair in her public communications include the short-term real interest rate "that would be neither expansionary nor contractionary if the economy was operating near potential" (Yellen, 2015c, 2016) and the short-term real interest rate "that would be consistent with real GDP expanding in line with potential" (Yellen, 2015b). There may be circumstances in which the nuances of these definitions would matter, but, for our purposes, we can take them as one and the same.

Taylor (1999) rule--the output gap and the deviation of inflation from target--can be thought of as capturing the influence of the drivers of monetary policy at business cycle frequencies, with the longer-lasting (lower-frequency) determinants of the level of the policy rate being subsumed into movements in r*.[3]

Using this definition of r*, we identify several economic disturbances that have long-lasting consequences for the savings-investment balance of the U.S. economy. We shock the FRB/US model with each of these disturbances and compute what long-lasting (but not necessarily permanent) shift in the intercept of the Taylor (1999) rule is the best perturbation to the rule.

The thought experiment behind the simulations is as follows. We assume that the public views the Taylor (1999) rule as a good approximation of the conduct of monetary policy, and, accordingly, they price assets and formulate expenditure decisions on the expectation that this policy will prevail. Then policymakers identify that the economy is encountering a shock with durable implications for the savings-investment balance of the economy. At this point, policymakers communicate to the public a long-lasting shift to the intercept of the rule. Private-sector agents are assumed to understand this communication, and find it credible, and thus adjust their expectations accordingly.

2. The shocks

All simulations were carried out using the database from the public release of the FRB/US model, starting in 2036:Q1, at which time the economy is in steady state.[4]

---

[3] Williams (2016) defines the *natural rate of interest* as the short-term real rate "that balances monetary policy so that it is neither accommodative nor contractionary in terms of growth and inflation." This description is close to that of the neutral rate (but not the natural rate) in the main text and in note 2 but adds a reference to inflation, which does not appear in definitions of the neutral rate.

[4] See Board of Governors (2016).

Accordingly, the effective lower bound on nominal interest rates is never a binding constraint under these circumstances. Consistent with the definition of a steady state, at the start of the simulations, the output gap is closed, the unemployment rate is equal to its natural rate of 4.8 percent, inflation is 2 percent, the nominal federal funds rate is 3 percent, the 10-year Treasury bond rate is 3.5 percent, and potential output growth is 2 percent. Except as otherwise noted, tax rates are held fixed at their baseline levels for four years, after which fiscal policy is allowed to respond by gradually adjusting the federal personal income tax rate to stabilize the ratio of federal government fiscal deficits to gross domestic product (GDP) at its assumed baseline target level. In all instances, monetary policy is assumed to be governed by the (non-inertial) Taylor (1999) rule, with an intercept shift where applicable.

Table A.1 summarizes the effects of several shocks on the long-run equilibrium real federal funds rate in the FRB/US model. The details of how these shocks were implemented follow.

Labor force. The growth rate of the U.S. population (variable N16 in the FRB/US model) is assumed to climb over the course of a year to a pace that is 1 percentage point faster than in the baseline, with commensurate effects on the labor force, employment, potential output, and actual output. The elevated pace of population growth lasts for 20 years before returning to baseline rates over the succeeding 5 years.

Productivity. The growth rate of total factor productivity (HMFPT) is increased 0.7 percentage point, which implies an acceleration in labor productivity (output per worker hour) of 1.0 percentage point. The shock lasts for 40 years before fading out at a moderate pace.

Investment. Sequences of shocks to the FRB/US model's three equations for business fixed investment--producer durables (EPD), intellectual property (EPI), and nonresidential structures (EPS)--are constructed such that the total increase in gross fixed capital investment equals 1 percent of GDP for 25 years. Thereafter, the shocks fade at a moderate rate over time. The shocks are scaled such that the split between the three components is about equal to their relative shares of GDP since 2001.

Cost of capital. Relative to its average over the period from 2000 to 2007, the financial cost of capital (RPD) has declined by about two percentage points, according to the FRB/US model database. That should have produced a boom in investment, which seems not to have happened. This shock computes the magnitude of this "missing effect" by simulating the effect of an increase in the financial cost of capital. RPD affects the user cost of capital for the model's four investment categories: equipment, intellectual property, nonresidential structures and inventories. Those, in turn, influence target rates of investment, all else equal. The shock lasts for 20 years before fading out at a moderate pace.

Foreign interest rates. The equilibrium real interest rate in (trade-weighted) foreign economies (FRSTAR) is assumed to decline by 1 percentage point for an indefinite period. This decline has the effect of reducing both foreign long- and short-term interest rates by a comparable amount.

Government spending. An increase in the level of federal expenditures on goods (EGFO) equal to 1 percent of GDP is sustained for 25 years and then phased out at a moderate pace thereafter. All other components of government spending are held at their baseline levels. The federal personal income tax rate is held at baseline for 10 years, and

then the model's fiscal policy reaction function is allowed to adjust the tax rate so as to return the ratio of federal deficits to GDP to its previous target level. The government-debt-to-GDP ratio is therefore allowed to permanently increase.

Tax cut. The model's fiscal policy reaction function is suspended for 10 years, similar to the case of the government spending shock described previously. A sequence of shocks to the FRB/US model's equation for the average federal personal income tax rate (TRFP) is constructed such that the resulting decrease in taxes increases the federal budget deficit very similarly to the government spending shock described previously, in order to make the two simulations of comparable magnitude. After 10 years, the personal federal tax rate is allowed to adjust to bring the ratio of government deficits to GDP back to the baseline target level. The government-debt-to-GDP ratio is permanently increased.

Table A.1
Summary of Shocks Affecting the Neutral Rate of Interest

	Shock	FRB/US Mnemonic	Specification of shock	Δrr^*
1	Population growth	N16	1 ppt, 20 years	1.15
2	Productivity growth	HMFPT	1 ppt, 40 years	0.85
3	Investment	EPD, EPS, EPI	1 pct of GDP, 25 years	0.29
4	Cost of capital	RPD	2 ppts, 20 years	0.63
5	Foreign interest rates	FRSTAR	1 ppt, indefinitely	0.27
6	Government spending	EGFO	1 pct of GDP, 25 years	0.50
7	Tax cut	TRFP	Deficits as in line 6	0.41

* In the current context, rr^* is defined as the intercept of the Taylor (1999) rule.

3. Calculations for figures

Figure 1: Effects on the long-run equilibrium federal funds rate

Slower growth. The slower growth of 1-1/4 percentage points in this scenario assumes that labor force growth is 1/4 percentage point lower and that labor productivity growth is 1 percentage point lower. According to table A.1, an increase of 1 percentage point in labor force growth would raise the equilibrium real federal funds rate by 1.15 percentage points. The contribution of the slower labor force growth to the equilibrium federal funds rate is therefore negative 0.25 x 1.15, or negative 30 basis points. Similarly, the contribution of slower productivity growth is negative 1.00 x 0.85 = negative 85 basis points, for a total effect of negative 115 basis points.

Demographics. As explained in the text, the effect of demographics on the equilibrium federal funds rate is based on the study of Gagnon, Johannsen, and Lopez-Salido (2016), who emphasize that demographic changes since the 1980s would imply a reduction of 125 basis points in the equilibrium federal funds rate. However, this number includes the effects of demographics on the labor force, which have already been included in the growth effect. As suggested by figure 12 of Gagnon, Johannsen, and Lopez-Salido (2016), adjusting for the effects of employment would trim about 50 basis points from the total effect (the distance between the solid-blue and dashed-green lines as of 2015). Thus, in Gagnon, Johannsen, and Lopez-Salido (2016), the effects excluding those via labor force growth are about negative 75 basis points.

Lower investment. This experiment corresponds to the cost of capital shock discussed in section 2, with the sign reversed. As can be seen in line 4 of table A.1, the

"missing effects" of a 2 percentage point decrease in the financial cost of capital would have lowered the equilibrium real funds rate by 63 basis points.

Slower foreign growth. Here, we assume that foreign trend GDP growth has fallen as much as U.S. trend GDP growth and thus has had a similar effect on interest rates--namely, 115 basis points. That assumption would imply a reduction in the (U.S.) equilibrium federal funds rate of negative 1.15 x 0.27, or negative 30 basis points.

Figure 2: Long-run effects of animal spirits and fiscal policy on interest rates

This figure shows the effects of shocks that lead to 1 percentage point shifts in each of the variables indicated. These simulations can be found directly in table A.1. Thus, the animal spirits shock in figure 2 corresponds to the investment shock shown in line 3 of table A.1. And the government spending and tax cut simulations shown in figure 2 line up with the simulations shown in lines 6 and 7 of table A.1.

References

Board of Governors of the Federal Reserve System (2016). "FRB/US Model," webpage, Board of Governors, https://www.federalreserve.gov/econresdata/frbus/us-models-package.htm.

Gagnon, Etienne, Benjamin K. Johannsen, and David Lopez-Salido (2016). "Understanding the New Normal: The Role of Demographics," Finance and Economics Discussion Series 2016-080. Washington: Board of Governors of the Federal Reserve System, October, www.federalreserve.gov/econresdata/feds/2016/files/2016080pap.pdf.

Taylor, John B. (1999). "A Historical Analysis of Monetary Policy Rules," in John B. Taylor, ed., *Monetary Policy Rules.* Chicago: University of Chicago Press, pp. 319-41.

Williams, John C. (2016). "Monetary Policy in a Low R-Star World," FRBSF Economic Letter 2016-23. San Francisco: Federal Reserve Bank of San Francisco, August, www.frbsf.org/economic-research/publications/economic-letter/2016/august/monetary-policy-and-low-r-star-natural-rate-of-interest.

Yellen, Janet L. (2015a). "Normalizing Monetary Policy: Prospects and Perspectives," speech delivered at "The New Normal Monetary Policy," a research conference sponsored by the Federal Reserve Bank of San Francisco, San Francisco, March 27, https://www.federalreserve.gov/newsevents/speech/yellen20150327a.htm.

-------- (2015b). "Inflation Dynamics and Monetary Policy," speech delivered at the Philip Gamble Memorial Lecture, University of Massachusetts, Amherst, Mass., September 24, https://www.federalreserve.gov/newsevents/speech/yellen20150924a.htm.

-------- (2015c). "The Economic Outlook and Monetary Policy," speech delivered at the Economic Club of Washington, Washington, December 2, https://www.federalreserve.gov/newsevents/speech/yellen20151202a.htm.

-------- (2016). "Current Conditions and the Outlook for the U.S. Economy," speech delivered at the World Affairs Council of Philadelphia, Philadelphia, June 6, https://www.federalreserve.gov/newsevents/speech/yellen20160606a.htm.

For Release at 12:15 p.m. EDT
October 17, 2016

Why Are Interest Rates So Low? Causes and Implications

Remarks by

Vice Chairman Stanley Fischer

Board of Governors of the Federal Reserve System

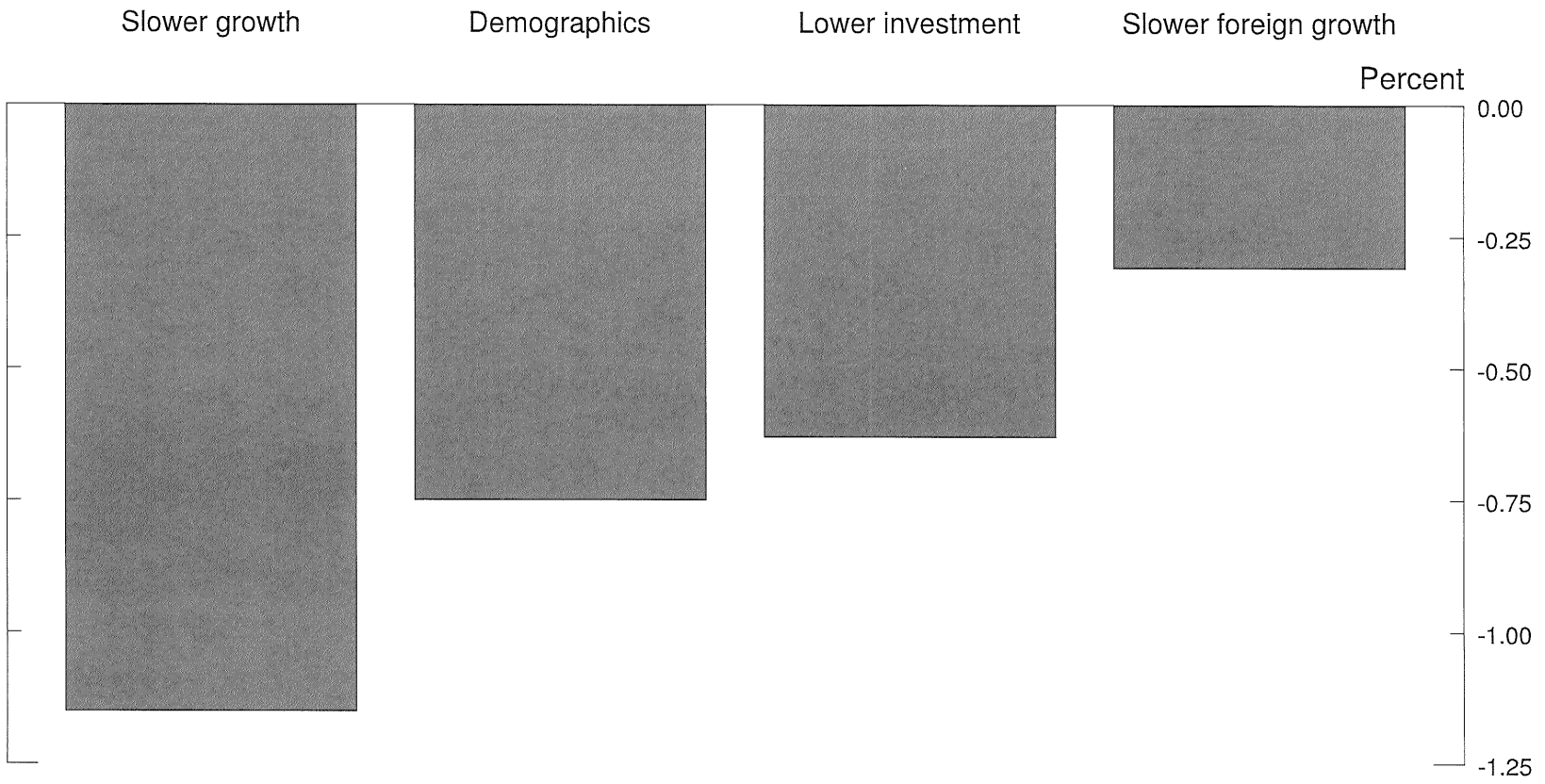
at the

Economic Club of New York

New York, New York

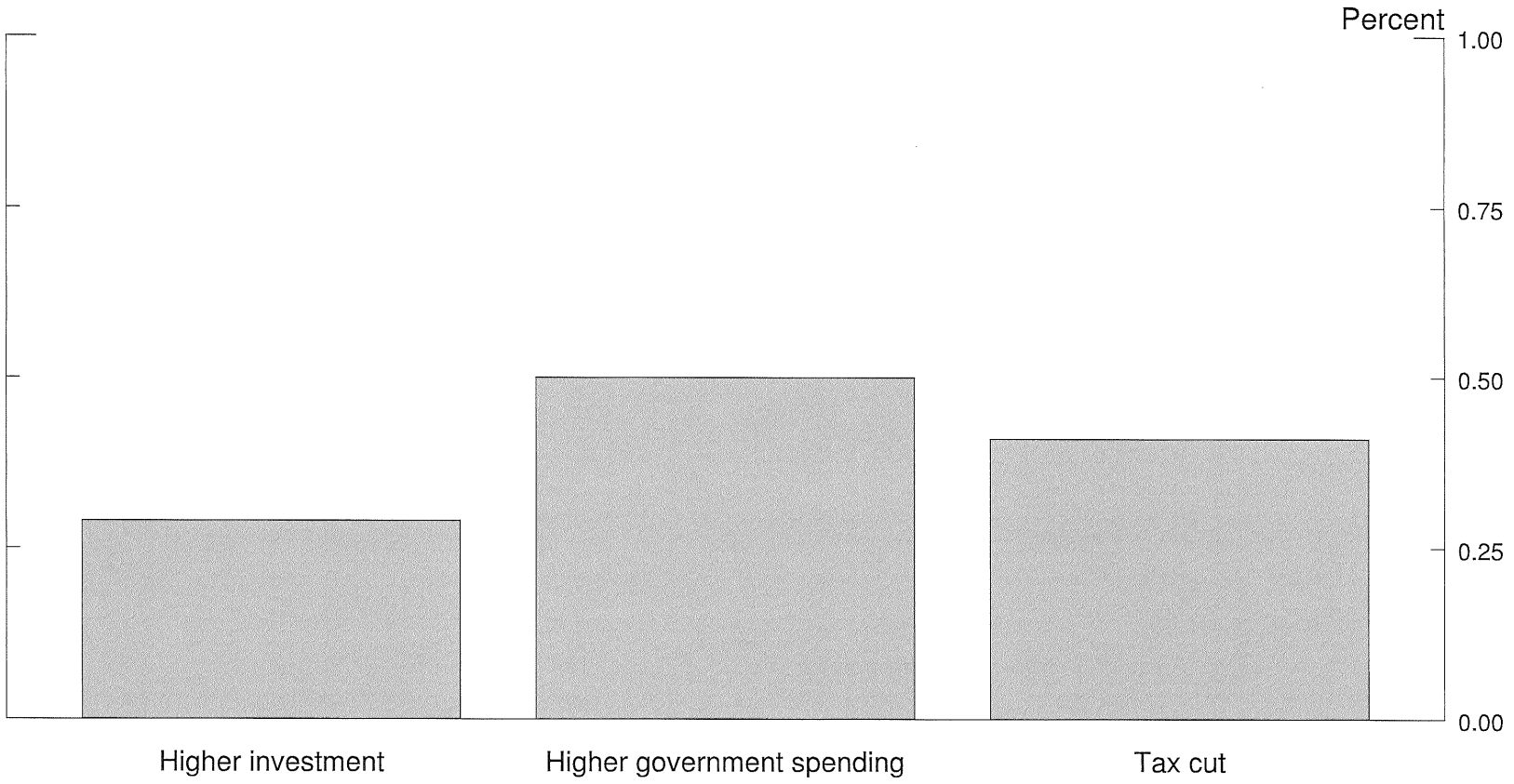
October 17, 2016

Figure 1. Effects on the Long-Run Equilibrium Federal Funds Rate



Source: Calculations by Federal Reserve Board staff based on simulation results from the Board s FRB/US model. Details are provided in the appendix.

Figure 2. Long-Run Effects of Animal Spirits and Fiscal Policy on Interest Rates



Note: Shocks scaled to 1 percent of gross domestic product.

Source: Calculations by Federal Reserve Board staff based on simulation results from the Board s FRB/US model. Details are provided in the appendix.

FRBSF ECONOMIC LETTER

2016-23 | August 15, 2016

Monetary Policy in a Low R-star World

BY JOHN C. WILLIAMS

Central banks and governments around the world must be able to adapt policy to changing economic circumstances. The time has come to critically reassess prevailing policy frameworks and consider adjustments to handle new challenges, specifically those related to a low natural real rate of interest. While price level or nominal GDP targeting by monetary authorities are options, fiscal and other policies must also take on some of the burden to help sustain economic growth and stability.

As nature abhors a vacuum, so monetary policy abhors stasis. Instead of being a rigid set of precepts, it follows the adage, that which survives is that which is most adaptive to change. Over the past century, monetary policy strategies have evolved in response to changing realities, from the panics and depressions of the late 19th and early 20th centuries that led to the creation of the Federal Reserve to the Great Depression, from Bretton Woods and subsequent battles to contain inflation to the dominance of inflation targeting today (Williams 2014, 2015a).

In the wake of the global financial crisis, monetary policy has continued to evolve, in this latest incarnation battling low inflation and stagnation via unconventional monetary policy actions like quantitative easing and near-zero or even negative interest rates. As we move forward, economic conditions require that central banks and governments throughout the world carefully reexamine their policy frameworks and consider further adjustments in terms of monetary policy strategy—both in its own right and as it relates to other policy arenas—to successfully navigate these new seas.

All the economic world's a stage: The roles of monetary and fiscal policy

To set the stage, we must look at pre-crisis views of the roles of monetary and fiscal policy. The inflation wars of the 1970s and 1980s led to a broad consensus on two fronts among academics and policymakers: First, central banks are responsible and accountable for price stability, which was often acknowledged through the formal adoption of an inflation targeting framework. Second, monetary policy should play the lead role in stabilizing inflation and employment, while fiscal policy plays a supporting role through mechanisms like automatic stabilizers and ad hoc fiscal stimulus during recessions. In this mindset, fiscal policy should focus primarily on longer-run goals such as economic efficiency and equity. The consensus on these two is evinced by countless research papers dedicated to monetary policy strategy and implementation in the past quarter-century, compared with a relative handful on the design of countercyclical fiscal policy.

In the post-financial crisis world, however, new realities pose significant challenges for the conduct of monetary policy. Foremost is the significant decline in the natural rate of interest, or r* (r-star), over the past quarter-century to historically low levels. Our understanding of the economy and monetary policy are underpinned by the concept of the natural interest rate—that is, the short-term real (inflation-adjusted) interest rate that balances monetary policy so that it is neither accommodative nor

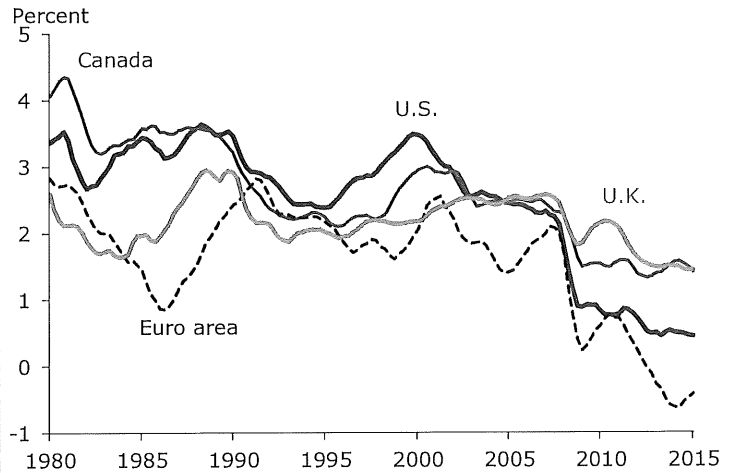
contractionary in terms of growth and inflation. In this *Letter*, I focus on the medium-term value of the natural rate—essentially what inflation-adjusted interest rates will be in an economy at full strength.

While a central bank sets its short-term interest rate, r-star is a function of the economy that is beyond its influence. The new challenge for central banks is how to deliver stable inflation in a low r-star world. This conundrum shares some characteristics and common roots with the theory of secular stagnation; in both scenarios, interest rates, growth, and inflation are persistently low (Summers 2015).

How low can rates stay?

A variety of economic factors have pushed natural interest rates very low and they appear poised to stay that way (Williams 2015b, Laubach and Williams 2015, Hamilton et al. 2015, Kiley 2015, Lubik and Matthes 2015). This is the case not just for the United States but for other advanced economies as well. Figure 1 shows estimates of the inflation-adjusted natural rate for four major economies: the United States, Canada, the euro area, and the United Kingdom (Holston, Laubach, and Williams 2016). In 1990, estimates ranged from about 2½ to 3½%. By 2007, on the eve of the global financial crisis, these had all declined to between 2 and 2½%. By 2015, all four estimates had dropped sharply, to 1½% for Canada and the United Kingdom, nearly zero for the United States, and below zero for the euro area.

Figure 1
Estimated inflation-adjusted natural rates of interest



Source: Holston, Laubach, and Williams (2016); data are four-quarter moving averages.

The underlying determinants for these declines are related to the global supply and demand for funds, including shifting demographics, slower trend productivity and economic growth, emerging markets seeking large reserves of safe assets, and a more general global savings glut (Council of Economic Advisers 2015, International Monetary Fund 2014, Rachel and Smith 2015, Caballero, Farhi, and Gourinchas 2016). The key takeaway from these global trends is that interest rates are going to stay lower than we've come to expect in the past. This does not mean they will be zero, but when juxtaposed with pre-recession normal short-term interest rates of, say, 4 to 4½%, it may be jarring to see the underlying r-star guiding us towards a new normal of 3 to 3½%—or even lower. Importantly, this future low level of interest rates is not due to easy monetary policy; instead, it is the rate expected to prevail when the economy is at full strength and the stance of monetary policy is neutral.

The critical implication of a lower natural rate of interest is that conventional monetary policy has less room to stimulate the economy during an economic downturn, owing to a lower bound on how low interest rates can go. This will necessitate a greater reliance on unconventional tools like central bank balance sheets, forward guidance, and potentially even negative policy rates. In this new normal, recessions will tend to be longer and deeper, recoveries slower, and the risks of unacceptably low inflation and the ultimate loss of the nominal anchor will be higher (Reifschneider and Williams 2000). We have

already gotten a first taste of the effects of a low r-star, with uncomfortably low inflation and growth despite very low interest rates. Unfortunately, if the status quo endures, the future is likely to hold more of the same—with the possibility of even more severe challenges to maintaining price and economic stability.

Low r-star and strategies for mitigation

To avoid this fate, central banks and governments should critically reassess the efficacy of their current approaches and carefully consider redesigning economic policy strategies to better cope with a low r-star environment. This includes considering fiscal and other policies aimed at raising the natural interest rate, as well as alternative monetary and fiscal policies that are more likely to succeed in the face of a low natural rate.

Taking each of those in turn, I'll start with policies aimed at raising r-star by affecting its underlying determinants. One potential avenue is to increase longer-run growth and prosperity through greater long-term investments in education, public and private capital, and research and development. Despite growing skepticism and endless column inches questioning whether college is worth the cost, the return on investment in post-secondary education is as high as ever (Autor 2014, Daly and Cao 2015). Likewise, returns on infrastructure and research and development investment are very high on average (Jones and Williams 1998, 2000, Fernald 1999).

Turning to policies that can help stabilize the economy during a downturn, countercyclical fiscal policy should be our equivalent of a first responder to recessions, working hand-in-hand with monetary policy. Instead, it has too often been stuck in a stop-and-go cycle, at times complementing monetary policy, at times working against it. This is not unique to the United States; Japan, and Europe have also fallen victim to fiscal consolidation in the midst of an economic downturn or incomplete recovery.

One solution to this problem is to design stronger, more predictable, systematic adjustments of fiscal policy that support the economy during recessions and recoveries (Williams 2009, Elmendorf 2011, 2016). These already exist in the form of programs such as unemployment insurance but are limited in size and scope. Some possible ideas for the United States include Social Security and income tax rates that move up or down in relation to the national unemployment rate, or federal grants to states that operate in the same way. Such approaches could be designed to be revenue-neutral over the business cycle; they also could avoid past debates over fiscal stimulus by separating decisions on countercyclical policy from longer-run decisions about the appropriate role of the government and tax system. Indeed, economists across the political spectrum have championed these ideas (Elmendorf and Furman 2008, Taylor 2000, 2009).

Finally, monetary policy frameworks should be critically reevaluated to identify potential improvements in the context of a low r-star. Although targeting a low inflation rate generally has been successful at taming inflation in the past, it is not as well-suited for a low r-star era. There is simply not enough room for central banks to cut interest rates in response to an economic downturn when both natural rates and inflation are very low.

Two alternatives can be considered together or in isolation to address this issue. First, the most direct attack on low r-star would be for central banks to pursue a somewhat higher inflation target. This would imply a higher average level of interest rates and thereby give monetary policy more room to maneuver

(Williams 2009; Blanchard, Dell'Ariccia, and Mauro 2010; Ball 2014). The logic of this approach argues that a 1 percentage point increase in the inflation target would offset the deleterious effects of an equal-sized *decline* in r-star. Of course, this approach would need to balance the purported benefits against the costs and challenges of achieving and maintaining a somewhat higher inflation rate.

Second, inflation targeting could be replaced by a flexible price-level or nominal GDP targeting framework, where the central bank targets a steadily growing level of prices or nominal GDP, rather than the rate of inflation. These approaches have a number of potential advantages over standard inflation targeting. For one, they may be better suited to periods when the lower bound constrains interest rates because they automatically deliver the "lower for longer" policy prescription the situation calls for (Eggertsson and Woodford 2003). In addition, nominal GDP targeting has a built-in protection against debt deflation (Koenig 2013, Sheedy 2014). Finally, in a nominal GDP targeting regime, a decline in r-star caused by slower trend growth automatically leads to a higher rate of trend inflation, providing a larger buffer to respond to economic downturns. Of course, these approaches also have potential disadvantages and must be carefully scrutinized when considering their relative costs and benefits.

In stressing the need to study and consider new approaches to fiscal and monetary policy, I am not advocating an abrupt reversal of course; after all, you don't change horses in the middle of a stream. And in monetary policy, "abrupt" and "disrupt" have more than merely resonance of sound in common. But *now* is the time for experts and policymakers around the world to carefully investigate the pros and cons of these proposals.

Conclusion

Economics rarely has the benefit of a crystal ball. But in this case, we are seeing the future now and have the opportunity to prepare for the challenges related to persistently low natural real rates of interest. Thoroughly reviewing the key aspects of inflation targeting is certainly necessary, and could go a long way towards mitigating the obstructions posed by low r-star. But that is where monetary policy meets the boundaries of its influence. We've come to the point on the path where central banks must share responsibilities. There are limits to what monetary policy can and, indeed, should do. The burden must also fall on fiscal and other policies to do their part to help create conditions conducive to economic stability.

Policymakers don't often cite Machiavelli, but in this instance, the analogy is potent (and, perhaps, a portent). In *The Prince*, fortune is compared to a river; in times of turbulence it wreaks havoc, flooding and destroying everything in its way. But in calm and sedate weather, people can build dams and stem the tide of destruction. In other words, we can wait for the next storm and hope for better outcomes or prepare for them now and be ready.

John C. Williams is president and chief executive officer of the Federal Reserve Bank of San Francisco.

References

Autor, David H. 2014. "Skills, Education, and the Rise of Earnings Inequality among the 'Other 99 Percent.'" *Science* 344(6186, May 23), pp. 843–851. http://science.sciencemag.org/content/344/6186/843.full

Ball, Laurence. 2014. "The Case for a Long-Run Inflation Target of Four Percent." IMF Working Paper 14/92, June. https://www.imf.org/external/pubs/ft/wp/2014/wp1492.pdf

Blanchard, Olivier, Giovanni Dell'Ariccia and Paolo Mauro. 2010. "Rethinking Macroeconomic Policy." IMF Staff Position Note 10/03. https://www.imf.org/external/pubs/ft/spn/2010/spn1003.pdf

Caballero, Ricardo J., Emmanuel Farhi, and Pierre-Olivier Gourinchas. 2016. "Global Imbalances and Currency Wars at the ZLB." Manuscript, UC Berkeley, March 10.

Council of Economic Advisers. 2015. "Long-Term Interest Rates: A Survey." Report, July. https://www.whitehouse.gov/sites/default/files/docs/interest_rate_report_final_v2.pdf

Daly, Mary C., and Yifan Cao. 2015. "Does College Pay?" In *Does College Matter? FRB San Francisco 2014 Annual Report*. http://sffed-education.org/annualreport2014/#college-essays/does-college-pay

Eggertsson, Gauti B., and Michael Woodford. 2003. "The Zero Bound on Interest Rates and Optimal Monetary Policy." *Brookings Papers on Economic Activity* 2003(1, Spring), pp. 139–211.

Elmendorf, Douglas W. 2011. "Policies for Increasing Economic Growth and Employment in 2012 and 2013." Statement before the Committee on the Budget, United State Senate. November 15. https://www.cbo.gov/sites/default/files/112th-congress-2011-2012/reports/11-15-Outlook_Stimulus_Testimony.pdf

Elmendorf, Douglas W. 2016. "Recommendations for Federal Fiscal Policy." Remarks at FRB San Francisco, March 4. https://www.hks.harvard.edu/about/admin/offices/deans-office/presentations-and-papers/recommendations-for-federal-fiscal-policy

Elmendorf, Douglas W., and Jason Furman. 2008. "If, When, How: A Primer on Fiscal Stimulus." Strategy Paper, The Hamilton Project, January. http://www.brookings.edu/research/papers/2008/01/10-fiscal-stimulus-elmendorf-furman

Fernald, John G. 1999. "Roads to Prosperity? Assessing the Link between Public Capital and Productivity." *American Economic Review* 89(3, June), pp. 619–638.

Hamilton, James D., Ethan S. Harris, Jan Hatzius, and Kenneth D. West. 2015. "The Equilibrium Real Funds Rate: Past, Present, and Future." Presented at the U.S. Monetary Policy Forum, New York, February 27 (revised August 2015). https://research.chicagobooth.edu/igm/usmpf/2015.aspx

Holston, Kathryn, Thomas Laubach, and John C. Williams. 2016. "Measuring the Natural Rate of Interest: International Trends and Determinants." FRBSF Working Paper 2016-11, June. http://www.frbsf.org/economic-research/publications/working-papers/wp2016-11.pdf

International Monetary Fund. 2014. *World Economic Outlook*, April. http://www.imf.org/external/pubs/ft/weo/2014/01/index.htm

Jones, Charles I., and John C. Williams. 1998. "Measuring the Social Return to R&D." *Quarterly Journal of Economics* 113(4), pp. 1119–1135.

Jones, Charles I., and John C. Williams. 2000. "Too Much of a Good Thing? The Economics of Investment in R&D." *Journal of Economic Growth* 5 (1, March), pp. 65–85.

Kiley, Michael T. 2015. "What Can the Data Tell Us About the Equilibrium Real Interest Rate?" Finance and Economics Discussion Series 2015-077, Federal Reserve Board of Governors. http://dx.doi.org/10.17016/FEDS.2015.077

Koenig, Evan F. 2013. "Like a Good Neighbor: Monetary Policy, Financial Stability, and the Distribution of Risk." *International Journal of Central Banking* 9(2, June), pp. 57–82. http://www.ijcb.org/journal/ijcb13q2a3.htm

Laubach, Thomas, and John C. Williams. 2015. "Measuring the Natural Rate of Interest Redux." FRB San Francisco Working Paper 2015-16, October, forthcoming in *Business Economics*. http://www.frbsf.org/economic-research/publications/working-papers/wp2015-16.pdf

Lubik, Thomas A., and Christian Matthes. 2015. "Calculating the Natural Rate of Interest: A Comparison of Two Alternative Approaches." FRB Richmond, *Economic Brief* 15-10, October. https://www.richmondfed.org/-/media/richmondfedorg/publications/research/economic_brief/2015/pdf/eb_15-10.pdf

Rachel, Lukasz, and Thomas D. Smith. 2015. "Secular Drivers of the Global Real Interest Rate." Bank of England Staff Working Paper 571, December. http://www.bankofengland.co.uk/research/Pages/workingpapers/2015/swp571.aspx

Reifschneider, David, and John C. Williams. 2000. "Three Lessons for Monetary Policy in a Low Inflation Era." *Journal of Money, Credit, and Banking* 32(4, November), pp. 936–966.

Sheedy, Kevin D. 2014. "Debt and Incomplete Financial Markets: A Case for Nominal GDP Targeting." *Brookings Papers on Economic Activity*, Spring, pp. 301–361.

Summers, Lawrence H. 2015. "Demand Side Secular Stagnation." *American Economic Review* 105(5, May), pp. 60–65.

Taylor, John B. 2000. "Reassessing Discretionary Fiscal Policy." *Journal of Economic Perspectives* 14(3), pp. 21–36.

Taylor, John B. 2009. "The Lack of an Empirical Rationale for a Revival of Discretionary Fiscal Policy." *American Economic Review* 99(2), pp. 550–555.

Williams, John C. 2009. "Heeding Daedalus: Optimal Inflation and the Zero Bound." *Brookings Papers on Economic Activity* 2, pp. 1–37.

Williams, John C. 2014. "Inflation Targeting and the Global Financial Crisis: Successes and Challenges." Presentation to the South African Reserve Bank Conference, Pretoria, October 31. http://www.frbsf.org/our-district/press/presidents-speeches/williams-speeches/2014/october/inflation-targeting-global-financial-crisis/

Williams, John C. 2015a. "Monetary Policy and the Independence Dilemma." Presentation to Chapman University, Orange, CA, May 1. http://www.frbsf.org/our-district/press/presidents-speeches/williams-speeches/2015/may/monetary-policy-independence-dilemma/

Williams, John C. 2015b. "The Decline in the Natural Rate of Interest." *Business Economics* 50(2, April), pp. 57–60. http://link.springer.com/article/10.1057/be.2015.11

Recent issues of *FRBSF Economic Letter* are available at http://www.frbsf.org/economic-research/publications/economic-letter/

2016-22	Fed Policy Liftoff and Emerging Markets http://www.frbsf.org/economic-research/publications/economic-letter/2016/july/liftoff-and-emerging-markets/	Bevilaqua / Nechio
2016-21	Fed Communication and the Zero Lower Bound http://www.frbsf.org/economic-research/publications/economic-letter/2016/july/fed-communication-and-zero-lower-bound/	de Carvalho / Hsu / Nechio
2016-20	Do Macro Variables Help Forecast Interest Rates? http://www.frbsf.org/economic-research/publications/economic-letter/2016/june/do-macroeconomic-variables-help-forecast-interest-rates/	Bauer / Hamilton
2016-19	Energy's Impact on Inflation Expectations http://www.frbsf.org/economic-research/publications/economic-letter/2016/june/energy-prices-and-inflation-expectations/	Cao / Shapiro
2016-18	China's IPO Activity and Equity Market Volatility http://www.frbsf.org/economic-research/publications/economic-letter/2016/june/china-initial-public-offerings-and-market-volatility/	Packer / Spiegel

Federal Reserve Board of Governors

Statement on Longer-Run Goals and Monetary Policy Strategy

As adopted effective January 24, 2012

Following careful deliberations at its recent meetings, the Federal Open Market Committee (FOMC) has reached broad agreement on the following principles regarding its longer-run goals and monetary policy strategy. The Committee intends to reaffirm these principles and to make adjustments as appropriate at its annual organizational meeting each January.

The FOMC is firmly committed to fulfilling its statutory mandate from the Congress of promoting maximum employment, stable prices, and moderate long-term interest rates. The Committee seeks to explain its monetary policy decisions to the public as clearly as possible. Such clarity facilitates well-informed decisionmaking by households and businesses, reduces economic and financial uncertainty, increases the effectiveness of monetary policy, and enhances transparency and accountability, which are essential in a democratic society.

Inflation, employment, and long-term interest rates fluctuate over time in response to economic and financial disturbances. Moreover, monetary policy actions tend to influence economic activity and prices with a lag. Therefore, the Committee's policy decisions reflect its longer-run goals, its medium-term outlook, and its assessments of the balance of risks, including risks to the financial system that could impede the attainment of the Committee's goals.

The inflation rate over the longer run is primarily determined by monetary policy, and hence the Committee has the ability to specify a longer-run goal for inflation. The Committee judges that inflation at the rate of 2 percent, as measured by the annual change in the price index for personal consumption expenditures, is most consistent over the longer run with the Federal Reserve's statutory mandate. Communicating this inflation goal clearly to the public helps keep longer-term inflation expectations firmly anchored, thereby fostering price stability and moderate long-term interest rates and enhancing the Committee's ability to promote maximum employment in the face of significant economic disturbances.

The maximum level of employment is largely determined by nonmonetary factors that affect the structure and dynamics of the labor market. These factors may change over time and may not be directly measurable. Consequently, it would not be appropriate to specify a fixed goal for employment; rather, the Committee's policy decisions must be informed by assessments of the maximum level of employment, recognizing that such assessments are necessarily uncertain and subject to revision. The Committee considers a wide range of indicators in making these assessments. Information about Committee participants' estimates of the longer-run normal rates of output growth and unemployment is published four times per year in the FOMC's Summary of Economic Projections. For example, in the most recent projections, FOMC participants' estimates of the longer-run normal rate of unemployment had a central tendency of 5.2 percent to 6.0 percent, roughly unchanged from last January but substantially higher than the corresponding interval several years earlier.

In setting monetary policy, the Committee seeks to mitigate deviations of inflation from its longer-run goal and deviations of employment from the Committee's assessments of its maximum level. These objectives are generally complementary. However, under circumstances in which the Committee judges that the objectives are not complementary, it follows a balanced approach in promoting them, taking into account the magnitude of the deviations and the potentially different time horizons over which employment and inflation are projected to return to levels judged consistent with its mandate.

Federal Reserve Board of Governors

Statement on Longer-Run Goals and Monetary Policy Strategy

Adopted effective January 24, 2012; as amended effective August 27, 2020

The Federal Open Market Committee (FOMC) is firmly committed to fulfilling its statutory mandate from the Congress of promoting maximum employment, stable prices, and moderate long-term interest rates. The Committee seeks to explain its monetary policy decisions to the public as clearly as possible. Such clarity facilitates well-informed decisionmaking by households and businesses, reduces economic and financial uncertainty, increases the effectiveness of monetary policy, and enhances transparency and accountability, which are essential in a democratic society.

Employment, inflation, and long-term interest rates fluctuate over time in response to economic and financial disturbances. Monetary policy plays an important role in stabilizing the economy in response to these disturbances. The Committee's primary means of adjusting the stance of monetary policy is through changes in the target range for the federal funds rate. The Committee judges that the level of the federal funds rate consistent with maximum employment and price stability over the longer run has declined relative to its historical average. Therefore, the federal funds rate is likely to be constrained by its effective lower bound more frequently than in the past. Owing in part to the proximity of interest rates to the effective lower bound, the Committee judges that downward risks to employment and inflation have increased. The Committee is prepared to use its full range of tools to achieve its maximum employment and price stability goals.

The maximum level of employment is a broad-based and inclusive goal that is not directly measurable and changes over time owing largely to nonmonetary factors that affect the structure and dynamics of the labor market. Consequently, it would not be appropriate to specify a fixed goal for employment; rather, the Committee's policy decisions must be informed by assessments of the shortfalls of employment from its maximum level, recognizing that such assessments are necessarily uncertain and subject to revision. The Committee considers a wide range of indicators in making these assessments.

The inflation rate over the longer run is primarily determined by monetary policy, and hence the Committee has the ability to specify a longer-run goal for inflation. The Committee reaffirms its judgment that inflation at the rate of 2 percent, as measured by the annual change in the price index for personal consumption expenditures, is most consistent over the longer run with the Federal Reserve's statutory mandate. The Committee judges that longer-term inflation expectations that are well anchored at 2 percent foster price stability and moderate long-term interest rates and enhance the Committee's ability to promote maximum employment in the face of significant economic disturbances. In order to anchor longer-term inflation expectations at this level, the Committee seeks to achieve inflation that averages 2 percent over time, and therefore judges that, following periods when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time.

Monetary policy actions tend to influence economic activity, employment, and prices with a lag. In setting monetary policy, the Committee seeks over time to mitigate shortfalls of employment from the Committee's assessment of its maximum level and deviations of inflation from its longer-run goal. Moreover, sustainably achieving maximum employment and price stability depends on a stable financial system. Therefore, the Committee's policy decisions reflect its longer-run goals, its medium-term outlook, and its assessments of the balance of risks, including risks to the financial system that could impede the attainment of the Committee's goals.

The Committee's employment and inflation objectives are generally complementary. However, under circumstances in which the Committee judges that the objectives are not complementary, it takes into account the employment shortfalls and inflation deviations and the potentially different time horizons over which employment and inflation are projected to return to levels judged consistent with its mandate.

The Committee intends to review these principles and to make adjustments as appropriate at its annual organizational meeting each January, and to undertake roughly every 5 years a thorough public review of its monetary policy strategy, tools, and communication practices.

In the revised Statement on Longer-Run Goals and Monetary Policy Strategy shown below, **underlined bold red** text shows additions and ~~struck-through~~ text shows deletions relative to the statement the Committee issued on January 29, 2019. Note that the discussion of the employment and inflation goals has been separated into two paragraphs and their order reversed relative to the January 2019 statement. To improve readability, these changes are not marked with underlined bold red text or struck-through text.

Statement on Longer-Run Goals and Monetary Policy Strategy

Adopted effective January 24, 2012; as amended effective ~~January 29, 2019~~ **August 27, 2020**

1. The Federal Open Market Committee (FOMC) is firmly committed to fulfilling its statutory mandate from the Congress of promoting maximum employment, stable prices, and moderate long-term interest rates. The Committee seeks to explain its monetary policy decisions to the public as clearly as possible. Such clarity facilitates well-informed decisionmaking by households and businesses, reduces economic and financial uncertainty, increases the effectiveness of monetary policy, and enhances transparency and accountability, which are essential in a democratic society.

2. **Employment,** inflation, ~~employment,~~ and long-term interest rates fluctuate over time in response to economic and financial disturbances. **Monetary policy plays an important role in stabilizing the economy in response to these disturbances. The Committee's primary means of adjusting the stance of monetary policy is through changes in the target range for the federal funds rate. The Committee judges that the level of the federal funds rate consistent with maximum employment and price stability over the longer run has declined relative to its historical average. Therefore, the federal funds rate is likely to be constrained by its effective lower bound more frequently than in the past. Owing in part to the proximity of interest rates to the effective lower bound, the Committee judges that downward risks to employment and inflation have increased. The Committee is prepared to use its full range of tools to achieve its maximum employment and price stability goals.** ~~Moreover, monetary policy actions tend to influence economic activity and prices with a lag. Therefore, the Committee's policy decisions reflect its longer-run goals, its medium-term outlook, and its assessments of the balance of risks, including risks to the financial system that could impede the attainment of the Committee's goals.~~

3. The maximum level of employment is **a broad-based and inclusive goal that is not directly measurable and changes over time owing** largely ~~determined by~~ **to** nonmonetary factors that affect the structure and dynamics of the labor market. ~~These factors may change over time and may not be directly measurable.~~ Consequently, it would not be appropriate to specify a fixed goal for employment; rather, the Committee's policy decisions must be informed by assessments of the **shortfalls of employment from its** maximum level ~~of employment~~, recognizing that such assessments are necessarily uncertain and subject to revision. The Committee considers a wide range of indicators in making these assessments. ~~Information about Committee participants' estimates of the longer-run normal rates of output growth and unemployment is published four times per year in the FOMC's Summary of Economic Projections. For example, in the most recent projections, the median of FOMC participants' estimates of the longer-run normal rate of unemployment was 4.4 percent.~~

4. The inflation rate over the longer run is primarily determined by monetary policy, and hence the Committee has the ability to specify a longer-run goal for inflation. The Committee reaffirms its judgment that inflation at the rate of 2 percent, as measured by the annual change in the price index for personal consumption expenditures, is most consistent over the longer run with the Federal Reserve's statutory mandate. The Committee ~~would be concerned if inflation were running persistently above or below this objective. Communicating this symmetric inflation goal clearly to the public helps keep~~ **judges that** longer-term inflation expectations ~~firmly~~ **that are well** anchored~~, thereby~~ **at 2 percent** foster~~ing~~ price stability and moderate long-term interest rates and ~~enhancing~~ **enhance** the Committee's ability to promote maximum employment in the face of significant economic disturbances. **In order to anchor longer-term inflation expectations at this level, the Committee seeks to achieve inflation that averages**

2 percent over time, and therefore judges that, following periods when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time.

5. Monetary policy actions tend to influence economic activity, employment, and prices with a lag. In setting monetary policy, the Committee seeks over time to mitigate shortfalls of employment from the Committee's assessment of its maximum level and deviations of inflation from its longer-run goal ~~and deviations of employment from the Committee's assessments of its maximum level~~. Moreover, sustainably achieving maximum employment and price stability depends on a stable financial system. Therefore, the Committee's policy decisions reflect its longer-run goals, its medium-term outlook, and its assessments of the balance of risks, including risks to the financial system that could impede the attainment of the Committee's goals.

6. ~~These~~ The Committee's employment and inflation objectives are generally complementary. However, under circumstances in which the Committee judges that the objectives are not complementary, it ~~follows a balanced approach in promoting them, taking~~ takes into account the ~~magnitude of the~~ employment shortfalls and inflation deviations and the potentially different time horizons over which employment and inflation are projected to return to levels judged consistent with its mandate.

7. The Committee intends to ~~reaffirm~~ review these principles and to make adjustments as appropriate at its annual organizational meeting each January, and to undertake roughly every five years a thorough public review of its monetary policy strategy, tools, and communication practices.

For release on delivery
9:10 a.m. EDT (8:10 a.m. CDT)
August 27, 2020

New Economic Challenges and the Fed's Monetary Policy Review

Remarks by

Jerome H. Powell

Chair

Board of Governors of the Federal Reserve System

at

"Navigating the Decade Ahead: Implications for Monetary Policy," an economic policy symposium sponsored by the Federal Reserve Bank of Kansas City

Jackson Hole, Wyoming
(via webcast)

August 27, 2020

Thank you, Esther, for that introduction, and good morning. The Kansas City Fed's Economic Policy Symposiums have consistently served as a vital platform for discussing the most challenging economic issues of the day. Judging by the agenda and the papers, this year will be no exception.

For the past year and a half, my colleagues and I on the Federal Open Market Committee (FOMC) have been conducting the first-ever public review of our monetary policy framework.[1] Earlier today we released a revised Statement on Longer-Run Goals and Monetary Policy Strategy, a document that lays out our goals, articulates our framework for monetary policy, and serves as the foundation for our policy actions.[2] Today I will discuss our review, the changes in the economy that motivated us to undertake it, and our revised statement, which encapsulates the main conclusions of the review.

Evolution of the Fed's Monetary Policy Framework

We began this public review in early 2019 to assess the monetary policy strategy, tools, and communications that would best foster achievement of our congressionally assigned goals of maximum employment and price stability over the years ahead in service to the American people. Because the economy is always evolving, the FOMC's strategy for achieving its goals—our policy framework—must adapt to meet the new challenges that arise. Forty years ago, the biggest problem our economy faced was high and rising inflation.[3] The Great Inflation demanded a clear focus on restoring the

---

[1] See Board of Governors (2018) and Clarida (2019).
[2] The revised Statement on Longer-Run Goals and Monetary Policy Strategy is available on the Board's website at https://www.federalreserve.gov/newsevents/pressreleases/monetary20200827a.htm.
[3] Consumer price inflation, which was running below 2 percent in the early 1960s, had risen into the double digits by the late 1970s and was slightly above 12 percent when the Committee gathered for an unscheduled meeting in the Eccles Building in Washington, D.C., on a Saturday in October 1979—before

credibility of the FOMC's commitment to price stability. Chair Paul Volcker brought that focus to bear, and the "Volcker disinflation," with the continuing stewardship of Alan Greenspan, led to the stabilization of inflation and inflation expectations in the 1990s at around 2 percent. The monetary policies of the Volcker era laid the foundation for the long period of economic stability known as the Great Moderation. This new era brought new challenges to the conduct of monetary policy. Before the Great Moderation, expansions typically ended in overheating and rising inflation. Since then, prior to the current pandemic-induced downturn, a series of historically long expansions had been more likely to end with episodes of financial instability, prompting essential efforts to substantially increase the strength and resilience of the financial system.[4]

By the early 2000s, many central banks around the world had adopted a monetary policy framework known as inflation targeting.[5] Although the precise features of inflation targeting differed from country to country, the core framework always articulated an inflation goal as a primary objective of monetary policy. Inflation targeting was also associated with increased communication and transparency designed to clarify the central bank's policy intentions. This emphasis on transparency reflected what was then a new appreciation that policy is most effective when it is clearly understood by the public. Inflation-targeting central banks generally do not focus solely on inflation: Those with "flexible" inflation targets take into account economic stabilization in addition to their inflation objective.

---

the days when transparency was the hallmark of institutional accountability—and decided to change the conduct of monetary policy. See Volcker and Gyohten (1992); also see Volcker (2008), pp. 73–74.

[4] See Powell (2019).

[5] For a readable explanation of inflation targeting, see Bernanke and Mishkin (1997); also see Bernanke and others (1999).

Under Ben Bernanke's leadership, the Federal Reserve adopted many of the features associated with flexible inflation targeting.[6] We made great advances in transparency and communications, with the initiation of quarterly press conferences and the Summary of Economic Projections (SEP), which comprises the individual economic forecasts of FOMC participants. During that time, then–Board Vice Chair Janet Yellen led an effort on behalf of the FOMC to codify the Committee's approach to monetary policy. In January 2012, the Committee issued its first Statement on Longer-Run Goals and Monetary Policy Strategy, which we often refer to as the consensus statement. A central part of this statement was the articulation of a longer-run inflation goal of 2 percent.[7] Because the structure of the labor market is strongly influenced by nonmonetary factors that can change over time, the Committee did not set a numerical objective for maximum employment. However, the statement affirmed the Committee's commitment to fulfilling both of its congressionally mandated goals. The 2012 statement was a significant milestone, reflecting lessons learned from fighting high inflation as well as from experience around the world with flexible inflation targeting. The statement largely articulated the policy framework the Committee had been following for some time.[8]

Motivation for the Review

The completion of the original consensus statement in January 2012 occurred early on in the recovery from the Global Financial Crisis, when notions of what the "new normal" might bring were quite uncertain. Since then, our understanding of the economy

---

[6] For the formalization and development of the concept of flexible inflation targeting, see Svensson (1999) and, more recently, Svensson (2020).
[7] As measured by the annual change in the price index for personal consumption expenditures.
[8] See Board of Governors (2012), p. 43.

has evolved in ways that are central to monetary policy. Of course, the conduct of monetary policy has also evolved. A key purpose of our review has been to take stock of the lessons learned over this period and identify any further changes in our monetary policy framework that could enhance our ability to achieve our maximum-employment and price-stability objectives in the years ahead.[9]

Our evolving understanding of four key economic developments motivated our review. First, assessments of the potential, or longer-run, growth rate of the economy have declined. For example, since January 2012, the median estimate of potential growth from FOMC participants has fallen from 2.5 percent to 1.8 percent (see figure 1). Some slowing in growth relative to earlier decades was to be expected, reflecting slowing population growth and the aging of the population. More troubling has been the decline in productivity growth, which is the primary driver of improving living standards over time.[10]

Second, the general level of interest rates has fallen both here in the United States and around the world. Estimates of the neutral federal funds rate, which is the rate consistent with the economy operating at full strength and with stable inflation, have fallen substantially, in large part reflecting a fall in the equilibrium real interest rate, or "r-star." This rate is not affected by monetary policy but instead is driven by fundamental factors in the economy, including demographics and productivity growth—the same factors that drive potential economic growth.[11] The median estimate from

---

[9] On the benefits of holding a review, see Fuhrer and others (2018).

[10] Between 1995 and 2003, business-sector output per hour increased at an annual rate of 3.4 percent, and it has risen only 1.4 percent since then. Fernald (2015) suggests 2003 as a break point for the beginning of the productivity slowdown. See also Fernald (2018), Gordon (2017), and Powell (2018).

[11] Estimates of r-star have fallen between 2 and 3 percentage points over the past two decades. For evidence on the secular decline in interest rates in the United States and abroad see, for instance, Holston,

FOMC participants of the neutral federal funds rate has fallen by nearly half since early 2012, from 4.25 percent to 2.5 percent (see figure 2).

This decline in assessments of the neutral federal funds rate has profound implications for monetary policy. With interest rates generally running closer to their effective lower bound even in good times, the Fed has less scope to support the economy during an economic downturn by simply cutting the federal funds rate.[12] The result can be worse economic outcomes in terms of both employment and price stability, with the costs of such outcomes likely falling hardest on those least able to bear them.

Third, and on a happier note, the record-long expansion that ended earlier this year led to the best labor market we had seen in some time. The unemployment rate hovered near 50-year lows for roughly 2 years, well below most estimates of its sustainable level. And the unemployment rate captures only part of the story. Having declined significantly in the five years following the crisis, the labor force participation rate flattened out and began rising even though the aging of the population suggested that it should keep falling.[13] For individuals in their prime working years, the participation rate fully retraced its post-crisis decline, defying earlier assessments that the Global Financial Crisis might cause permanent structural damage to the labor market.

Laubach, and Williams (2017) and Lunsford and West (2019). See also the recent evidence in Lopez-Salido and others (2020).

[12] Both the experience following the Global Financial Crisis and the current situation drive this point home. After the Global Financial Crisis, the Fed held the federal funds rate at the lower bound for seven years. Thereafter, as the economy strengthened, the federal funds rate reached a peak just above 2 percent. By comparison, the federal funds rate averaged a little more than 5 percent in the 1990s. And, at the onset of the COVID pandemic, we quickly cut rates to the effective lower bound. But since the federal funds rate was only about 1-1/2 percent before the pandemic—because that is what the economy required at that time—our scope to reduce the federal funds rate was far less than in earlier recessions.

[13] The labor force participation rate for prime-age individuals (those between 25 and 54 years old), which is much less sensitive to the effects of population aging, has been rising over the past few years and continued to increase in 2019. For a longer-run perspective, see the analysis presented in Aaronson and others (2014).

Moreover, as the long expansion continued, the gains began to be shared more widely across society. The Black and Hispanic unemployment rates reached record lows, and the differentials between these rates and the white unemployment rate narrowed to their lowest levels on record.[14] As we heard repeatedly in our *Fed Listens* events, the robust job market was delivering life-changing gains for many individuals, families, and communities, particularly at the lower end of the income spectrum.[15] In addition, many who had been left behind for too long were finding jobs, benefiting their families and communities, and increasing the productive capacity of our economy. Before the pandemic, there was every reason to expect that these gains would continue. It is hard to overstate the benefits of sustaining a strong labor market, a key national goal that will require a range of policies in addition to supportive monetary policy.

Fourth, the historically strong labor market did not trigger a significant rise in inflation. Over the years, forecasts from FOMC participants and private-sector analysts routinely showed a return to 2 percent inflation, but these forecasts were never realized on a sustained basis (see figure 3). Inflation forecasts are typically predicated on estimates of the natural rate of unemployment, or "u-star," and of how much upward pressure on inflation arises when the unemployment rate falls relative to u-star.[16] As the unemployment rate moved lower and inflation remained muted, estimates of u-star were revised down. For example, the median estimate from FOMC participants declined from

---

[14] The decline in the unemployment rate for African Americans has been particularly sizable, and its average rate in the second half of October 2019 was the lowest recorded since the data began to be reported in 1972; see Board of Governors (2020a). See also Daly (2020) and Aaronson and others (2019).

[15] Information on the *Fed Listens* events is available on the Board's website at https://www.federalreserve.gov/monetarypolicy/review-of-monetary-policy-strategy-tools-and-communications-fed-listens-events.htm.

[16] A discussion of various concepts of unemployment rate benchmarks that are frequently used by policymakers for assessing the current state of the economy is presented in Crump and others (2020).

5.5 percent in 2012 to 4.1 percent at present (see figure 4). The muted responsiveness of inflation to labor market tightness, which we refer to as the flattening of the Phillips curve, also contributed to low inflation outcomes.[17] In addition, longer-term inflation expectations, which we have long seen as an important driver of actual inflation, and global disinflationary pressures may have been holding down inflation more than was generally anticipated. Other advanced economies have also struggled to achieve their inflation goals in recent decades.

The persistent undershoot of inflation from our 2 percent longer-run objective is a cause for concern. Many find it counterintuitive that the Fed would want to push up inflation. After all, low and stable inflation is essential for a well-functioning economy. And we are certainly mindful that higher prices for essential items, such as food, gasoline, and shelter, add to the burdens faced by many families, especially those struggling with lost jobs and incomes. However, inflation that is persistently too low can pose serious risks to the economy. Inflation that runs below its desired level can lead to an unwelcome fall in longer-term inflation expectations, which, in turn, can pull actual inflation even lower, resulting in an adverse cycle of ever-lower inflation and inflation expectations.

This dynamic is a problem because expected inflation feeds directly into the general level of interest rates. Well-anchored inflation expectations are critical for giving the Fed the latitude to support employment when necessary without destabilizing inflation.[18] But if inflation expectations fall below our 2 percent objective, interest rates

---

[17] See, for instance, Blanchard, Cerutti, and Summers (2015).

[18] The success of monetary policy in taming high and variable inflation in the 1980s and 1990s was instrumental in anchoring inflation expectations at low levels. See, for instance, Goodfriend (2007).

would decline in tandem. In turn, we would have less scope to cut interest rates to boost employment during an economic downturn, further diminishing our capacity to stabilize the economy through cutting interest rates. We have seen this adverse dynamic play out in other major economies around the world and have learned that once it sets in, it can be very difficult to overcome. We want to do what we can to prevent such a dynamic from happening here.

Elements of the Review

We began our review with these changes in the economy in mind. The review had three pillars: a series of *Fed Listens* events held around the country, a flagship research conference, and a series of Committee discussions supported by rigorous staff analysis. As is appropriate in our democratic society, we have sought extensive engagement with the public throughout the review.

The *Fed Listens* events built on a long-standing practice around the Federal Reserve System of engaging with community groups. The 15 events involved a wide range of participants—workforce development groups, union members, small business owners, residents of low- and moderate-income communities, retirees, and others—to hear about how our policies affect peoples' daily lives and livelihoods.[19] The stories we heard at *Fed Listens* events became a potent vehicle for us to connect with the people and communities that our policies are intended to benefit. One of the clear messages we heard was that the strong labor market that prevailed before the pandemic was generating

---

[19] See the report *Fed Listens: Perspectives from the Public* (Board of Governors, 2020b), which summarizes the 14 *Fed Listens* events hosted by the Board and the Federal Reserve Banks during 2019, as well as an additional event in May 2020 to follow up with participants about the effects of the COVID-19 pandemic on their communities. Information on the individual *Fed Listens* events is available on the Board's website at https://www.federalreserve.gov/monetarypolicy/review-of-monetary-policy-strategy-tools-and-communications-fed-listens-events.htm.

employment opportunities for many Americans who in the past had not found jobs readily available. A clear takeaway from these events was the importance of achieving and sustaining a strong job market, particularly for people from low- and moderate-income communities.

The research conference brought together some of the world's leading academic experts to address topics central to our review, and the presentations and robust discussion we engaged in were an important input to our review process.[20]

Finally, the Committee explored the range of issues that were brought to light during the course of the review in five consecutive meetings beginning in July 2019. Analytical staff work put together by teams across the Federal Reserve System provided essential background for each of the Committee's discussions.[21]

Our plans to conclude the review earlier this year were, like so many things, delayed by the arrival of the pandemic. When we resumed our discussions last month, we turned our attention to distilling the most important lessons of the review in a revised Statement on Longer-Run Goals and Monetary Policy Strategy.

New Statement on Longer-Run Goals and Monetary Policy Strategy

The federated structure of the Federal Reserve, reflected in the FOMC, ensures that we always have a diverse range of perspectives on monetary policy, and that is certainly the case today. Nonetheless, I am pleased to say that the revised consensus statement was adopted today with the unanimous support of Committee participants. Our

---

[20] The Federal Reserve System's "Conference on Monetary Policy Strategy, Tools, and Communication Practices (A *Fed Listens* Event)" was hosted by the Federal Reserve Bank of Chicago in June 2019. See https://www.federalreserve.gov/conferences/conference-monetary-policy-strategy-tools-communications-20190605.htm for the conference program, links to the conference papers and presentations, and links to session videos. A special issue of the *International Journal of Central Banking* (February 2020) included five of the seven papers presented at the conference (see https://www.ijcb.org/journal/ijcb2002.htm).

[21] See the overview presented in Altig and others (2020).

new consensus statement, like its predecessor, explains how we interpret the mandate Congress has given us and describes the broad framework that we believe will best promote our maximum-employment and price-stability goals. Before addressing the key changes in our statement, let me highlight some areas of continuity. We continue to believe that specifying a numerical goal for employment is unwise, because the maximum level of employment is not directly measurable and changes over time for reasons unrelated to monetary policy. The significant shifts in estimates of the natural rate of unemployment over the past decade reinforce this point. In addition, we have not changed our view that a longer-run inflation rate of 2 percent is most consistent with our mandate to promote both maximum employment and price stability. Finally, we continue to believe that monetary policy must be forward looking, taking into account the expectations of households and businesses and the lags in monetary policy's effect on the economy. Thus, our policy actions continue to depend on the economic outlook as well as the risks to the outlook, including potential risks to the financial system that could impede the attainment of our goals.

The key innovations in our new consensus statement reflect the changes in the economy I described. Our new statement explicitly acknowledges the challenges posed by the proximity of interest rates to the effective lower bound. By reducing our scope to support the economy by cutting interest rates, the lower bound increases downward risks to employment and inflation.[22] To counter these risks, we are prepared to use our full range of tools to support the economy.

---

[22] See Caldara and others (2020).

With regard to the employment side of our mandate, our revised statement emphasizes that maximum employment is a broad-based and inclusive goal. This change reflects our appreciation for the benefits of a strong labor market, particularly for many in low- and moderate-income communities.[23] In addition, our revised statement says that our policy decision will be informed by our "assessments of the *shortfalls* of employment from its maximum level" rather than by "*deviations* from its maximum level" as in our previous statement.[24] This change may appear subtle, but it reflects our view that a robust job market can be sustained without causing an outbreak of inflation.

In earlier decades when the Phillips curve was steeper, inflation tended to rise noticeably in response to a strengthening labor market. It was sometimes appropriate for the Fed to tighten monetary policy as employment rose toward its estimated maximum level in order to stave off an unwelcome rise in inflation. The change to "shortfalls" clarifies that, going forward, employment can run at or above real-time estimates of its maximum level without causing concern, unless accompanied by signs of unwanted increases in inflation or the emergence of other risks that could impede the attainment of our goals.[25] Of course, when employment is below its maximum level, as is clearly the

---

[23] The analysis of how alternative strategies that succeed in reducing the frequency and/or severity of ELB recessions can induce longer run beneficial effects on economic inequality is presented in Feiveson and others (2020).

[24] Italics added for emphasis. The 2012 statement noted that the Committee would mitigate "deviations" of employment from the Committee's assessments of its maximum level, suggesting that the Committee would actively seek to lower employment if it assessed that employment was above the Committee's estimate of its maximum level. In practice, the Committee has not conducted policy in this way, but rather has supported continued gains in the labor market.

[25] In addition, because real-time estimates are highly uncertain, we no longer refer to estimates of the natural rate of unemployment from the SEP in our consensus statement. Another reason for dropping this reference is that the unemployment rate does not adequately capture the full range of experience in the labor market. The SEP will continue to report FOMC participants' estimates of the longer-run level of the unemployment rate, as such information remains a useful, albeit highly incomplete, input into our policy deliberations.

case now, we will actively seek to minimize that shortfall by using our tools to support economic growth and job creation.

We have also made important changes with regard to the price-stability side of our mandate. Our longer-run goal continues to be an inflation rate of 2 percent. Our statement emphasizes that our actions to achieve both sides of our dual mandate will be most effective if longer-term inflation expectations remain well anchored at 2 percent. However, if inflation runs below 2 percent following economic downturns but never moves above 2 percent even when the economy is strong, then, over time, inflation will average less than 2 percent. Households and businesses will come to expect this result, meaning that inflation expectations would tend to move below our inflation goal and pull realized inflation down. To prevent this outcome and the adverse dynamics that could ensue, our new statement indicates that we will seek to achieve inflation that averages 2 percent over time. Therefore, following periods when inflation has been running below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time.

In seeking to achieve inflation that averages 2 percent over time, we are not tying ourselves to a particular mathematical formula that defines the average. Thus, our approach could be viewed as a flexible form of average inflation targeting.[26] Our decisions about appropriate monetary policy will continue to reflect a broad array of considerations and will not be dictated by any formula. Of course, if excessive

---

[26] This strategy embodies some key lessons from the general class of makeup strategies that have been analyzed extensively in the economics literature. The literature has emphasized that the proximity of interest rates to the effective lower bound poses an asymmetric challenge for monetary policy, increasing the likelihood that inflation and employment will tend to be too low. An extensive discussion about how these issues affect the design of monetary policy, as well as the relevant related literature, can be found in Duarte and others (2020), Arias and others (2020), and Hebden and others (2020).

inflationary pressures were to build or inflation expectations were to ratchet above levels consistent with our goal, we would not hesitate to act.

The revisions to our statement add up to a robust updating of our monetary policy framework. To an extent, these revisions reflect the way we have been conducting policy in recent years. At the same time, however, there are some important new features. Overall, our new Statement on Longer-Run Goals and Monetary Policy Strategy conveys our continued strong commitment to achieving our goals, given the difficult challenges presented by the proximity of interest rates to the effective lower bound. In conducting monetary policy, we will remain highly focused on fostering as strong a labor market as possible for the benefit of all Americans. And we will steadfastly seek to achieve a 2 percent inflation rate over time.

Looking Ahead

Our review has provided a platform for productive discussion and engagement with the public we serve. The *Fed Listens* events helped us connect with our core constituency, the American people, and hear directly how their everyday lives are affected by our policies. We believe that conducting a review at regular intervals is a good institutional practice, providing valuable feedback and enhancing transparency and accountability. And with the ever-changing economy, future reviews will allow us to take a step back, reflect on what we have learned, and adapt our practices as we strive to achieve our dual-mandate goals. As our statement indicates, we plan to undertake a thorough public review of our monetary policy strategy, tools, and communication practices roughly every five years.

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, https://www.brookings.edu/wp-content/uploads/2016/07/Fall2014BPEA_Aaronson_et_al.pdf.

Aaronson, Stephanie, Mary C. Daly, William Wascher, and David W. Wilcox (2019). "Okun Revisited: Who Benefits Most from a Strong Economy?" *Brookings Papers on Economic Activity,* Spring, pp. 333–75, https://www.brookings.edu/wp-content/uploads/2019/03/Aaronson_web.pdf.

Altig, David, Jeff Fuhrer, Marc P. Giannoni, and Thomas Laubach (2020). "The Federal Reserve's Review of its Monetary Policy Framework: A Roadmap," FEDS Notes. Washington: Board of Governors of the Federal Reserve System, August 27, https://doi.org/10.17016/2380-7172.2767.

Arias, Jonas, Martin Bodenstein, Hess Chung, Thorsten Drautzburg, and Andrea Raffo (2020). "Alternative Strategies: How Do They Work? How Might They Help?" Finance and Economics Discussion Series 2020-068. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.068.

Bernanke, Ben S., Thomas Laubach, Frederic S. Mishkin, and Adam S. Posen (1999). *Inflation Targeting: Lessons from the International Experience.* Princeton, N.J.: Princeton University Press.

Bernanke, Ben S., and Frederic S. Mishkin (1997). "Inflation Targeting: A New Framework for Monetary Policy?" *Journal of Economic Perspectives,* vol. 11 (Spring), pp. 97–116.

Blanchard, Olivier J., Eugenio M. Cerutti, and Lawrence Summers (2015). "Inflation and Activity—Two Explorations and Their Monetary Policy Implications," IMF Working Paper 15/230. Washington: International Monetary Fund, https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Inflation-and-Activity-Two-Explorations-and-their-Monetary-Policy-Implications-43377.

Board of Governors of the Federal Reserve System (2012). "Meeting of the Federal Open Market Committee on January 24–25, 2012," transcript. Washington: Board of Governors, https://www.federalreserve.gov/monetarypolicy/files/FOMC20120125meeting.pdf.

——— (2018). "Federal Reserve to Review Strategies, Tools, and Communication Practices It Uses to Pursue Its Mandate of Maximum Employment and Price Stability," press release, November 15, https://www.federalreserve.gov/newsevents/pressreleases/monetary20181115a.htm.

——— (2020a), *Monetary Policy Report.* Washington: Board of Governors, February, https://www.federalreserve.gov/monetarypolicy/files/20200207_mprfullreport.pdf.

——— (2020b). *Fed Listens: Perspectives from the Public,* report. Washington: Board of Governors, June, https://www.federalreserve.gov/publications/files/fedlistens-report-20200612.pdf.

Caldara, Dario, Etienne Gagnon, Enrique Martínez-García, and Christopher J. Neely (2020). "Monetary Policy and Economic Performance since the Financial Crisis," Finance and Economics Discussion Series 2020-065. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.065.

Clarida, Richard H. (2019). "The Federal Reserve's Review of Its Monetary Policy Strategy, Tools, and Communication Practices," speech delivered at the 2019 U.S. Monetary Policy Forum, sponsored by the Initiative on Global Markets at the University of Chicago Booth School of Business, held in New York, February 22, https://www.federalreserve.gov/newsevents/speech/clarida20190222a.htm.

Crump, Richard, Christopher Nekarda, and Nicolas Petrosky-Nadeu (2020). "Unemployment Rate Benchmarks," Finance and Economics Discussion Series 2020-072. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.072.

Daly, Mary C. (2020). "We Can't Afford Not To," speech delivered at the National Press Club Virtual Event, Washington, June 15, available at https://www.frbsf.org/our-district/press/presidents-speeches/mary-c-daly/2020/june/we-cant-afford-not-to.

Duarte, Fernando, Benjamin K. Johannsen, Leonardo Melosi, and Taisuke Nakata (2020). "Strengthening the FOMC's Framework in View of the Effective Lower Bound and Some Considerations Related to Time-Inconsistent Strategies," Finance and Economics Discussion Series 2020-067. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.067.

Feiveson, Laura, Nils Goernemann, Julie Hotchkiss, Karel Mertens, and Jae Sim (2020). "Distributional Considerations for Monetary Policy Strategy," Finance and Economics Discussion Series 2020-073. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.073.

Fernald, John G. (2015). "Productivity and Potential Output before, during, and after the Great Recession," in Jonathan A. Parker and Michael Woodford, eds., *NBER Macroeconomics Annual 2014,* vol. 29. Chicago: University of Chicago Press, pp. 1–51.

——— (2018). "Is Slow Productivity and Output Growth in Advanced Economies the New Normal?" *International Productivity Monitor,* vol. 35 (Fall), pp. 138–48.

Fuhrer, Jeff, Giovanni P. Olivei, Eric S. Rosengren, and Geoffrey M.B. Tootell (2018). "Should the Federal Reserve Regularly Evaluate Its Monetary Policy Framework?" *Brookings Papers on Economic Activity,* Fall, pp. 443–97, https://www.brookings.edu/wp-content/uploads/2018/09/Fuhrer-et-al_Text.pdf.

Goodfriend, Marvin (2007). "How the World Achieved Consensus on Monetary Policy," *Journal of Economic Perspectives,* vol. 21 (Fall), pp. 47–68.

Gordon, Robert J. (2017). *The Rise and Fall of American Growth: The U.S. Standard of Living since the Civil War.* Princeton, N.J.: Princeton University Press.

Hebden, James, Edward P. Herbst, Jenny Tang, Giorgio Topa, and Fabian Winkler (2020). "How Robust Are Makeup Strategies to Key Alternative Assumptions?" Finance and Economics Discussion Series 2020-069. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.069.

Holston, Kathryn, Thomas Laubach, and John C. Williams (2017). "Measuring the Natural Rate of Interest: International Trends and Determinants," *Journal of International Economics,* vol. 108 (May, S1), pp. S59–75.

Lopez-Salido, David, Gerardo Sanz-Maldonado, Carly Schippits, and Min Wei (2020). "Measuring the Natural Rate of Interest: The Role of Inflation Expectations," FEDS Notes. Washington: Board of Governors of the Federal Reserve System, June 19, https://doi.org/10.17016/2380-7172.2593.

Lunsford, Kurt G., and Kenneth D. West (2019). "Some Evidence on Secular Drivers of U.S. Safe Real Rates," *American Economic Journal: Macroeconomics,* vol. 11 (October), pp. 113–39.

Powell, Jerome H. (2018). "Opening Remarks: Monetary Policy in a Changing Economy." In Federal Reserve Bank of Kansas City, ed., *Changing Market Structure and Implications for Monetary Policy: A Symposium Sponsored by the Federal Reserve Bank of Kansas City,* Jackson Hole, Wyo., August 23–25. Kansas City, Mo.: FRB Kansas City, pp. 1–18, https://www.kansascityfed.org/~/media/files/publicat/sympos/2018/powell2018.pdf?la=en.

——— (2019). "Opening Remarks: Challenges for Monetary Policy." In Federal Reserve Bank of Kansas City, ed., *Challenges for Monetary Policy: A Symposium Sponsored by the Federal Reserve Bank of Kansas City,* Jackson Hole, Wyo., August 22–24. Kansas City, Mo.: FRB Kansas City, pp. 1–16, https://www.kansascityfed.org/~/media/files/publicat/sympos/2019/powell2019.pdf?la=en.

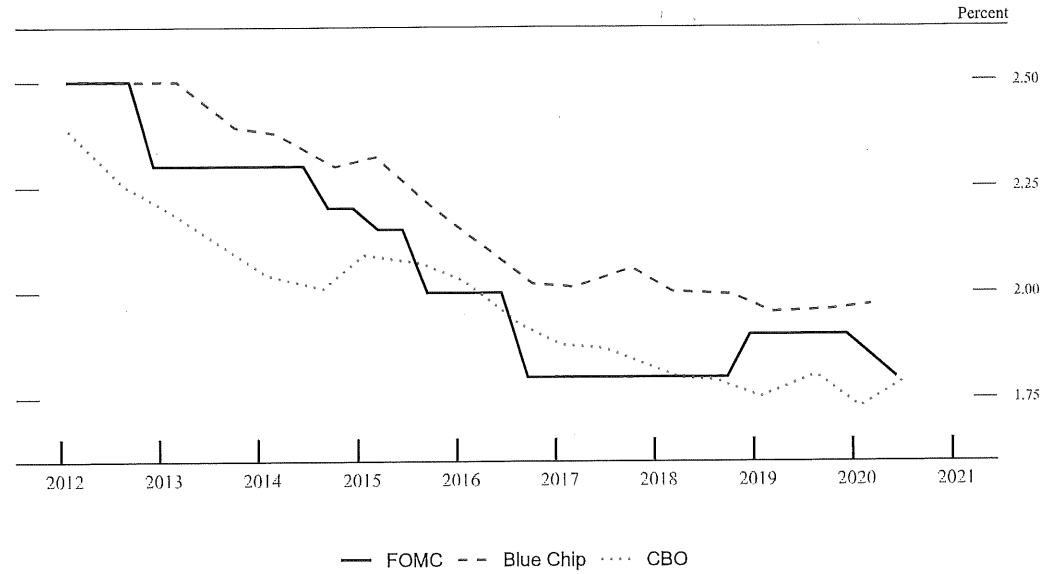
Svensson, Lars E. O. (1999). "Inflation Targeting as a Monetary Policy Rule," *Journal of Monetary Economics,* vol. 43 (June), pp. 607–54.

——— (2020). "Monetary Policy Strategies for the Federal Reserve," *International Journal of Central Banking,* vol. 16 (February), pp. 133–93, https://www.ijcb.org/journal/ijcb2002_3.pdf.

Volcker, Paul A. (2008). Interview by Donald L. Kohn, Lynn S. Fox, and David H. Small (second day of interview), *Federal Reserve Board Oral History Project,* Board of Governors of the Federal Reserve System. Washington: Board of Governors, January 28, https://www.federalreserve.gov/aboutthefed/files/paul-a-volcker-interview-20080225.pdf.

Volcker, Paul A., and Toyoo Gyohten (1992). *Changing Fortunes: The World's Money and the Threat to American Leadership.* New York: Crown.

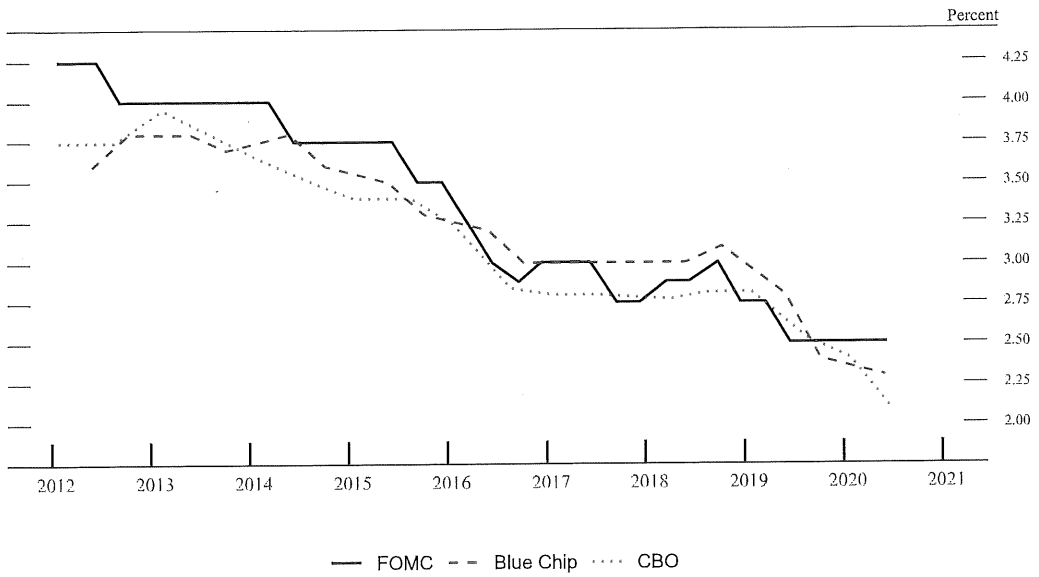
Figure 1: Real-Time Projections of Longer-Run Real Gross Domestic Product Growth



Note: The Federal Open Market Committee (FOMC) data are quarterly, extend through June 2020, and are median projections of longer-term normal; for 2015:Q1 and 2015:Q2, the data are central tendency midpoints. The Blue Chip data are biannual, extend through March 2020, and are consensus projections for 6 to 10 years in the future. The Congressional Budget Office (CBO) data are biannual, extend through July 2020, and are baseline projections for the calendar year 10 years ahead.

Source: For FOMC, Summary of Economic Projections, available on the Board's website at https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm; for Blue Chip, Wolters Kluwer, Blue Chip Economic Indicators; for CBO, Congressional Budget Office (The Budget and Economic Outlook, 10-Year Economic Projections).

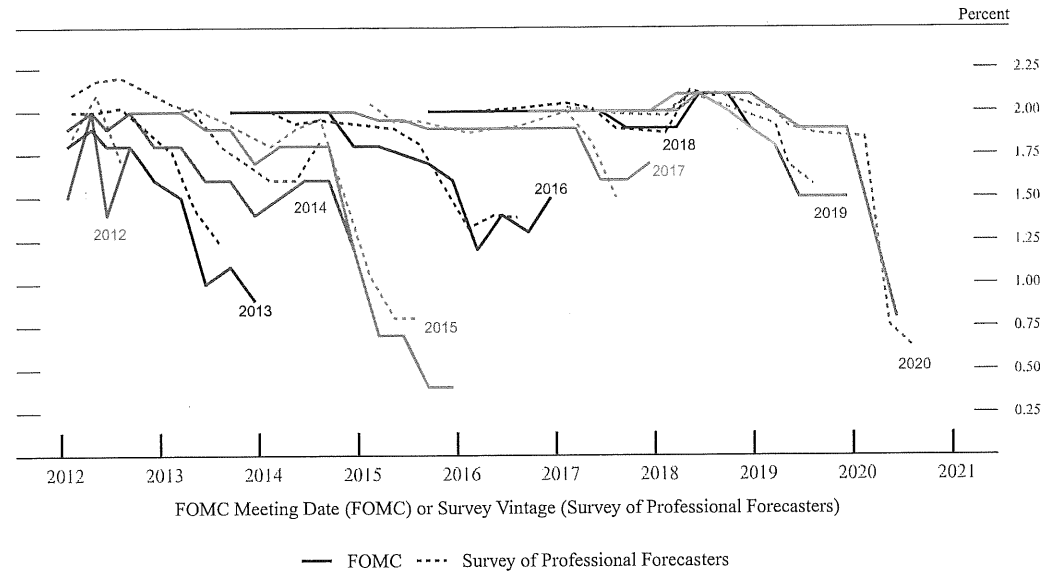
Figure 2: Real-Time Projections of Longer-Run Federal Funds Rate



Note: The Federal Open Market Committee (FOMC) data are quarterly, extend through June 2020, and are median projections of longer-term normal (rounded to the nearest 1/8 percentage point). The Blue Chip data are biannual, extend through June 2020, and are consensus estimates for 6 to 10 years in the future. The Congressional Budget Office (CBO) data are biannual, extend through July 2020, and are baseline projections of the three-month Treasury bill rate for the calendar year 10 years ahead.

Source: For FOMC, Summary of Economic Projections, available on the Board's website at https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm; for Blue Chip, Wolters Kluwer, Blue Chip Financial Forecasts; for CBO, Congressional Budget Office (The Budget and Economic Outlook, 10-Year Economic Projections).

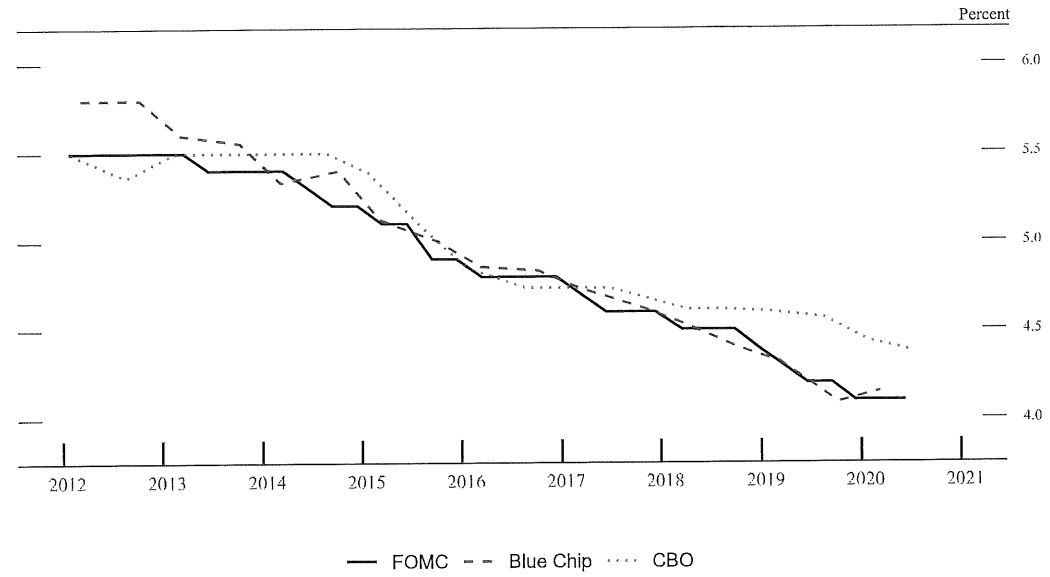
Figure 3: Evolution of Real-Time Projections for Personal Consumption Expenditures Inflation



Note: The Federal Open Market Committee (FOMC) data, represented by the solid lines, are median projections published quarterly; the latest data vintage is June 2020. For 2015:Q1 and 2015:Q2, the data are central tendency midpoints. The Survey of Professional Forecasters (SPF) data, represented by the dashed lines, are median projections published quarterly; the latest data vintage corresponds to 2020:Q3.

Source: For FOMC, Summary of Economic Projections, available on the Board's website at https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm; for SPF, Federal Reserve Bank of Philadelphia.

Figure 4: Real-Time Projections of Longer-Run Unemployment Rate



Note: The Federal Open Market Committee (FOMC) data are quarterly, extend through June 2020, and are median projections of longer-term normal; for 2015:Q1 and 2015:Q2, the data are central tendency midpoints. The Blue Chip data are biannual, extend through March 2020, and are consensus projections for 6 to 10 years in the future. The Congressional Budget Office (CBO) data are biannual, extend through July 2020, and correspond to the baseline estimate of the underlying long-term rate of unemployment for the current quarter at the time of the projection.

Source: For FOMC, Summary of Economic Projections, available on the Board's website at https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm; for Blue Chip, Wolters Kluwer, Blue Chip Economic Indicators; for CBO, Congressional Budget Office (The Budget and Economic Outlook, 10-Year Economic Projections).

For release on delivery
9:00 a.m. EDT
August 31, 2020

The Federal Reserve's New Monetary Policy Framework: A Robust Evolution

Remarks by

Richard H. Clarida

Vice Chair

Board of Governors of the Federal Reserve System

at the

Peterson Institute for International Economics

Washington, D.C.
(via webcast)

August 31, 2020

Last week, the Federal Reserve reached an important milestone in its ongoing review of its monetary policy strategy, tools, and communication practices with the unanimous approval and release of a new Statement on Longer-Run Goals and Monetary Policy Strategy.[1] In my remarks today, I will discuss our new framework and highlight some important policy implications that flow from the revised statement and our new strategy.[2] I believe that this new statement and strategy represent a critical and robust evolution of our framework that will best equip the Federal Reserve to achieve our dual-mandate objectives on a sustained basis in the world in which we conduct policy today and for the foreseeable future.

I will divide my remarks into four parts. First, I will discuss the factors that motivated the Federal Reserve in November 2018 to announce it would undertake in 2019 the first-ever public review of its monetary policy strategy, tools, and communication practices. Second, I will discuss the review process itself, with particular focus on the economic analysis and public input the Federal Open Market Committee (FOMC) drew on as it contemplated, over the past 18 months, potential changes to its policy framework. Third, I will briefly summarize the flexible inflation-targeting strategy that has been guiding U.S. monetary policy since 2012 in the context of some important changes in the economic landscape that have become evident since 2012.

---

[1] The revised statement is available on the Board's website at https://www.federalreserve.gov/monetarypolicy/files/FOMC_LongerRunGoals.pdf. Last week, Chair Powell made the review and the revised statement the focus of his speech at "Navigating the Decade Ahead: Implications for Monetary Policy," a symposium sponsored by the Federal Reserve Bank of Kansas City and held in Jackson Hole, Wyoming; see Powell (2020).

[2] The views expressed are my own and not necessarily those of other Federal Reserve Board members or Federal Open Market Committee participants. I would like to thank Etienne Gagnon, Ellen Meade, Jon Faust, and Trevor Reeve for their assistance in preparing these remarks, and Thomas Laubach for sharing with me throughout the review process his many keen insights on monetary policy strategy and communication.

Fourth, I will discuss the major findings of the review as codified in our new Statement on Longer-Run Goals and Monetary Policy Strategy and highlight some important policy implications that flow from them. Finally, I will offer some brief concluding remarks before joining in conversation with my good friend Adam Posen, which, as always, I very much look forward to.

Motivation for the Review

As my FOMC colleagues and I indicated from the outset, the fact that the Federal Reserve System chose to conduct this review does not indicate that we believed we have been poorly served by the framework in place since 2012. Indeed, I would argue that over the past eight years, the framework served us well and supported the Federal Reserve's efforts after the Global Financial Crisis (GFC) first to achieve and then, for several years, to sustain—until cut short this spring by the COVID-19 pandemic—the operation of the economy at or close to both our statutorily assigned goals of maximum employment and price stability in what became the longest economic expansion in U.S. history. Nonetheless, both the U.S. economy—and, equally importantly, our understanding of the economy—have clearly evolved along several crucial dimensions since 2012, and we believed that in 2019 it made sense to step back and assess whether, and in what possible ways, we might refine and rethink our strategy, tools, and communication practices to achieve and sustain our goals as consistently and robustly as possible in the global economy in which we operate today and for the foreseeable future.[3]

Perhaps the most significant change since 2012 in our understanding of the economy is our reassessment of the neutral real interest rate, r*, that, over the longer run,

[3] For a discussion of the elements that motivated the launch of the review and of how the previous policy framework had served us, see Clarida (2019b). See also Powell (2019a).

is consistent with our maximum-employment and price-stability mandates. In January 2012, the median FOMC participant projected a long-run r* of 2.25 percent, which, in tandem with the inflation goal of 2 percent, indicated a neutral setting for the federal funds rate of 4.25 percent. However, in the eight years since 2012, members of the Committee—as well as outside forecasters and financial market participants—have repeatedly marked down their estimates of longer-run r* and, thus, the neutral nominal policy rate.[4] Indeed, as of the most recent Summary of Economic Projections (SEP) released in June, the median FOMC participant currently projects a longer-run r* equal to just 0.5 percent, which implies a neutral setting for the federal funds rate of 2.5 percent. Moreover, as is well appreciated, the decline in neutral policy rates since the GFC is a global phenomenon that is widely expected by forecasters and financial markets to persist for years to come.[5]

The substantial decline in the neutral policy rate since 2012 has critical implications for the design, implementation, and communication of Federal Reserve monetary policy because it leaves the FOMC with less conventional policy space to cut rates to offset adverse shocks to aggregate demand. With a diminished reservoir of conventional policy space, it is much more likely than was appreciated in 2012 that, in

---

[4] See Chair Powell's address in Jackson Hole, Wyoming, last week (Powell, 2020) for an illustration of the revisions to the macroeconomic projections—including for the longer-run neutral federal funds rate—of FOMC participants as well as private and public forecasters. The downward revisions to r* over time have been informed, in part, by the general fall in interest rates and by econometric evidence that suggests that this fall is of a permanent rather than a cyclical nature. See, among many contributors, Hamilton and others (2016), Johannsen and Mertens (2018), Laubach and Williams (2016), Del Negro and others (2017), and López-Salido and others (2020). For discussions of the various factors that might have contributed to this fall, see Fischer (2016) and Rachel and Smith (2017).

[5] For evidence on the global nature of the decline in r*, see King and Low (2014); Holston, Laubach, and Williams (2017); Wynne and Zhang (2018); and Del Negro and others (2019). For a discussion of global considerations for U.S. monetary policy, see Obstfeld (2020).

economic downturns, the effective lower bound (ELB) will constrain the ability of the FOMC to rely solely on the federal funds rate instrument to offset adverse shocks.[6] This development, in turn, makes it more likely that recessions will impart elevated risks of more persistent downward pressure on inflation and upward pressure on unemployment that the Federal Reserve's monetary policy should, in design and implementation, seek to offset throughout the business cycle and not just in downturns themselves.[7]

Two other, related developments that have also become more evident than they appeared in 2012 are that price inflation seems less responsive to resource slack, and also, that estimates of resource slack based on historically estimated price Phillips curve relationships are less reliable and subject to more material revision than was once commonly believed.[8] For example, in the face of declining unemployment rates that did not result in excessive cost-push pressure to price inflation, the median of the Committee's projections of u*—the rate of unemployment consistent in the longer run with the 2 percent inflation objective—has been repeatedly revised lower, from

---

[6] For assessments of the risk that the federal funds rate will be constrained by the ELB in the future, along with policy strategies that might mitigate that risk, see Kiley and Roberts (2017); Chung and others (2019); Hebden and López-Salido (2018); and Bernanke, Kiley, and Roberts (2019).

[7] For pre-GFC discussions of the macroeconomic consequences of policy rates being constrained by the ELB, see Krugman (1998), Eggertsson and Woodford (2003), and Adam and Billi (2007). For the GFC and its aftermath, using a time-series approach, Eberly, Stock, and Wright (2020) estimate that, in the absence of the ELB constraint, the labor market recovery would have proceeded at a significantly more rapid pace than was observed, whereas core inflation would have been only modestly higher because of inflation's limited sensitivity to resource slack. Using a DSGE (dynamic stochastic general equilibrium) approach, the mean estimates of Gust and others (2017) suggest that a binding ELB accounted for about 30 percent (roughly 2 percentage points) of the 6 percent contraction in gross domestic product in 2009 relative to the peak in 2007 and was responsible for an even larger fraction of the ensuing slow recovery.

[8] For evidence of a flattening of the slope of the Phillips curve in the United States and abroad, see, among others, Simon, Matheson, and Sandri (2013); Blanchard, Cerutti, and Summers (2015); and Pfajfar and Roberts (2018). The difficulties in assessing shortfalls from maximum employment using measures of the unemployment rate has motivated researchers to explore alternative approaches. See Abraham, Haltiwanger, and Rendell (2020) for an approach based on the job search and matching framework. See also the staff discussion of various concepts of unemployment rate benchmarks by Crump, Nekarda, and Petrosky-Nadeau (2020), which was prepared as background materials for this review.

5.5 percent in January 2012 to 4.1 percent as of the June 2020 SEP.[9] Projections of u* by the Congressional Budget Office and professional forecasters show a similar decline during this same period and for the same reason.[10] In the past several years of the previous expansion, declines in the unemployment rate occurred in tandem with a notable and, to me, welcome increase in real wages that was accompanied by an increase in labor's share of national income, but not a surge in price inflation to a pace inconsistent with our price-stability mandate and well-anchored inflation expectations. Indeed, this pattern of mid-cycle declines in unemployment coincident with noninflationary increases in real wages has been evident in the U.S. data since the 1990s.[11]

With regard to inflation expectations, there is broad agreement among academics and policymakers that achieving price stability on a sustainable basis requires that inflation expectations be well anchored at the rate of inflation consistent with the price-stability goal. This is especially true in the world that prevails today, with flat Phillips curves in which the primary determinant of actual inflation is expected inflation.[12] The

---

[9] The large degree of uncertainty attached to estimates of r*, u*, the slope of the (short-run) Phillips curve, and other key economic objects adds additional risk-management considerations in the conduct of monetary policy, especially in a low r* environment in which the federal funds rate is likely to be constrained by the ELB. See Powell (2019b) for a discussion of the implications for monetary policy and my recent remarks in Clarida (2020). See also the model-based analyses of Erceg and others (2018), Ajello and others (2020), and Hebden and others (2020).

[10] See Powell (2020) for an illustration. See also Caldara and others (2020) for a discussion of how repeated surprises in macroeconomic forecasts affect inference about the appropriate stance of policy.

[11] See Clarida (2016, 2019c) and Heise, Karahan, and Şahin (2020) for discussions.

[12] See Yellen (2015) for a discussion of inflation dynamics and monetary policy and Erceg and others (2018) for a quantitative exploration of the monetary policy implications of a flat Phillips curve in an uncertain economic environment. Since the mid-1980s, movements in both realized inflation and measures of longer-term inflation expectations have been somewhat muted, complicating the task of extracting the precise role of inflation expectations as a determinant of realized inflation. Faust and Wright (2013) review the literature on inflation forecasting and present evidence in support of the conclusion that measures of longer-run inflation expectations help predict inflation. Mavroeidis, Plagborg-Møller, and Stock (2014) discuss the challenges of identifying the precise role of expectations in determining actual inflation. Cecchetti and others (2017) suggest that, in a low and stable inflation environment, policymakers should pay attention to a wide array of indicators in determining the implications for monetary policy of movements in realized inflation and measures of inflation expectations.

pre-GFC academic literature derived the important result that a credible inflation-targeting monetary policy strategy that is not constrained by the ELB can deliver, under rational expectations, inflation expectations that themselves are well anchored at the inflation target.[13] In other words, absent a binding ELB constraint, a policy that targets actual inflation in these models delivers long-run inflation expectations well anchored at the target "for free." But this "copacetic coincidence" no longer holds in a world of low r* in which adverse aggregate demand shocks are expected to drive the economy in at least some downturns to the ELB. In this case, which is obviously relevant today, economic analysis indicates that flexible inflation-targeting monetary policy cannot be relied on to deliver inflation expectations that are anchored at the target, but instead will tend to deliver inflation expectations that, in each business cycle, become anchored at a level below the target.[14] This is the crucial insight in my colleague John Williams' research with Thomas Mertens. Indeed John's research over the past 20 years on r* estimation and monetary policy design at the ELB have been enormously influential, not only in the profession but also at Fed and certainly in my own thinking about how our framework should evolve. This downward bias in inflation expectations under inflation targeting in an ELB world can in turn reduce already scarce policy space—because nominal interest rates reflect both real rates and expected inflation—and it can open up the risk of the downward spiral in both actual and expected inflation that has been observed in some other major economies.

---

[13] See Bernanke and others (1999) for a review of the considerations that led to the adoption of inflation-targeting frameworks and the early international experience. See Svensson (1997), Clarida, Galí, and Gertler (1999), and Woodford (2003) for conceptual treatments of inflation targeting, including of rational expectations.

[14] See Mertens and Williams (2019) and Bianchi, Melosi, and Rottner (2019).

Inflation expectations are, of course, not directly observed and must be imperfectly inferred from surveys, financial market data, and econometric models. Each of these sources contains noise as well as signal, and they can and sometimes do give contradictory readings. But, at minimum, the failure of actual PCE (personal consumption expenditures) inflation—core or headline—over the past eight years to reach the 2 percent goal on a sustained basis cannot have contributed favorably to keeping inflation expectations anchored at 2 percent. Indeed, my reading of the evidence is that the various measures of inflation expectations I follow reside at the low end of a range I consider consistent with our 2 percent inflation goal.[15]

The Review Process

With this brief overview of important changes in the economic landscape since 2012, I would now like to discuss the review process itself. In November 2018, the Federal Reserve announced that in 2019 the System would undertake a wide-ranging, public review of its monetary policy strategy, tools, and communication practices. This initiative would be the first-ever *public* review of monetary policy strategy ever undertaken by the Fed. From the outset, it was conceived that the review would build on three pillars: a series of livestreamed *Fed Listens* events hosted by each of the 12 Reserve Banks and the Board, a flagship research conference hosted by the Federal Reserve Bank of Chicago, and a series of 13 rigorous briefings for the Committee by System staff at a succession of five consecutive FOMC meetings commencing in July 2019 and running through January 2020.

---

[15] See Clarida (2020).

The *Fed Listens* series built on a long-standing practice at the Reserve Banks and the Board of hosting outreach events that included a wide range of community groups, but, by focusing on a common format in which representatives of these groups were encouraged to tell their stories about our policies' effect on their communities and daily lives, it became a potent vehicle for us to better connect with the people our policies are meant to benefit. Although many people across the System were involved in making *Fed Listens* the success it was, I would be more than remiss if I did not single out Ellen Meade for her indefatigable contributions and attention to detail and organization that were essential to pulling the whole thing off. A report on the *Fed Listens* series is available on the Board's web site.[16]

The second pillar of our review, a research conference hosted by the Federal Reserve Bank of Chicago, brought together some of the world's leading academic experts in monetary economics to present bespoke papers on a range of topics central to the review. These papers and the robust discussion at the conference that they stimulated were an important input to the review process. The proceedings of the Chicago conference are available as a special January 2020 issue of the *International Journal of Central Banking*.[17]

The third important pillar of the review is a collection of 13 memos prepared by System staff and discussed by the Committee at a number of FOMC meetings over the past 18 months. These memos were commissioned by a System steering committee that

---

[16] See Board of Governors (2020).

[17] This special issue, which includes five of the seven papers presented at the research conference, is available on the journal's website at https://www.ijcb.org/journal/ijcb2002.htm. The conference program, conference drafts, presentations, and video recordings of the sessions can be found on the Board's website at https://www.federalreserve.gov/conferences/conference-monetary-policy-strategy-tools-communications-20190605.htm.

included Jeff Fuhrer, Marc Giannoni, and David Altig, with extensive input from Trevor Reeve. Thomas Laubach chaired the steering committee, and I must note that we simply would not be here today discussing this significant evolution of our framework without Thomas and the insights, inspiration, and good judgment that he brought to the project and the review process. A collection of the staff memos prepared for the review is now available on the Board's website.[18]

A New Economic Landscape Compels a Framework ReThink

As I mentioned earlier, the Committee devoted five consecutive FOMC meetings between July 2019 and January 2020 to presentations by the staff and Committee discussions of memos touching on various aspects of the framework review, and it held a lengthy discussion at the July 2020 FOMC meeting about the new Statement on Longer-Run Goals and Monetary Policy Strategy.[19] While it is fair to say that these Committee discussions revealed among the 17 participants a healthy range of views about and priorities for refining our framework and strategy, some common themes did emerge, and these provided the foundation for the revised Statement on Longer-Run Goals and Monetary Policy Strategy that the Committee discussed in July, approved last week, and released on Thursday, August 27.

Broadly, we agreed that the economic landscape has changed in important ways since 2012 and that, as a result, the existing statement and the monetary policy strategy

---

[18] An overview of the System staff work in support of the review is presented in Altig and others (2020). Federal Reserve staff analysis on the *Fed Listens* initiative was presented and discussed at the December 2019 FOMC meeting and is part of the *Fed Listens* report.

[19] Summaries of these discussions can be found in the minutes of these FOMC meetings, which are accessible on the Board's website at https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm.

that flows from it need as well to evolve along several dimensions.[20] For example, under our previous flexible inflation-targeting framework, the Federal Reserve declared that the 2 percent inflation objective is "symmetric." This term has been interpreted by many observers to mean that the Committee's reaction function aimed to be symmetric on either side of the 2 percent inflation goal, and that the FOMC set policy with the (ex ante) aim that the 2 percent goal should represent an inflation ceiling in economic expansions following economic downturns in which inflation falls below target. Regarding the ELB, the previous statement was silent on the global decline in neutral policy rates, the likelihood that the ELB will constrain monetary policy space in economic downturns, and the implications of this constraint for our ability to achieve our dual-mandate goals. As for inflation expectations, the previous statement did discuss expected inflation, but only in the context of mentioning that the announcement of a 2 percent goal helps anchor inflation expectations. While this is certainly true, it does beg the deeper question of how well anchored inflation expectations can be if the 2 percent goal is seen by the public as—and turns out ex post to be—a ceiling. Regarding the maximum-employment leg of the dual mandate, the previous statement's discussion of minimizing "deviations" of employment from its maximum level does not adequately reflect how the FOMC has actually conducted monetary policy in recent years—before the pandemic—as the actual unemployment rate was declining and, for several years, remained below SEP median

[20] The FOMC published the statement for the first time alongside its January 2012 postmeeting statement; the document is available on the Board's website at https://www.federalreserve.gov/newsevents/pressreleases/monetary20120125c.htm. This statement has been reaffirmed each year, and was updated in 2016 to include the language on symmetry. The version of the statement that prevailed at the start of the review, which was affirmed in January 2019, can be found on the Board's website at https://www.federalreserve.gov/newsevents/pressreleases/monetary20190130b.htm.

projections of u* (although, to be sure, the earlier statement did acknowledge that it can be difficult to estimate the maximum level of employment with precision).[21]

The New Statement and Strategy

Before discussing how our Statement on Longer-Run Goals and Monetary Policy Strategy has evolved, let me highlight some important elements that remain unchanged. First and foremost, our policy framework and strategy remain focused exclusively on meeting the dual mandate assigned to us by the Congress. Second, our statement continues to note that the maximum level of employment that we are mandated to achieve is not directly measurable and changes over time for reasons unrelated to monetary policy. Hence, we continue not to specify a numerical goal for our employment objective as we do for inflation. Third, we continue to state that an inflation rate of 2 percent over the longer run is most consistent with our mandate to promote both maximum employment and price stability. Finally, because the effect of monetary policy on the economy operates with a lag, our strategy remains forward looking. As a result, our policy actions depend on the economic outlook as well as the risks to the outlook, and we continue in the new statement to highlight potential risks to the financial system that could impede the attainment of our dual-mandate goals on a sustained basis.

With respect to the new framework itself, the statement now notes that the neutral level of the federal funds rate has declined relative to its historical average and therefore that the policy rate is more likely than in the past to be constrained by its ELB, and, moreover, that this binding ELB constraint is likely to impart downside risks to inflation and employment that the Committee needs to consider in implementing its monetary

[21] See my earlier remarks on these aspects in Clarida (2018a, 2018b, 2019a).

policy strategy. In this regard, the statement now highlights that the Committee is prepared to use its full range of tools to achieve its dual-mandate objectives.[22]

Regarding the maximum-employment mandate, the new statement now acknowledges that maximum employment is a "broad-based and inclusive goal" and continues to state that the FOMC considers a wide range of indicators to assess the level of maximum employment consistent with this broad-based goal. However, under our new framework, policy decisions going forward will be based on the FOMC's estimates of "*shortfalls* of employment from its maximum level"—not "deviations."[23] This change conveys our judgment that a low unemployment rate by itself, in the absence of evidence that price inflation is running or is likely to run persistently above mandate-consistent levels or pressing financial stability concerns, will not, under our new framework, be a sufficient trigger for policy action.[24] This is a robust evolution in the Federal Reserve's policy framework and, to me, reflects the reality that econometric models of maximum employment, while essential inputs to monetary policy, can be and have been wrong, and, moreover, that a decision to tighten monetary policy based solely on a model without any other evidence of excessive cost-push pressure that puts the price-stability mandate at risk is difficult to justify, given the significant cost to the economy if the model turns out to be

---

[22] FOMC participants discussed the benefits, limitations, and risks associated with policy tools other than the setting of the federal funds rate target at various points during the review. See, notably, the summaries of FOMC participants' discussions at the July 2019 and October 2019 meetings—available on the Board's website at https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm—which covered, respectively, the performance of these tools during the GFC and its aftermath and issues pertaining to the use of these tools in the future. See also the analyses of Sims and Wu (2020), Caldara and others (2020), Campbell and others (2020), and Carlson and others (2020), prepared for this review.

[23] Italics added for emphasis.

[24] For a discussion of financial stability considerations in the conduct of monetary policy, see Kashyap and Siegert (2020) and Goldberg and others (2020), prepared as part of this review.

wrong and given the ability of monetary policy to respond if the model were eventually to turn out to be right.[25]

With regard to the price-stability mandate, while the new statement maintains our definition that the longer-run goal for inflation is 2 percent, it elevates the importance—and the challenge—of keeping inflation expectations "well anchored *at 2 percent*" (and not just "well anchored") in a world of low r* and an ELB constraint that is binding in downturns.[26] To this end, the new statement conveys the Committee's judgment that, in order to anchor expectations at 2 percent, it "seeks to achieve inflation that averages 2 percent over time," and—in the same sentence—that therefore "following periods when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time." This is the second robust evolution of our framework, and it reflects the inherent asymmetry of conducting monetary policy in a low r* world with an ELB constraint that binds in economic downturns. As discussed earlier, if policy seeks only to return inflation to 2 percent following a downturn in which the ELB has constrained policy, an inflation-targeting monetary policy will tend to generate inflation that averages less than 2 percent, which, in turn, will tend to put persistent downward pressure on inflation expectations

---

[25] As I stated in Clarida (2019a, paragraph 17), "For example, were models to predict a surge in inflation, a decision for preemptive hikes before the surge is evident in actual data would need to be balanced against the cost of the model being wrong." One major cost of withdrawing policy accommodation prematurely during an economic expansion is that it prevents job opportunities from reaching all communities. A clear takeaway from our *Fed Listens* events is that the strong job market that preceded the pandemic was especially beneficial to members of low- and moderate-income communities. The prolonged economic expansion not only helped create job opportunities for marginalized groups and cement their attachment to the labor force, but, as we heard at these events, it also more generally strengthened families, businesses, and communities. See Aaronson and others (2019) for a discussion of how a strong labor market helped address labor market disparities in the previous economic expansion. See also Feiveson and others (2020) for a discussion of distributional considerations and monetary policy.

[26] Italics added for emphasis.

and, potentially, on available policy space. In order to offset this downward bias, our new framework recognizes that monetary policy during economic expansions needs to "aim to achieve inflation moderately above 2 percent for some time." In other words, the aim to achieve *symmetric* outcomes for inflation (as would be the case under flexible inflation targeting in the absence of the ELB constraint) requires an *asymmetric* monetary policy reaction function in a low r* world with binding ELB constraints in economic downturns.

It is for this reason that while our new statement no longer refers to the 2 percent inflation goal as symmetric, it does now say that the Committee "seeks to achieve inflation that averages 2 percent over time." To be clear, "inflation that averages 2 percent over time" represents an ex ante aspiration, not a description of a mechanical reaction function—nor is it a commitment to conduct monetary policy tethered to any particular formula or rule.[27] Indeed, as summarized in the minutes of the September 2019 FOMC meeting, the Committee (and, certainly, I) was skeptical about the benefit, credibility, or practicality of adopting a formal numerical price level or average inflation target rule, just as it has been unwilling to implement its existing flexible inflation-targeting strategy via any sort of mechanical rule.[28] So in practice, what, then, is the

---

[27] The absence of a commitment to a specific formula or rule should not be interpreted as the absence of a commitment to achieving our mandated goals. To the contrary, the revised statement has strengthened our commitment to achieving these goals in several important ways. Notably, it has clarified that we seek to achieve 2 percent inflation, on average, over time and that, when inflation has been running persistently too low, it is appropriate to aim for inflation outcomes moderately above 2 percent for some time to solidly anchor longer-run inflation expectations at 2 percent. The revised statement also emphasizes our resolve to use our full range of tools to achieve our goals. Clarity about our goals, strategy, and tools fosters greater democratic accountability in the pursuit of our dual mandate. For a discussion of time-consistency issues in monetary policy, see the staff analysis of Duarte and others (2020), prepared for this review.

[28] A summary of the September 2019 FOMC discussion is available on the Board's website at https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm. For the staff analysis presented as background to that discussion, see Arias and others (2020), Duarte and others (2020), and Hebden and others (2020). See also the related staff analysis by Chung and others (2020) on the use of operational inflation ranges.

policy implication of this stated desire "to achieve inflation that averages 2 percent over time"? Again, the implication of our new strategy for monetary policy is stated explicitly in the new statement, and, at the risk of repeating myself, let me restate it verbatim: "... following periods when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time." Full stop. As Chair Powell indicated in his remarks last week, we think of this new strategy as an evolution from flexible inflation targeting to flexible average inflation targeting.[29]

Concluding Thoughts

My remarks today have been focused on our new framework and flexible average inflation targeting strategy. Of course, our review has also explored ways in which we might add to our toolkit and refine our communication practices. With regard to our toolkit, we believe that forward guidance and large-scale asset purchases have been and continue to be effective sources of support to the economy when the federal funds rate is at the ELB, and, of course, both were deployed promptly in our March 2020 policy response to the pandemic. With regard to other monetary policy tools, and as we have made clear previously in the minutes to our October 2019 FOMC meeting, we do not see negative policy rates as an attractive policy option in the U.S. context.[30] As for targeting the yield curve, our general view is that with credible forward guidance and asset purchases, the potential benefits from such an approach may be modest. At the same

---

[29] Svensson (2020) argues that "forecast targeting" approaches, by which policymakers set the federal funds rate so as to best stabilize forecasts for inflation and employment around the FOMC's longer-run goals, outperform policy strategies that respond only to current economic conditions, past economic conditions, or both. In addition, he finds that average inflation targeting offers some advantages over the other strategies that he considers.

[30] The minutes of the FOMC's October 2019 meeting are available on the Board's website at https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm.

time, the approach brings complications in terms of implementation and communications. Hence, as noted in the minutes from our previous meeting (July 2020), most of my colleagues judged that yield caps and targets were not warranted in the current environment but should remain an option that the Committee could reassess in the future if circumstances changed markedly.[31] Regarding communication practices, our new consensus statement does bring greater clarity and transparency to the way we will conduct policy going forward, and in that regard I note that Michelle Smith is leading our efforts to make immediately and readily available on the web a bounty of content that will be invaluable to those who desire a more granular understanding of the review process. Finally, now that we have ratified our new statement, the Committee can assess possible refinements to our SEP with the aim of reaching a decision on any potential changes by the end of this year.[32]

In closing, let me say that while I was not a member of the Committee in 2012, had I been I would have voted enthusiastically for the January 2012 statement. It was the right statement, and flexible inflation targeting was the right strategy, at that time and for the next eight years. The existing framework served us well by supporting the Federal Reserve's efforts after the GFC first to achieve and then, for several years, to sustain the operation of the economy at or close to both our statutorily assigned goals of maximum employment and price stability. But times change, as has the economic landscape, and

---

[31] See the minutes of the FOMC's June 2020 and July 2020 meetings, which can be found on the Board's website at https://www.federalreserve.gov/monetarypolicy/fomccalendars.htm.

[32] For a discussion of the importance of clear Federal Reserve communications in an uncertain economic environment, along with possible enhancements, see the paper Cecchetti and Schoenholtz (2019) prepared for the research conference at the Federal Reserve Bank of Chicago.

our framework and strategy need to change as well.[33] My colleagues and I believe that this new framework represents a critical and robust evolution of our monetary policy strategy that will best equip the Federal Reserve to achieve our dual-mandate objectives on a sustained basis in the world in which we conduct policy today and for the foreseeable future. Thank you very much for your time and attention, and I look forward now to my conversation with Adam.

[33] See Fuhrer and others (2018) for a discussion of the benefits of holding periodic reviews of central banks' monetary policy frameworks.

References

Aaronson, Stephanie R., Mary C. Daly, William L. Wascher, and David W. Wilcox (2019). "Okun Revisited: Who Benefits Most from a Strong Economy?" *Brookings Papers on Economic Activity,* Spring, pp. 333–75, https://www.brookings.edu/wp-content/uploads/2019/03/aaronson_web.pdf.

Abraham, Katharine G., John C. Haltiwanger, and Lea E. Rendell (2020). "How Tight Is the U.S. Labor Market?" paper presented at the Brookings Papers on Economic Activity Conference, held at the Brookings Institution, Washington, March 19, https://www.brookings.edu/wp-content/uploads/2020/03/Abraham-et-al-Conference-Draft.pdf.

Adam, Klaus, and Roberto M. Billi (2007). "Discretionary Monetary Policy and the Zero Lower Bound on Nominal Interest Rates," *Journal of Monetary Economics,* vol. 54 (April), pp. 728–52.

Ajello, Andrea, Isabel Cairó, Vasco Cúrdia, Thomas A. Lubik, and Albert Queralto (2020). "Monetary Policy Tradeoffs and the FOMC's Dual Mandate," Finance and Economics Discussion Series 2020-066. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.066.

Altig, David, Jeff Fuhrer, Marc P. Giannoni, and Thomas Laubach (2020). "The Federal Reserve's Review of Its Monetary Policy Framework: A Roadmap," FEDS Notes. Washington: Board of Governors of the Federal Reserve System, August 27, https://doi.org/10.17016/2380-7172.2767.

Arias, Jonas, Martin Bodenstein, Hess Chung, and Thorsten Drautzburg (2020). "Alternative Strategies: How Do They Work? How Might They Help?" Finance and Economics Discussion Series 2020-068. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.068.

Bernanke, Ben S., Michael T. Kiley, and John M. Roberts (2019). "Monetary Policy Strategies for a Low-Rate Environment," *AEA Papers and Proceedings,* vol. 109 (May), pp. 421–26.

Bernanke, Ben S., Thomas Laubach, Frederick S. Mishkin, and Adam S. Posen (1999). *Inflation Targeting: Lessons from the International Experience*. Princeton, N.J.: Princeton University Press.

Bianchi, Francesco, Leonardo Melosi, and Matthias Rottner (2019). "Hitting the Elusive Inflation Target," NBER Working Paper Series 26279. Cambridge, Mass.: National Bureau of Economic Research, September (revised January 2020), http://www.nber.org/papers/w26279.pdf.

Blanchard, Olivier, Eugenio Cerutti, and Lawrence Summers (2015). "Inflation and Activity—Two Explorations and Their Monetary Policy Implications," IMF

Working Paper WP/15/230. Washington: International Monetary Fund, November, https://www.imf.org/external/pubs/ft/wp/2015/wp15230.pdf.

Board of Governors of the Federal Reserve System (2020). *Fed Listens: Perspectives from the Public.* Washington: Board of Governors, June, https://www.federalreserve.gov/publications/files/fedlistens-report-20200612.pdf.

Caldara, Dario, Etienne Gagnon, Enrique Martínez-García, and Christopher J. Neely (2020). "Monetary Policy and Economic Performance since the Financial Crisis," Finance and Economics Discussion Series 2020-065. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.065.

Campbell, Jeffrey, Thomas B. King, Anna Orlik, and Rebecca Zarutskie (2020). "Issues regarding the Use of the Policy Rate Tool," Finance and Economics Discussion Series 2020-070. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.070.

Carlson, Mark, Stefania D'Amico, Cristina Fuentes-Albero, Bernd Schlusche, and Paul Wood (2020). "Issues in the Use of the Balance Sheet Tool," Finance and Economics Discussion Series 2020-071. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.071.

Cecchetti, Stephen G., Michael E. Feroli, Peter Hooper, Anil K. Kashyap, and Kermit L. Schoenholtz (2017). *Deflating Inflation Expectations: The Implications of Inflation's Simple Dynamics,* report prepared for the 2017 U.S. Monetary Policy Forum, sponsored by the Initiative on Global Markets at the University of Chicago Booth School of Business, held in New York, March 3, https://research.chicagobooth.edu/%7E/media/806fc2ded9644b5da99518d2b07cc637.pdf.

Cecchetti, Stephen G., and Kermit L. Schoenholtz (2019). "Improving U.S. Monetary Policy Communications," paper presented at the Conference on Monetary Policy Strategy, Tools, and Communication Practices (a *Fed Listens* event), held at the Federal Reserve Bank of Chicago, June 4, https://www.chicagofed.org/~/media/others/events/2019/monetary-policy-conference/communications-cecchetti-schoenholtz-pdf.pdf.

Chung, Hess, Brian M. Doyle, James Hebden, and Michael Siemer (2020). "Considerations regarding Inflation Ranges," Finance and Economics Discussion Series 2020-075. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.075.

Chung, Hess, Etienne Gagnon, Taisuke Nakata, Matthias Paustian, Bernd Schlusche, James Trevino, Diego Vilán, and Wei Zheng (2019). "Monetary Policy Options at the Effective Lower Bound: Assessing the Federal Reserve's Current Policy Toolkit," Finance and Economics Discussion Series 2019-003. Washington:

Board of Governors of the Federal Reserve System, January, https://doi.org/10.17016/FEDS.2019.003.

Clarida, Richard H. (2016). "Good News for the Fed," *International Economy*, Spring, pp. 44–45 and 75–76.

——— (2018a). "Outlook for the U.S. Economy and Monetary Policy," speech delivered at the Peterson Institute for International Economics, Washington, October 25, https://www.federalreserve.gov/newsevents/speech/clarida20181025a.htm.

——— (2018b). "Data Dependence and U.S. Monetary Policy," speech delivered at the Clearing House and the Bank Policy Institute Annual Conference, New York, November 27, https://www.federalreserve.gov/newsevents/speech/clarida20181127a.htm.

——— (2019a). "Monetary Policy Outlook for 2019," speech delivered at the Money Marketeers of New York University, New York, January 10, https://www.federalreserve.gov/newsevents/speech/clarida20190110a.htm.

——— (2019b). "The Federal Reserve's Review of Its Monetary Policy Strategy, Tools, and Communication Practices," speech delivered at the 2019 U.S. Monetary Policy Forum, sponsored by the Initiative on Global Markets at the University of Chicago Booth School of Business, New York, February 22, https://www.federalreserve.gov/newsevents/speech/clarida20190222a.htm.

——— (2019c). "Models, Markets, and Monetary Policy," speech delivered at the Hoover Institution Monetary Policy Conference "Strategies for Monetary Policy," Stanford University, Stanford, Calif., May 3, https://www.federalreserve.gov/newsevents/speech/clarida20190503a.htm.

——— (2020). "Financial Markets and Monetary Policy: Is There a Hall of Mirrors Problem?" speech delivered at the 2020 U.S. Monetary Policy Forum, sponsored by the Initiative on Global Markets at the University of Chicago Booth School of Business, New York, February 21, https://www.federalreserve.gov/newsevents/speech/clarida20200221a.htm.

Clarida, Richard, Jordi Galí, and Mark Gertler (1999). "The Science of Monetary Policy: A New Keynesian Perspective," *Journal of Economic Literature,* vol. 37 (December), pp. 1661–707.

Crump, Richard K., Christopher J. Nekarda, and Nicholas Petrosky-Nadeau (2020). "Unemployment Rate Benchmarks," Finance and Economics Discussion Series 2020-072. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.072.

Del Negro, Marco, Domenico Giannone, Marc P. Giannoni, and Andrea Tambalotti (2017). "Safety, Liquidity, and the Natural Rate of Interest," *Brookings Papers*

on Economic Activity, Spring, pp. 235–94, https://www.brookings.edu/wp-content/uploads/2017/08/delnegrotextsp17bpea.pdf.

——— (2019). "Global Trends in Interest Rates," *Journal of International Economics,* vol. 118 (May), pp. 248–62.

Duarte, Fernando, Benjamin K. Johannsen, Leonardo Melosi, and Taisuke Nakata (2020). "Strengthening the FOMC's Framework in View of the Effective Lower Bound and Some Considerations Related to Time-Inconsistent Strategies," Finance and Economics Discussion Series 2020-067. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.067.

Eberly, Janice C., James H. Stock, and Jonathan H. Wright (2020). "The Federal Reserve's Current Framework for Monetary Policy: A Review and Assessment," *International Journal of Central Banking*, vol. 16 (February), pp. 5–71, https://www.ijcb.org/journal/ijcb2002_1.pdf.

Eggertsson, Gauti B., and Michael Woodford (2003). "The Zero Bound on Interest Rates and Optimal Monetary Policy," *Brookings Papers on Economic Activity*, no. 1, pp. 139–233, https://www.brookings.edu/wp-content/uploads/2003/01/2003a_bpea_eggertsson.pdf.

Erceg, Christopher, James Hebden, Michael Kiley, David López-Salido, and Robert Tetlow (2018). "Some Implications of Uncertainty and Misperception for Monetary Policy," Finance and Economics Discussion Series 2018-059. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2018.059.

Faust, Jon, and Jonathan H. Wright (2013). "Forecasting Inflation," in Graham Elliott, Clive Grander, and Allan Timmermann, eds., *Handbook of Economic Forecasting,* vol. 2A. Amsterdam: Elsevier, pp. 2–56.

Feiveson, Laura, Nils Goernemann, Julie Hotchkiss, Karel Mertens, and Jae Sim (2020). "Distributional Considerations for Monetary Policy Strategy," Finance and Economics Discussion Series 2020-073. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.073.

Fischer, Stanley (2016). "Why Are Interest Rates So Low? Causes and Implications," speech delivered at the Economic Club of New York, New York, October 17, https://www.federalreserve.gov/newsevents/speech/fischer20161017a.htm.

Fuhrer, Jeff, Giovanni P. Olivei, Eric S. Rosengren, and Geoffrey M.B. Tootell (2018). "Should the Federal Reserve Regularly Evaluate Its Monetary Policy Framework?" *Brookings Papers on Economic Activity*, Fall, pp. 443–97, https://www.brookings.edu/wp-content/uploads/2018/09/Fuhrer-et-al_Text.pdf.

Goldberg, Jonathan, Elizabeth Klee, Edward Simpson Prescott, and Paul Wood (2020). "Monetary Policy Strategy and Tools: Financial Stability Considerations,"

Finance and Economics Discussion Series 2020-074. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.074.

Gust, Christopher, Edward Herbst, David López-Salido, and Matthew E. Smith (2017). "The Empirical Implications of the Interest-Rate Lower Bound," *American Economic Review,* vol. 107 (July), pp. 1971–2006.

Hamilton, James D., Ethan S. Harris, Jan Hatzius, and Kenneth D. West (2016). "The Equilibrium Real Funds Rate: Past, Present, and Future," *IMF Economic Review,* vol. 64 (4), pp. 660–707.

Hebden, James, Edward P. Herbst, Jenny Tang, Giorgio Topa, and Fabian Winkler (2020). "How Robust Are Makeup Strategies to Key Alternative Assumptions?" Finance and Economics Discussion Series 2020-069. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2020.069.

Hebden, James, and David López-Salido (2018). "From Taylor's Rule to Bernanke's Temporary Price Level Targeting," Finance and Economics Discussion Series 2018-051. Washington: Board of Governors of the Federal Reserve System, July, https://doi.org/10.17016/FEDS.2018.051.

Heise, Sebastian, Fatih Karahan, and Ayşegül Şahin (2020). "The Missing Inflation Puzzle: The Role of the Wage-Price Pass-Through," NBER Working Paper Series 27663. Cambridge, Mass.: National Bureau of Economic Research, August, https://www.nber.org/papers/w27663.

Holston, Kathryn, Thomas Laubach, and John C. Williams (2017). "Measuring the Natural Rate of Interest: International Trends and Determinants," *Journal of International Economics,* vol. 108 (May, S1), pp. S59–75.

Johannsen, Benjamin K., and Elmar Mertens (2018). "A Time Series Model of Interest Rates with the Effective Lower Bound," BIS Working Papers 715. Basel, Switzerland: Bank for International Settlements, April, https://www.bis.org/publ/work715.pdf.

Kashyap, Anil K., and Caspar Siegert (2020). "Financial Stability Considerations and Monetary Policy," *International Journal of Central Banking,* vol. 16 (February), pp. 231–66, https://www.ijcb.org/journal/ijcb2002_5.pdf.

Kiley, Michael T., and John M. Roberts (2017). "Monetary Policy in a Low Interest Rate World," *Brookings Papers on Economic Activity,* Spring, pp. 317–72, https://www.brookings.edu/wp-content/uploads/2017/08/kileytextsp17bpea.pdf.

King, Mervyn, and David Low (2014). "Measuring the 'World' Real Interest Rate," NBER Working Paper Series 19887. Cambridge, Mass.: National Bureau of Economic Research, February, https://www.nber.org/papers/w19887.pdf.

Krugman, Paul R. (1998). "It's Baaack: Japan's Slump and the Return of the Liquidity Trap," *Brookings Papers on Economic Activity,* no. 2, pp. 137–87, https://www.brookings.edu/wp-content/uploads/1998/06/1998b_bpea_krugman_dominquez_rogoff.pdf.

Laubach, Thomas, and John C. Williams (2016). "Measuring the Natural Rate of Interest Redux," Finance and Economics Discussion Series 2016-011. Washington: Board of Governors of the Federal Reserve System, February, http://dx.doi.org/10.17016/FEDS.2016.011.

López-Salido, David, Gerardo Sanz-Maldonado, Carly Schippits, and Min Wei (2020). "Measuring the Natural Rate of Interest: The Role of Inflation Expectations," FEDS Notes. Washington: Board of Governors of the Federal Reserve System, June 19, https://www.federalreserve.gov/econres/notes/feds-notes/measuring-the-natural-rate-of-interest-the-role-of-inflation-expectations-20200619.htm.

Mavroeidis, Sophocles, Mikkel Plagborg-Møller, and James H. Stock (2014). "Empirical Evidence on Inflation Expectations in the New Keynesian Phillips Curve," *Journal of Economic Literature,* vol. 52 (March), pp. 124–88.

Mertens, Thomas M., and John C. Williams (2019). "Tying Down the Anchor: Monetary Policy Rules and the Lower Bound on Interest Rates," Staff Report 887. New York: Federal Reserve Bank of New York, May (revised August 2019), https://www.newyorkfed.org/research/staff_reports/sr887.html.

Obstfeld, Maurice (2020). "Global Dimensions of U.S. Monetary Policy," *International Journal of Central Banking,* vol. 16 (February), pp. 73–132, https://www.ijcb.org/journal/ijcb2002_2.pdf.

Pfajfar, Damjan, and John M. Roberts (2018). "The Role of Expectations in Changed Inflation Dynamics," Finance and Economics Discussion Series 2018-062. Washington: Board of Governors of the Federal Reserve System, August, https://doi.org/10.17016/FEDS.2018.062.

Powell, Jerome H. (2019a). "Monetary Policy: Normalization and the Road Ahead," delivered at the 2019 SIEPR Economic Summit, Stanford Institute of Economic Policy Research, Stanford, Calif., March 8, https://www.federalreserve.gov/newsevents/speech/powell20190308a.htm.

——— (2019b). "Opening Remarks: Challenges for Monetary Policy." In Federal Reserve Bank of Kansas City, ed., "Challenges for Monetary Policy," *A Symposium Sponsored by the Federal Reserve Bank of Kansas City,* Jackson Hole, Wyo., August 22–24. Kansas City, Mo.: FRB Kansas City, pp. 1–16, https://www.kansascityfed.org/~/media/files/publicat/sympos/2019/powell2019.pdf?la=en.

——— (2020). "New Economic Challenges and the Fed's Monetary Policy Review," speech delivered at "Navigating the Decade Ahead: Implications for Monetary

Policy," a symposium sponsored by the Federal Reserve Bank of Kansas City, held in Jackson Hole, Wyo., August 27, https://www.federalreserve.gov/newsevents/speech/powell20200827a.htm.

Rachel, Lukasz, and Thomas D. Smith (2017). "Are Low Real Interest Rates Here to Stay?" *International Journal of Central Banking,* vol. 13 (September), pp. 1–42, https://www.ijcb.org/journal/ijcb17q3a1.pdf.

Simon, John, Troy Matheson, and Damiano Sandri (2013). "The Dog That Didn't Bark: Has Inflation Been Muzzled or Was It Just Sleeping?" in *World Economic Outlook: Hopes, Realities, Risks.* Washington: International Monetary Fund, April, pp. 1–17, https://www.imf.org/external/pubs/ft/weo/2013/01/pdf/c3.pdf.

Sims, Eric, and Jing Cynthia Wu (2020). "Are QE and Conventional Monetary Policy Substitutable?" *International Journal of Central Banking*, vol. 16 (February), pp. 195–230, https://www.ijcb.org/journal/ijcb2002_4.pdf.

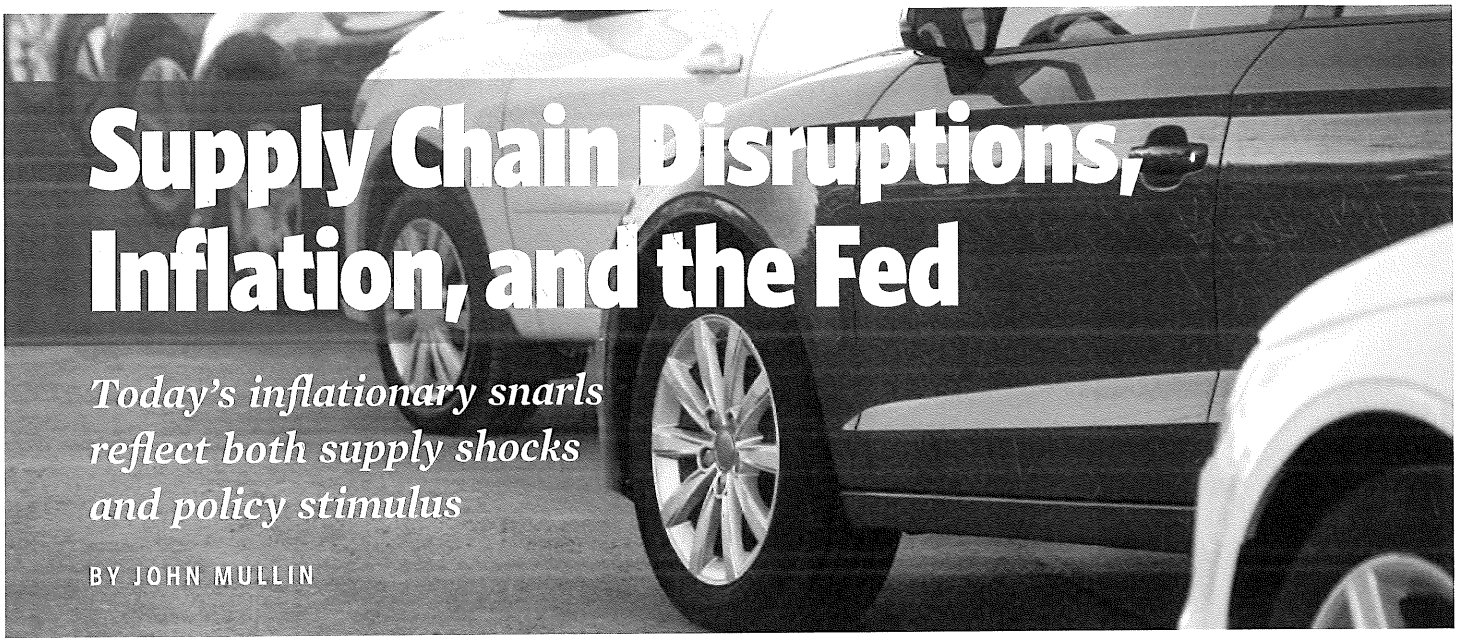
Svensson, Lars E.O. (1997). "Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets," *European Economic Review,* vol. 41 (June), pp. 1111–46.

——— (2020). "Monetary Policy Strategies for the Federal Reserve," *International Journal of Central Banking,* vol. 16 (February), pp. 133–93, https://www.ijcb.org/journal/ijcb2002_3.pdf.

Woodford, Michael (2003). *Interest and Prices: Foundations of a Theory of Monetary Policy.* Princeton, N.J.: Princeton University Press.

Wynne, Mark A., and Ren Zhang (2018). "Measuring the World Natural Rate of Interest," *Economic Inquiry,* vol. 56 (January), pp. 530–44.

Yellen, Janet L. (2015). "Inflation Dynamics and Monetary Policy," speech delivered at the Philip Gamble Memorial Lecture, University of Massachusetts, Amherst, September 24, https://www.federalreserve.gov/newsevents/speech/yellen20150924a.htm.



Supply Chain Disruptions, Inflation, and the Fed

Today's inflationary snarls reflect both supply shocks and policy stimulus

BY JOHN MULLIN

Used cars became a hot commodity during the pandemic, with their prices increasing by roughly 50 percent between January 2020 and December 2021. The spike in used car prices was a prominent example of how global supply chain disruptions have contributed to U.S. inflation. It also highlighted the complexity of global supply and demand relationships.

In the early stages of the COVID-19 pandemic, many U.S. and European auto manufacturers shut down production to help stop the disease's spread. Semiconductor producers, concentrated in Asia, responded by shifting production toward chips for electronic devices such as computers and games. As the pandemic progressed, demand increased in these other markets as homebound consumers shifted their spending away from services such as restaurant meals and travel and toward consumer durables.

Later in 2020, when U.S. auto manufacturers resumed production, they faced chip supply shortages. The shortages not only reflected pandemic-related production shutdowns in Asia, they also reflected a reluctance on the part of chip manufacturers to shift production back to chips used in auto production and away from the relatively lucrative market for chips used in electronic devices.

The diminished supply of new cars in the U.S. market provided support for higher used car prices. (See chart.) Since used cars comprise roughly 4 percent of the basket that makes up the consumer price index (CPI), the 50 percent cumulative price increase for the category increased the overall CPI by a cumulative 2 percentage points. According to an analysis by Richmond Fed economist Alex Wolman, the increase in motor vehicle prices ranked as one of the "main culprits" of the U.S. inflationary increase through November 2021.

The used car example illustrates the limited ability of monetary policy to control inflation's short-run trajectory. "It's true that inflation is a monetary phenomenon, in the sense that monetary policy has the ability to control inflation over the medium to long run," says Wolman. "However, even when monetary policy is being successful at controlling inflation, unusual shocks to supply and demand for particular goods and services move inflation around from month to month."

The U.S. economy has indeed faced a string of unusual supply and demand shocks since the pandemic's onset — most of which have tended to boost inflation. But this fact does not necessarily let the Fed off the hook.

A MIX OF SUPPLY AND DEMAND SHOCKS

Since the onset of the pandemic, the U.S. economy has been hit by a series of supply and demand shocks. The first of these, of course, was the pandemic itself. Several early analyses of the pandemic characterized it as a combined supply-demand shock. For example, an NBER working paper in February by Martin Eichenbaum of Northwestern University, Sergio Rebelo of Northwestern University's Kellogg School of Management, and Mathias Trabandt of Goethe University Frankfurt presented a model of epidemics in which COVID-19 "acts like a negative shock to the demand for consumption and the supply of labor."

The view of the pandemic as a combination of negative supply and demand shocks found support in the data. For instance, a 2020 paper by Geert Bekaert of Columbia University, Eric Engstrom of the Fed Board of Governors, and Andrey Ermolov of Fordham University employed statistical methods to "extract aggregate demand and supply shocks for the US economy" during the early stages of the pandemic. The paper estimated that negative aggregate supply and demand shocks both contributed substantially to the initial output decline in 2020.

During the initial stages of the pandemic, there was much concern among economists and policymakers that the pandemic's initial negative effect on aggregate demand could be exacerbated by job destruction and firm closures. This concern was reflected in an *American Economic Review* article by Veronica Guerrieri of the University of Chicago's Booth School of Business, Guido Lorenzoni of Northwestern University, Ludwig Straub of Harvard University, and Iván Werning of Massachusetts Institute of Technology, which presented "a theory of Keynesian supply shocks: supply

shocks that trigger changes in aggregate demand larger than the shocks themselves." Their preferred policy responses included many of the measures implemented by U.S. policymakers, such as emergency loans, enhanced social insurance payments, and accommodative monetary policy.

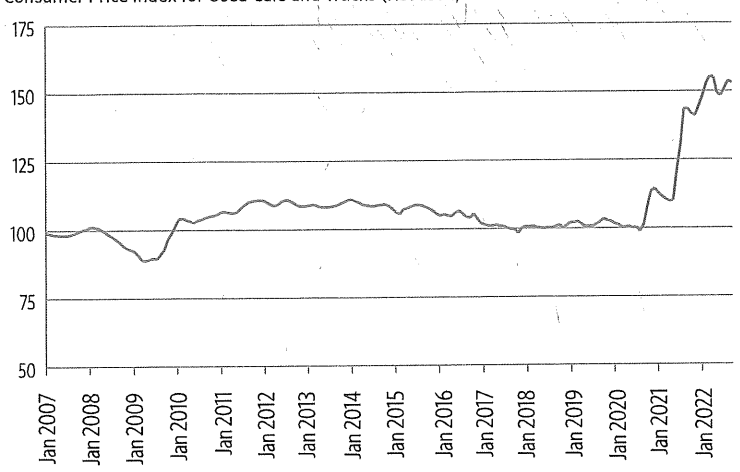
It did not take long for these measures to show results. One of their initial effects was to boost the U.S. personal savings rate. Bank accounts grew rapidly during 2020 as people received stimulus payments from the Internal Revenue Service and enhanced unemployment insurance checks — some received more from these benefits than they had been earning from their former jobs — while drastically reducing their spending on dining, entertainment, and travel. Flush with cash, many consumers quickly started to buy consumer durables.

"There was a huge surge in consumer goods demand, because households were simply unable to spend their cash on going out for a meal or going to the cinema or going on holiday," says Christopher Williamson, chief business economist at IHS Markit, a provider of data and research affiliated with S&P Global. "So, a whole lot of us spent a lot of time ordering new computers, furniture, and bicycles."

In retrospect, there is a broad consensus among economists and policymakers that the combination of increased fiscal spending and an aggressively accommodative monetary policy ultimately overshot the mark by providing excessive economic stimulus. To the extent that they did, the policies arguably constituted a second major shock to the U.S. economy. The Russian invasion of Ukraine in February of this year imposed a third major shock by restricting global oil and grain supplies, causing spikes in the two commodities' prices, which had been already increasing since mid-2020. The combination of the three shocks — the pandemic, the expansionary policy overshoot, and war — left analysts with a hard-to-identify stew in which pandemic-related foreign plant closures, heightened consumer durables demand, and increased global commodity prices have put tremendous strains on global supply networks.

Used Cars Become Hot Commodities

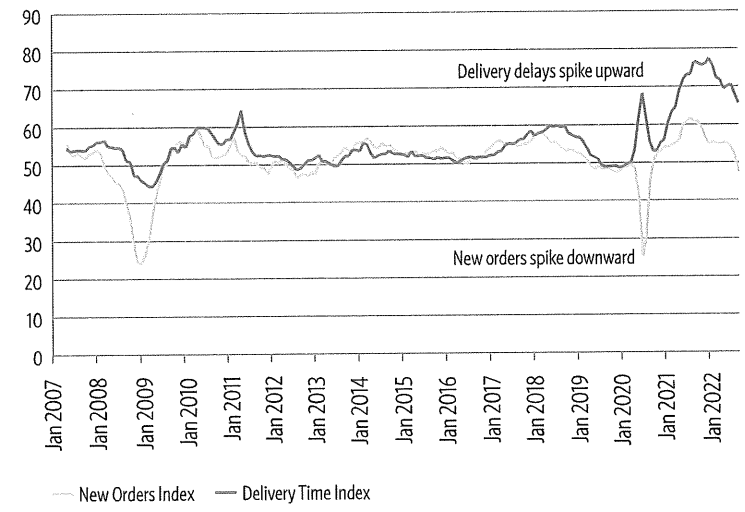
Consumer Price Index for Used Cars and Trucks (Rebased, December 2006 = 100)



SOURCE: Bureau of Labor Statistics via FRED

Unprecedented Delivery Delays

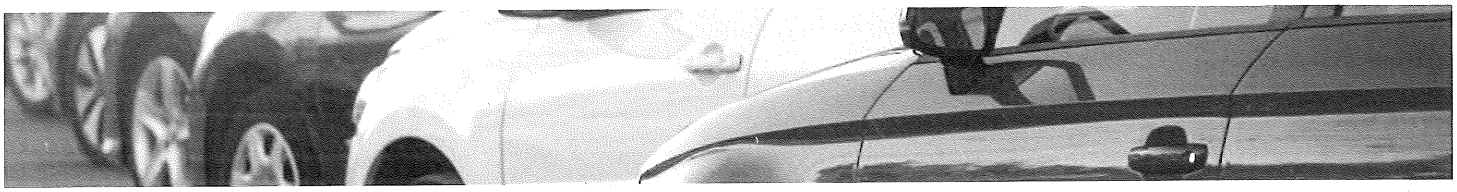
JPMorgan Purchasing Managers Indices: Delivery Time Index and New Orders Index



SOURCE: S&P Global

SUPPLY CHAIN DISRUPTIONS

There is no precedent in recent history for the supply chain disruptions that currently afflict the global economy. The scope of the problem is seen, among other places, in the recent behavior of the JPMorgan Global Purchasing Managers Indices (PMI) delivery time index, which provides a measure of delivery delays around the globe. Ordinarily, the delivery index tends to closely track the JPMorgan PMI new orders index. For example, when the new orders index declined during the 2008-2009 recession, the delivery index declined as well; and when the new orders index subsequently recovered, the delivery index followed suit. This positive correlation is just what one would expect for economic cycles that are driven primarily by fluctuations in aggregate demand: Weak demand means shorter waiting times; strong demand means longer waiting times. (See chart.)



In contrast, the two indexes moved in dramatically divergent directions at the onset of the pandemic. The new orders index plunged, signaling a collapse in aggregate demand, but the delivery time index spiked upward. This negative correlation is just what one would expect for an economic cycle driven by a combination of negative supply and demand shocks.

Supply disruptions (as reflected in the delivery time index) became even more pronounced as aggregate demand (as reflected in the new orders index) recovered. The new orders index peaked in mid-2021, and subsequently declined. Nevertheless, the delivery time index has remained near its historical peak, signaling continued supply problems.

Global companies reported reduced production due to staff shortages that peaked during each of the pandemic's various waves, according to data from S&P Global. Each wave of staff shortages gave rise to a follow-on wave of materials shortages.

Transportation snarls exacerbated the problems caused by plant closures, further disrupting global supply chains. "There were a lot of port closures — notably in China," says Williamson. "With restrictions heavily in place, the ports just couldn't function as efficiently as they could before. And it's not just ships going into ports, but trucks bringing containers in and out of the ports. A lot of containers ended up in the wrong places. It produced unprecedented congestion."

By late 2021, shipping a container through U.S. ports took more than three times longer than it normally did. The congestion at Chinese ports only worsened recently due to COVID-19 lockdowns in Shanghai and other ports. Shipping costs have remained elevated, and port congestion has had numerous effects that may have been hard to predict. California farmers, for instance, have been having a difficult time finding container capacity to export tree nuts, produce, and dairy products.

Of all the supply problems that have arisen during the pandemic, semiconductor shortages have had some of the most widespread effects. In many cases, semiconductors account for only a small part of a product's total cost. Yet they often have no close substitutes, making them indispensable to the production process. Because of this, semiconductor shortages can have an outsized effect on final-product supply shortages and the inflationary pressures they create. Recent research by economists at the St. Louis Fed indicated that the problem extended far beyond the auto industry to a broad range of other U.S. manufacturing industries. Comparing 56 industries that use semiconductors as a direct input with 170 industries that do not, they found substantially higher price changes in the semiconductor-dependent industries during 2021.

Additional research from the St. Louis Fed shows that price pressures tended to be greatest in U.S. industries with heightened exposure to foreign countries experiencing particularly severe supply bottlenecks, as measured by indexes of work backlogs and supplier delivery times. Some of the largest exposures were in the U.S. motor vehicles, petroleum, basic metals, and electrical equipment industries.

HOW MUCH INFLATION CAME FROM WHERE?

A natural question is the extent to which increased inflation is due to overly accommodative macroeconomic policies versus the supply-side shocks caused by the COVID-19 pandemic and, more recently, the war in Ukraine. The multiplicity of shocks and their staggered arrival times make this a difficult question to answer definitively.

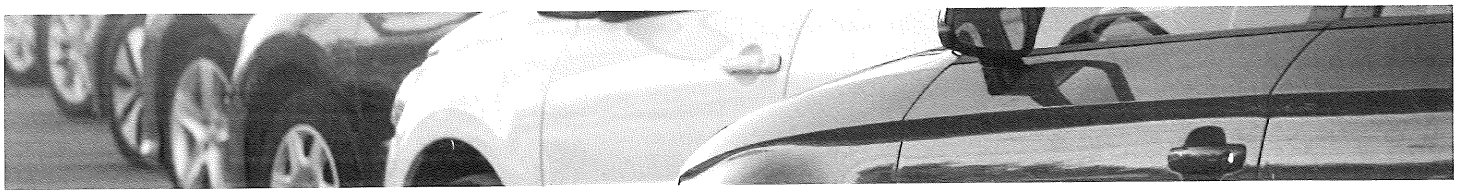
Researchers have responded to the challenge by taking a variety of approaches. One such effort was undertaken by the Richmond Fed's Alex Wolman in a recent working paper, "Relative Price Shocks and Inflation," which he co-authored with Francisco Ruge-Murcia of McGill University. Within the context of a more general analysis of the relationship between relative price shocks and inflation, the researchers presented a model that they used to break down the behavior of U.S. inflation from March 2021 through November 2021 into contributions from supply-side shocks versus overly accommodative monetary policy.

In the model, the monetary authorities do not attempt to stabilize the prices of individual goods and services, nor do they attempt to constrain overall inflation to an extremely narrow range in the short run. "If the relative price of used cars needs to go sky high because of supply disruptions, the way that's going to happen at first is for the prices of used cars to go sky high," says Wolman. "It's not going to happen by having the prices of all of the other goods in the economy decline all at once." Thus, sector-specific supply shocks can affect the economy-wide rate of inflation on a month-by-month basis, even under a monetary regime marked by low inflation and policy stability.

Over the model's long-term horizon, however, monetary policy does stabilize inflation. Although the central bank allows unusually large relative price shocks to pass through to inflation, those shocks are — by definition — unusual, so inflation tends to remain close to the Fed's target.

Wolman and Ruge-Murcia found that the inflationary increase during the period between March 2020 and November 2021 was roughly four-fifths due to supply-side shocks, with the single largest supply-side shock coming from the vehicle sector. Overly accommodative monetary policy explained the remaining one-fifth of the inflation overshoot. Although the model does not explicitly incorporate fiscal policy, Wolman believes that, in practice, their calculation of monetary policy's contribution to inflation most likely captures the combined inflationary contributions of both monetary *and* fiscal policy. "My view is that there was a big expansionary fiscal shock, and that if the Fed had followed its usual policy rule, it would have chosen a much higher interest rate than it actually did," says Wolman. "To the extent that the Fed did not raise rates in response to the fiscal stimulus, it's going to show up in our model as a monetary policy shock."

Recent research by economists at the New York Fed broadly concurs with Wolman's finding that the inflationary increase seen during 2021 owed much to supply-side factors



such as production and shipping bottlenecks and higher input prices. They also agreed in the assessment that loose monetary policy played a secondary role, concluding that the global nature of recent supply shocks suggests that "domestic monetary policy actions would have only a limited effect on these sources of inflationary pressures."

But these two studies come with an important caveat: They only cover the period through late 2021, when U.S. inflation was still behaving much like it had during 1995-2019 — a period of low and stable inflation in which relatively high monthly inflation readings were mostly accounted for by large price increases in a small share of goods and services. More recent data have deviated from this pattern. "Not only has inflation continued to be high," says Wolman, "it has also been associated with a larger share of goods with large price increases." To Wolman, this increased inflationary breadth raises concern that inflation may be becoming more of a monetary phenomenon and less a supply-side phenomenon.

Ana Maria Santacreu of the St. Louis Fed has taken a variety of approaches to understanding the recent increase in inflation. "We've done a lot of things from different angles," she says. "There's no one method that can tell us, 'how much is demand, and how much is supply?'" While some of her research has pointed to the importance of supply-side factors, she has also found evidence suggesting that expansionary fiscal policies have played an important role. She recently co-authored a working paper that examined recent increases in inflation across a sample of advanced and emerging economies. The researchers found that expansionary fiscal policies tended to increase consumption but had only a limited impact on the supply of goods as measured by industrial production indexes. "We take the results as evidence that fiscal policies contributed to inflationary mismatches between demand and supply," says Santacreu.

A MONETARY POLICY CONUNDRUM

Pinning down the precise sources of current inflationary pressure has important implications for policy. To the extent that increased inflation reflects overly stimulative policy, the antidote is apparent: Reverse course and revert to policies more consistent with past periods in which inflation was stabilized. To the extent that increased inflation reflects supply-side shocks, however, the usual tools of aggregate demand management are likely to offer little help.

In the wake of the global oil price shocks of the 1970s, economists devoted much effort to understanding the optimal monetary policy response to supply shocks. Unfortunately, however, the consensus conclusion was that the standard tools of monetary and fiscal policy are not well designed to address supply shocks. Edward Gramlich of the University of Michigan provided a summary of this viewpoint in a 1979 article that appeared in *Brookings Papers on Economic Activity*. He concluded that supply shocks are very costly, no matter what the policy response: "If their unemployment impact is minimized by accommodating policies, the shock-induced inflation can linger for several years. If their inflationary impact is minimized by an immediate recession, the cost in terms of high unemployment is sizable."

As a practical matter, economists have often advocated some degree of accommodation in response to aggregate supply shocks. But the prescription for accommodation typically rests on the assumption of an economy initially at equilibrium — that is, one with stable inflation and full employment. While that was likely the case at the onset of the pandemic, it certainly was not the case when global energy and grain supplies were disrupted at the onset of the war in Ukraine. Indeed, year-over-year U.S. inflation had already hit a nearly 40-year record before that point.

While monetary policy is generally not an effective avenue for alleviating supply shocks, companies and governments are likely to take measures designed to soften such blows in the future. Undoubtedly, changing perceptions of risk will cause some firms to reassess their supply chains, just as Japanese automakers did after their supply networks were heavily disrupted by the 2011 Tōhoku earthquake. Indeed, even before the pandemic, many companies had been already reassessing their reliance on foreign value chains, due to, among other things, increased labor costs in China and the growing importance of "speed-to-market" as a competitive factor.

Calls for government policies to decrease dependency on global supply chains have come from many circles in the United States, Europe, and Japan. Treasury Secretary Janet Yellen, for example, has raised the prospect of "friend- shoring" policies. Similarly, officials from France and Germany have spoken of "reshoring projects" and "minimizing one-sided dependencies." Within the United States, the costs and benefits of such policies will continue to be debated among researchers and politicians, while Fed officials focus on the appropriate extent of monetary tightening or accommodation. **EF**

READINGS

Akinci, Ozge, Gianluca Benigno, Ruth Cesar Heymann, Julian di Giovanni, Jan J. J. Groen, Lawrence Lin, and Adam Noble. "The Global Supply Side of Inflationary Pressures." New York Fed's "Liberty Street Economics" blog, Jan. 28, 2022.

Gramlich, Edward M. "Macro Policy Responses to Price Shocks." *Brookings Papers on Economic Activity*, 1979.

Ruge-Murcia, Francisco, and Alexander L. Wolman. "Relative Price Shocks and Inflation." Richmond Fed Working Paper No. 22-07, June 2022.

de Soyres, François, Ana Maria Santacreu, and Henry Yong. "Demand-Supply Imbalance During the COVID-19 Pandemic: The Role of Fiscal Policy." Working Paper, June 2022.

For release on delivery
3:00 p.m. EST
November 28, 2022

What Can We Learn from the Pandemic and the War about Supply Shocks, Inflation, and Monetary Policy?

Remarks by

Lael Brainard

Vice Chair

Board of Governors of the Federal Reserve System

Prepared for the conference volume of the

21st BIS Annual Conference
Central Banking after the Pandemic: Challenges Ahead

Bank for International Settlements
Basel, Switzerland

Policymakers and researchers have begun reassessing certain features of the economy and monetary policy in light of recent experience. After several decades in which supply was highly elastic and inflation was low and relatively stable, a series of supply shocks associated with the pandemic and Russia's war against Ukraine have contributed to high inflation, in combination with a very rapid recovery in demand. The experience with the pandemic and the war highlights the challenges for monetary policy in responding to a protracted series of adverse supply shocks. In addition, to the extent that the lower elasticity of supply we have seen recently could become more common due to challenges such as demographics, deglobalization, and climate change, it could herald a shift to an environment characterized by more volatile inflation compared with the preceding few decades.[1]

Inflation in the United States and many countries around the world is very high (figure 1). While both demand and supply are contributing to high inflation, it is the relative inelasticity of supply in key sectors that most clearly distinguishes the pandemic- and war-affected period of the past three years from the preceding 30 years of the Great Moderation.[2] Interestingly,

---

[1] I am grateful to Kurt Lewis of the Federal Reserve Board for his assistance in preparing this text and to Kenneth Eva for preparing the figures. This text updates the views that I discussed as part of a panel at the BIS Annual Meeting on June 24, 2022. These views are my own and do not necessarily reflect those of the Federal Reserve Board or the Federal Open Market Committee.

[2] Research has generated a range of estimates on the contributions from supply and demand factors. For example, Shapiro (2022) finds that demand factors are responsible for about one-third of the surge in inflation above the pre-pandemic trend, while di Giovanni and others (2022) find a number closer to two-thirds. See Adam Shapiro (2022), "How Much Do Supply and Demand Drive Inflation?" FRBSF Economic Letter 2022-15 (San Francisco: Federal Reserve Bank of San Francisco, June), https://www.frbsf.org/economic-research/publications/economic-letter/2022/june/how-much-do-supply-and-demand-drive-inflation; and Julian di Giovanni, Sebnem Kalemli-Ozcan, Alvaro Silva, and Muhammed Yildirim (2022), "Global Supply Chain Pressures, International Trade, and Inflation," paper presented at the ECB Forum on Central Banking 2022, Sintra, Portugal, June 27–29, https://www.ecb.europa.eu/pub/conferences/ecbforum/shared/pdf/2022/Kalemli-Oezcan_paper.pdf.

inflation is broadly higher throughout much of the global economy, and even jurisdictions that began raising rates forcefully in 2021 have not stemmed the global inflationary tide.[3]

In the United States, as a result of significant fiscal and monetary support, the level of private domestic final purchases recovered extremely rapidly in 2020 and 2021 to levels consistent with the pre-pandemic trend before moving below trend in 2022 (figure 2). Although demand came in near the pre-pandemic trend on an aggregate level, the pandemic induced a shift in composition that concentrated large increases in demand in certain sectors where the supply response was constrained. The shift in consumption from services to goods was so pronounced that—despite plunging at the onset of the pandemic in March 2020—real spending on goods had already risen nearly 4 percent above its pre-pandemic trend by June of that year. While a very slow rotation back toward pre-pandemic patterns of consumption has been under way for over a year, it remains incomplete more than two and a half years after the initial shutdown: In the most recent data, the level of goods spending remains 6 percent above the level implied by its pre-pandemic trend, while services spending remains a little more than 2 percent below its pre-pandemic trend (figure 3).

The supply shocks to goods, labor, and commodities have been accompanied by unusually high volatility in monthly inflation readings since the beginning of the pandemic. Since March 2020, the standard deviation of month-over-month core inflation has been 0.22 percentage point—a level of variation not seen in a 31-month period since the 1970s and more than double the standard deviation in monthly core inflation from 1990 to 2019. The initial

---

[3] The median year-to-date total policy rate hike within the group of Brazil, Hungary, New Zealand, Norway, Peru, Poland, and South Korea is 6 percentage points. All of these countries began forceful rate hikes in 2021, and the cumulative hikes have taken policy rates in some of these countries above 10 percent. Despite this, through September 2022 core inflation in these countries was 9.5 percent year-over-year, rising 3.5 percentage points since March. See Economist (2022), "Even Super-Tight Policy Is Not Bringing Down Inflation," October 28, https://www.economist.com/finance-and-economics/2022/10/23/even-super-tight-policy-is-not-bringing-down-inflation.

drivers of this high variation in monthly core inflation readings were a sharp drop in prices and subsequent bounceback in the first months of the pandemic, followed by a couple of bursts lasting three to four months each. The first burst occurred around reopening in the spring of 2021, and the second occurred amid the effects of the Delta and Omicron COVID-19 variants in the autumn of 2021 (figure 4).[4]

The evidence suggests that high concentrations of demand in sectors such as appliances, housing, and motor vehicles—where supply was constrained by the effects of the pandemic—played an important role initially in generating inflationary pressures. Acute constraints on shipping and on the supply of nonsubstitutable intermediate inputs like semiconductors were compounded by acute constraints on labor supply associated with the effects of the Delta and Omicron variants and later compounded further by sharp commodities supply shocks associated with Russia's war on Ukraine.

The standard monetary policy prescription is to "look through" supply shocks, such as commodities price shocks or shutdowns of ports or semiconductor plants, that are not assessed to leave a lasting imprint on potential output.[5] In contrast, if supply shocks durably lower potential output such that the economy is operating above potential, monetary policy tightening is necessary to bring demand into alignment with the economy's reduced productive capacity.

---

[4] Pandemic fiscal measures played an important role in boosting demand, but the rapid deceleration of inflation over the summer of 2021 and subsequent rebound in inflation from October through the end of the year do not line up well with the fiscal demand impulse projected by most forecasters. For example, the Brookings Institution projected a smooth demand impulse from the American Rescue Plan that peaked at the end of last year. See Wendy Edelberg and Louise Sheiner (2021), "The Macroeconomic Implications of Biden's $1.9 Trillion Fiscal Package," Brookings Institution, *Up Front* (blog), January 28, https://www.brookings.edu/blog/up-front/2021/01/28/the-macroeconomic-implications-of-bidens-1-9-trillion-fiscal-package.

[5] See, for instance, Martin Bodenstein, Christopher J. Erceg, and Luca Guerrieri (2008), "Optimal Monetary Policy with Distinct Core and Headline Inflation Rates," *Journal of Monetary Economics,* vol. 55 (October), pp. S18–33.

Importantly, and separately from the implications for potential output, monetary policy should respond strongly if supply shocks risk de-anchoring inflation expectations.[6]

Although these tenets of monetary policy sound relatively straightforward in theory, they are challenging to assess and implement in practice. It is difficult to assess potential output and the output gap in real time, as has been extensively documented by research.[7] This is especially true in an environment of high uncertainty. The level of uncertainty around the output gap varies considerably over time, and research suggests that more muted policy reactions are warranted when uncertainty about the output gap is high.[8] The unexpectedly long-lasting global pandemic and the sharp disruptions to commodities associated with Russia's war against Ukraine have contributed to substantial uncertainty (figure 5).

Even so, the drawn-out sequence of shocks to the supply of labor, commodities, and key intermediate inputs, such as semiconductors, blurred the lines about what constitutes a temporary shock as opposed to a persistent shock to potential output. Even when each individual supply shock fades over time and behaves like a temporary shock on its own, a drawn-out sequence of adverse supply shocks that has the cumulative effect of constraining potential output for an extended period is likely to call for monetary policy tightening to restore balance between demand and supply.

---

[6] Ricardo Reis makes the case that both these factors would have prescribed tighter policy in the current environment. See Ricardo Reis (2022), "The Burst of High Inflation in 2021–22: How and Why Did We Get Here?" CEPR Discussion Paper Series DP17514 (London: Centre for Economic Policy Research, July), https://cepr.org/publications/dp17514.

[7] See Athanasios Orphanides and Simon van Norden (2002), "The Unreliability of Output-Gap Estimates in Real Time," *Review of Economics and Statistics,* vol. 84 (November), pp. 569–83.

[8] For discussions of the time-varying nature of output gap uncertainty, see Travis J. Berge (2020), "Time-Varying Uncertainty of the Federal Reserve's Output Gap Estimate," Finance and Economics Discussion Series 2020-012 (Washington: Board of Governors of the Federal Reserve System, February; revised April 2021), https://doi.org/10.17016/FEDS.2020.012r1; and Rochelle M. Edge and Jeremy B. Rudd (2016), "Real-Time Properties of the Federal Reserve's Output Gap," *Review of Economics and Statistics,* vol. 98 (October), pp. 785–91. For a discussion of tempering the policy response to the output gap in response to increased uncertainty, see Athanasios Orphanides (2003), "Monetary Policy Evaluation with Noisy Information," *Journal of Monetary Economics,* vol. 50 (April), pp. 605–31.

In addition, a protracted series of supply shocks associated with an extended period of high inflation—as with the pandemic and the war—risks pushing the inflation expectations of households and businesses above levels consistent with the central bank's long-run inflation objective.[9] It is vital for monetary policy to keep inflation expectations anchored, because inflation expectations shape the behavior of households, businesses, and workers and enter directly into the inflation process. In the presence of a protracted series of supply shocks and high inflation, it is important for monetary policy to take a risk-management posture to avoid the risk of inflation expectations drifting above target. Even in the presence of pandemics and wars, central bankers have the responsibility to ensure that inflation expectations remain firmly anchored at levels consistent with our target.

In monitoring inflation expectations for purposes of risk management, not only the median but also the distribution of inflation expectations can provide important information about how inflation expectations may be changing.[10] Survey measures suggest that the median of longer-term inflation has remained within pre-pandemic ranges consistent with 2 percent inflation (figure 6). However, starting in 2021, there has been a greater dispersion than usual of views about future inflation in survey responses, as shown in figure 6. Although initially the increased dispersion reflected a rise in expectations for significantly above-target inflation, more

---

[9] For two recent examples of assessing longer-term inflation expectations, see Michael T. Kiley (2022), "Anchored or Not: How Much Information Does 21st Century Data Contain on Inflation Dynamics?" Finance and Economics Discussion Series 2022-016 (Washington: Board of Governors of the Federal Reserve System, March), https://doi.org/10.17016/FEDS.2022.016; and Danilo Cascaldi-Garcia, Francesca Loria, and David López-Salido (2022), "Is Trend Inflation at Risk of Becoming Unanchored? The Role of Inflation Expectations," FEDS Notes (Washington: Board of Governors of the Federal Reserve System, March 31), https://doi.org/10.17016/2380-7172.3043.

[10] See, for example, Ricardo Reis (2021), "Losing the Inflation Anchor," *Brookings Papers on Economic Activity*, Fall, pp. 307–61, https://www.brookings.edu/wp-content/uploads/2021/09/15985-BPEA-BPEA-FA21_WEB_Reis.pdf. The Board's staff recently updated the Index of Common Inflation Expectations to include the 25th and 75th percentiles of inflation expectations over the next 12 months from the University of Michigan Surveys of Consumers.

recently, following substantial cumulative monetary policy tightening, the increased dispersion has also reflected increased expectations of no inflation or even disinflation. About one-fourth of respondents to the most recent University of Michigan Surveys of Consumers anticipate that prices are likely to be the same or below their current level 5 to 10 years in the future—roughly three times the average fraction that reported such expectations before the pandemic.

Finally, it is important to explore whether any features of the inelastic supply response associated with the pandemic and the war may have implications for potential growth and macroeconomic stability in the future.[11] In particular, despite the unprecedented pandemic policy support for businesses of all sizes that was directed at preserving the supply side of the economy, key sectors struggled to ramp up activity after reopening. The supply response was particularly impaired in sectors where supply chains are geographically fragmented and recurring foreign COVID-19 lockdowns have reduced the reliability of foreign supplies. While conditions have improved dramatically from some of the worst periods in 2021, measures like the Global Supply Chain Pressure Index from the Federal Reserve Bank of New York indicate that total supply chain pressures still are elevated relative to pre-pandemic levels (figure 7).

The supply disruptions in key goods and commodities sectors associated with the pandemic and Russia's war against Ukraine have highlighted the fragility of global supply chains and the risks of inelastic supply at moments of stress. Conditions have improved dramatically over the past year, judging by the return of the ISM Supplier Deliveries index to its pre-pandemic range of values (figure 8). That said, ongoing discussions about moving from "just in time" to "just in case" inventory management and from offshoring to "nearshoring" are raising

[11] See, for example, Agustín Carstens (2022), "The Return of Inflation," speech delivered at the International Center for Monetary and Banking Studies, Geneva, April 5, https://www.bis.org/speeches/sp220405.htm.

important questions about the extent to which businesses are likely to reconfigure global supply chains based on a reassessment of the tradeoff between cost efficiency and supply resilience.

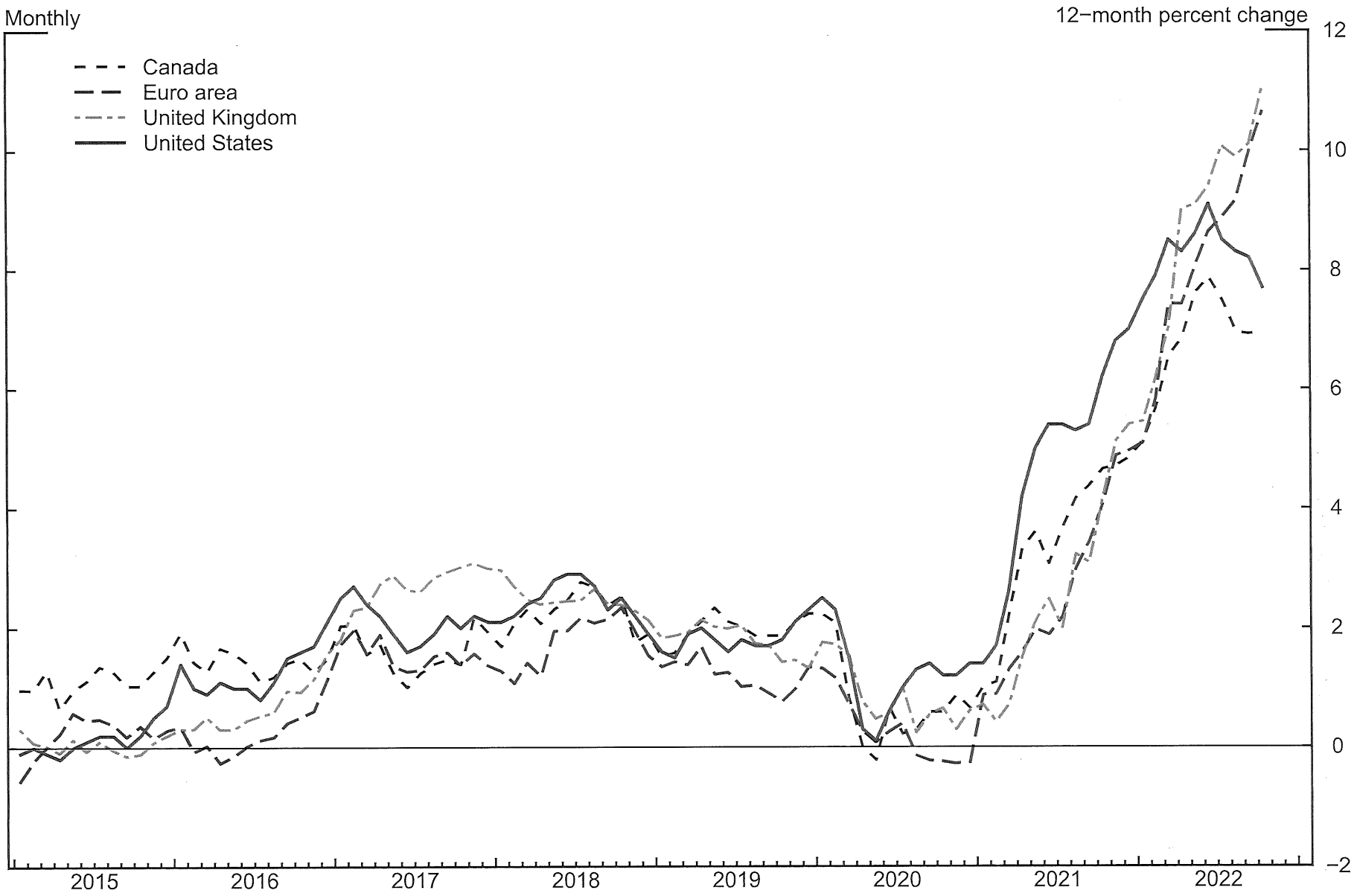
Similarly, some have conjectured that the slow and incomplete recovery of the workforce over the course of the pandemic may be the beginning of a longer-term change in labor supply dynamics (figure 9).[12] In addition, the potential for more frequent and severe climate events, as we are already seeing, and for frictions in the energy transition could also lead to greater volatility of supply. Together, a combination of forces—the deglobalization of supply chains, the higher frequency and severity of climate disruptions, and demographic shifts—could lead to a period of lower supply elasticity and greater inflation volatility.

To conclude, the experience with the pandemic and the war highlights challenges for monetary policy in responding to supply shocks. A protracted series of adverse supply shocks could persistently weigh on potential output or could risk pushing inflation expectations above target in ways that call for monetary policy to tighten for risk-management reasons. More speculatively, it is possible that longer-term changes—such as those associated with labor supply, deglobalization, and climate change—could reduce the elasticity of supply and increase inflation volatility into the future.

---

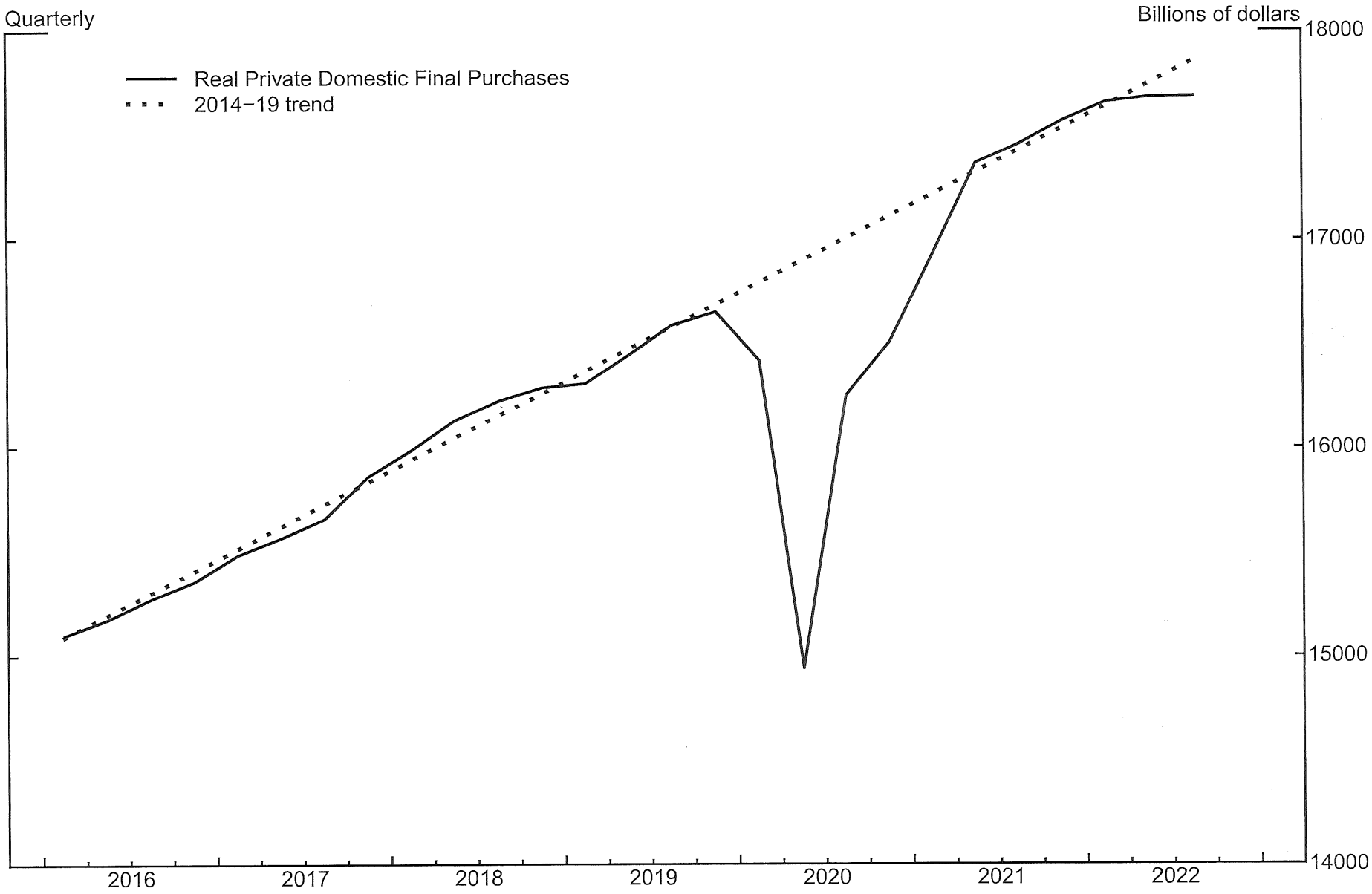
[12] See, for example, Charles Goodhart and Manoj Pradhan (2020), *The Great Demographic Reversal: Ageing Societies, Waning Inequality, and an Inflation Revival* (Cham, Switzerland: Palgrave Macmillan).

Figure 1. Headline Inflation for Selected Countries



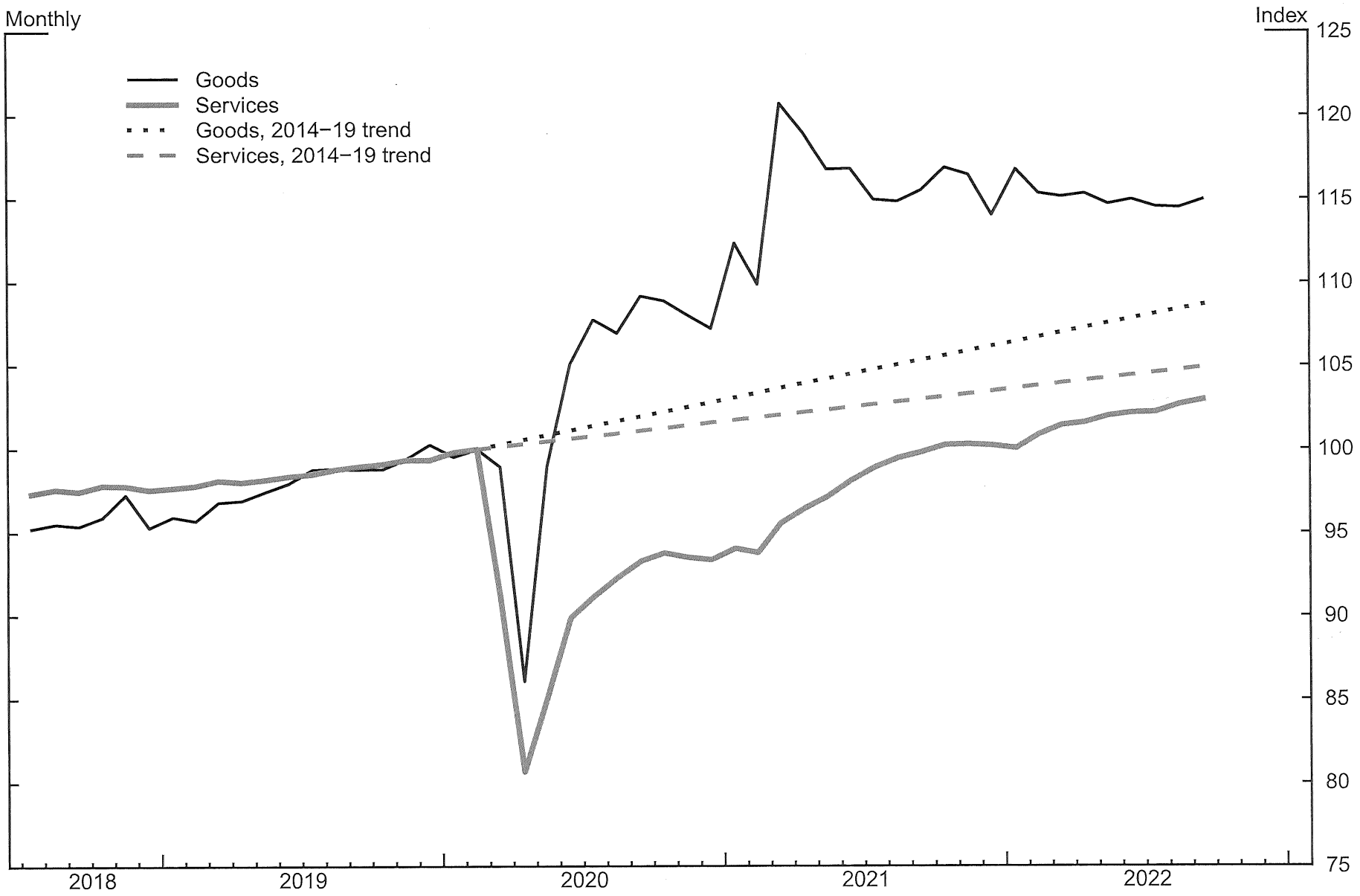
Note: Data go through October 2022.
Source: Haver Analytics.

Figure 2. Real Private Domestic Final Purchases



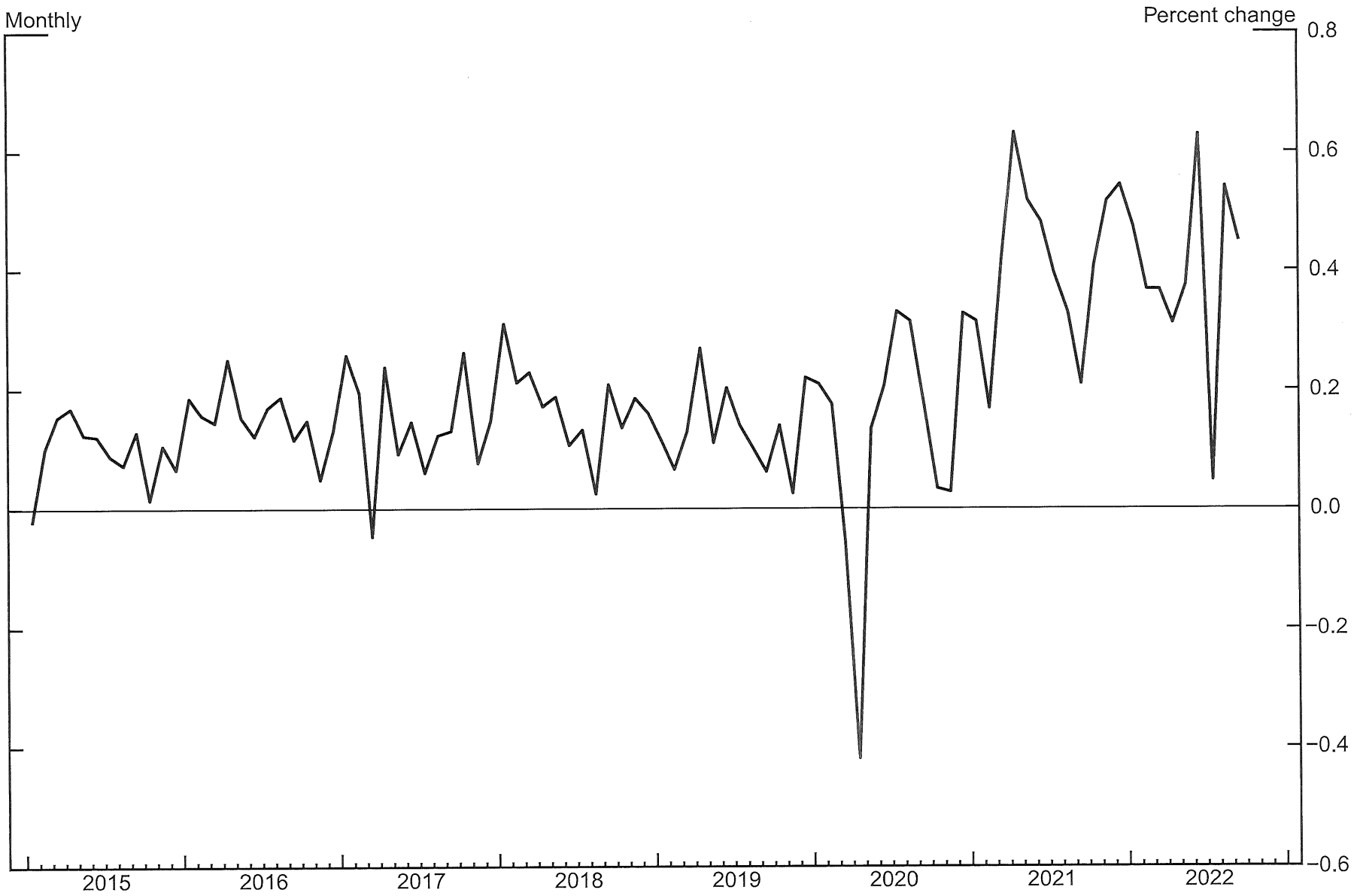
Note: Data go through 2022:Q3.
Source: Bureau of Economic Analysis.

Figure 3. Real Personal Consumption Expenditures



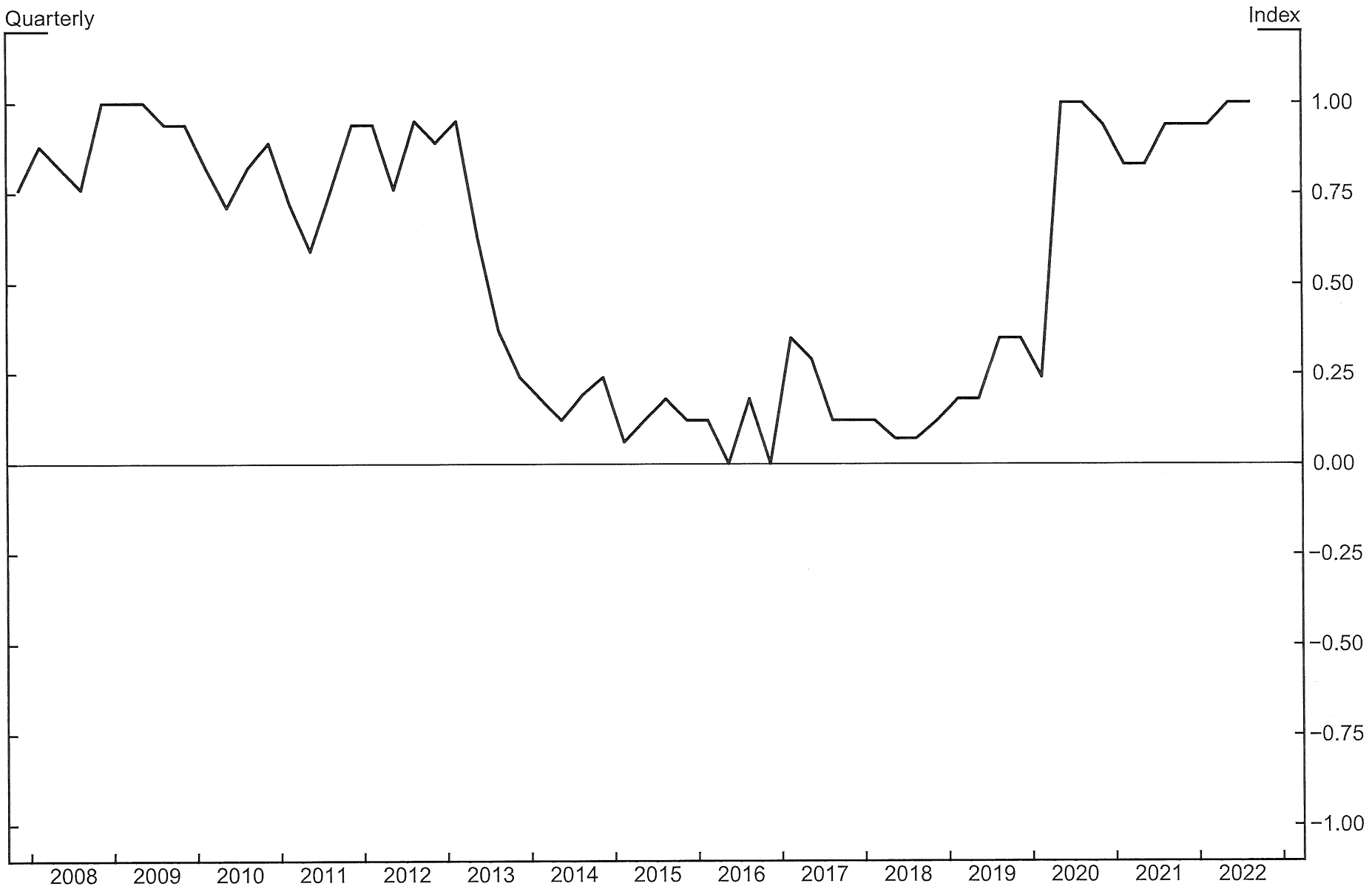
Note: Data go through September 2022.
Source: Bureau of Economic Analysis.

Figure 4. PCE Monthly Inflation Less Food and Energy



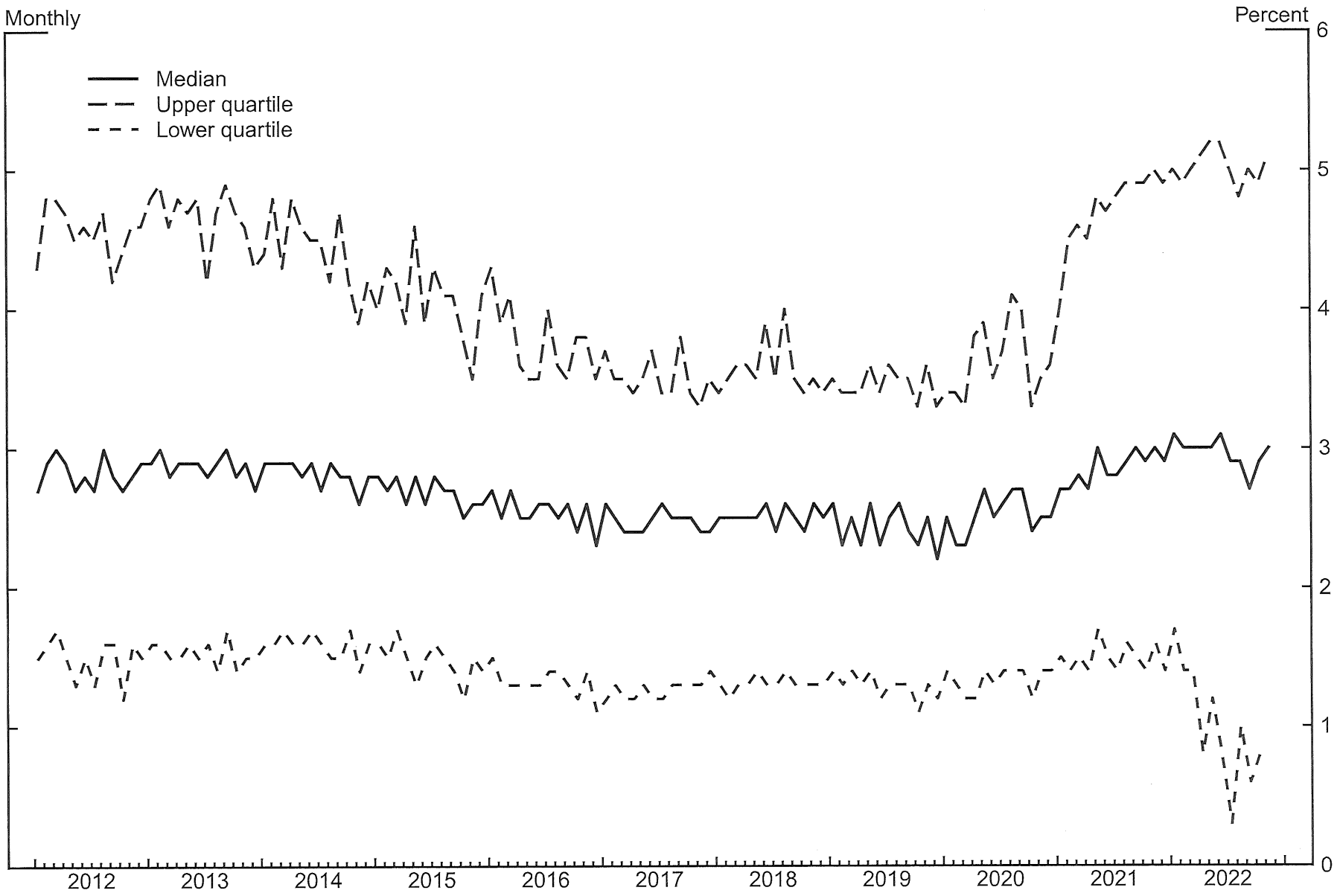
Note: Data go through September 2022. PCE is personal consumption expenditures.
Source: Bureau of Economic Analysis.

Figure 5. Diffusion Index of FOMC Participants' Uncertainty Assessments for GDP Growth



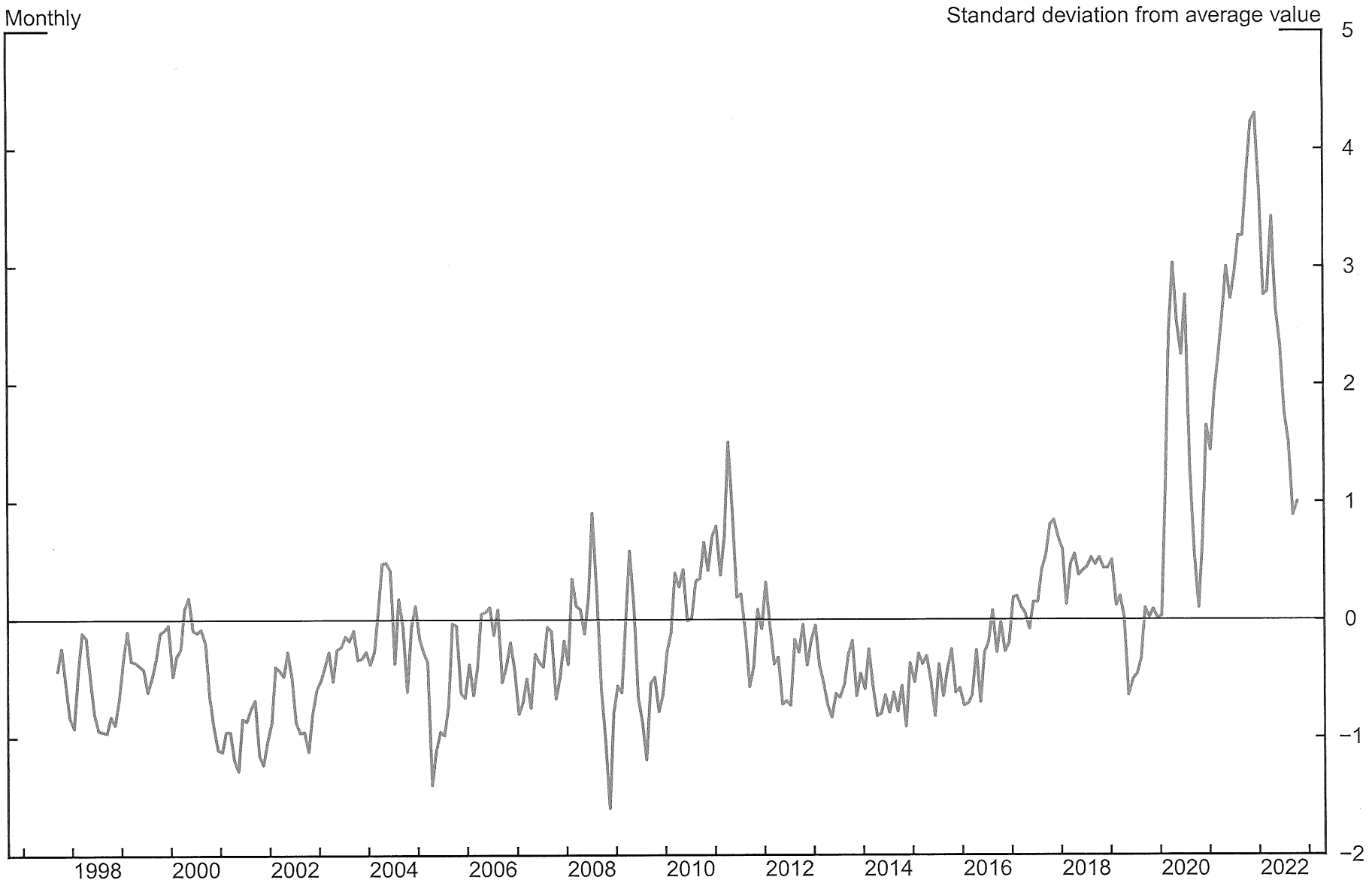
Note: Data go through 2022:Q3. FOMC is Federal Open Market Committee; GDP is gross domestic product.
Source: Federal Reserve Board.

Figure 6. Expected Price Change, Next 5 to 10 Years



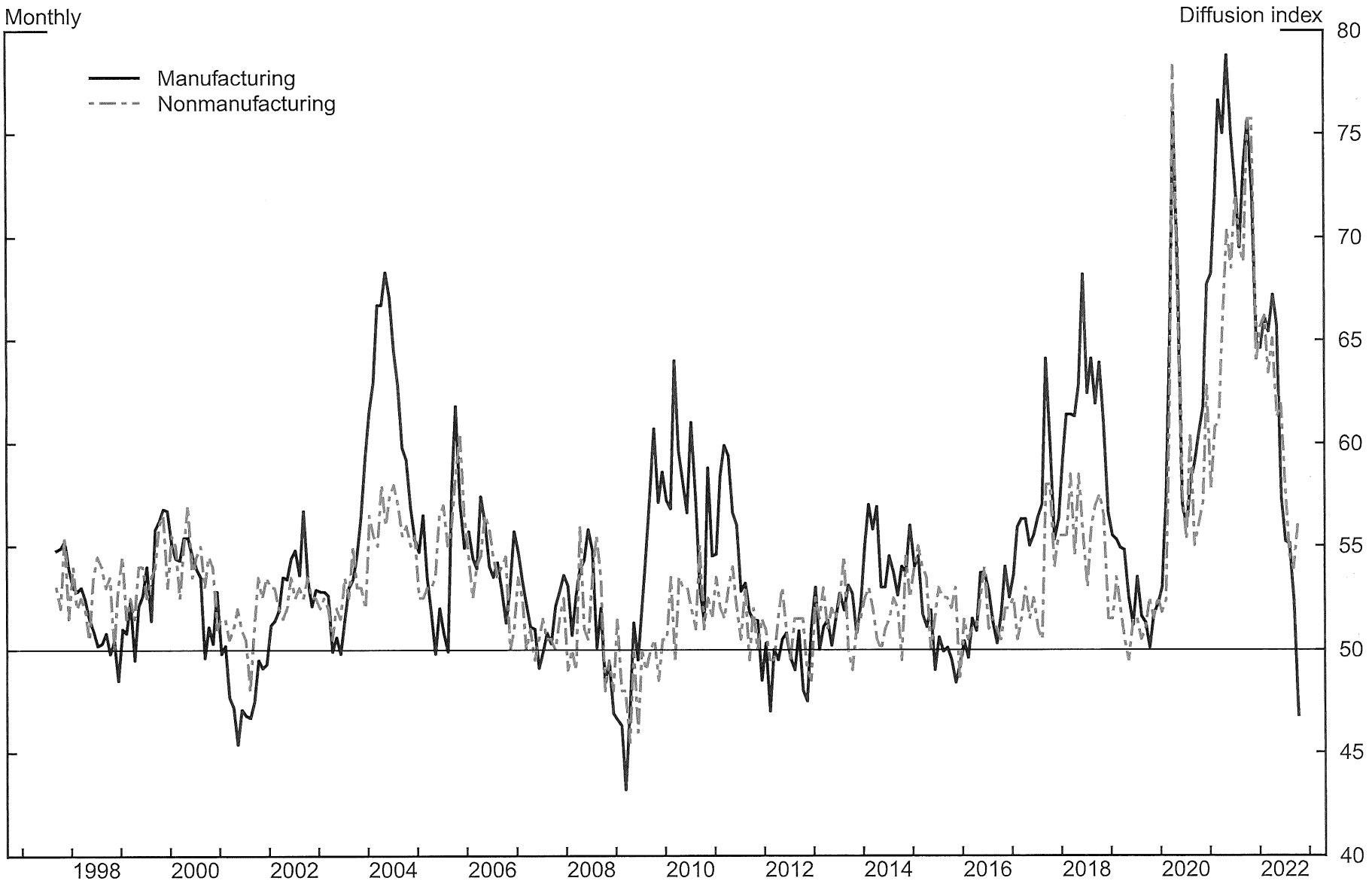
Note: Data go through November 2022.
Source: University of Michigan Surveys of Consumers.

Figure 7. Global Supply Chain Pressure Index



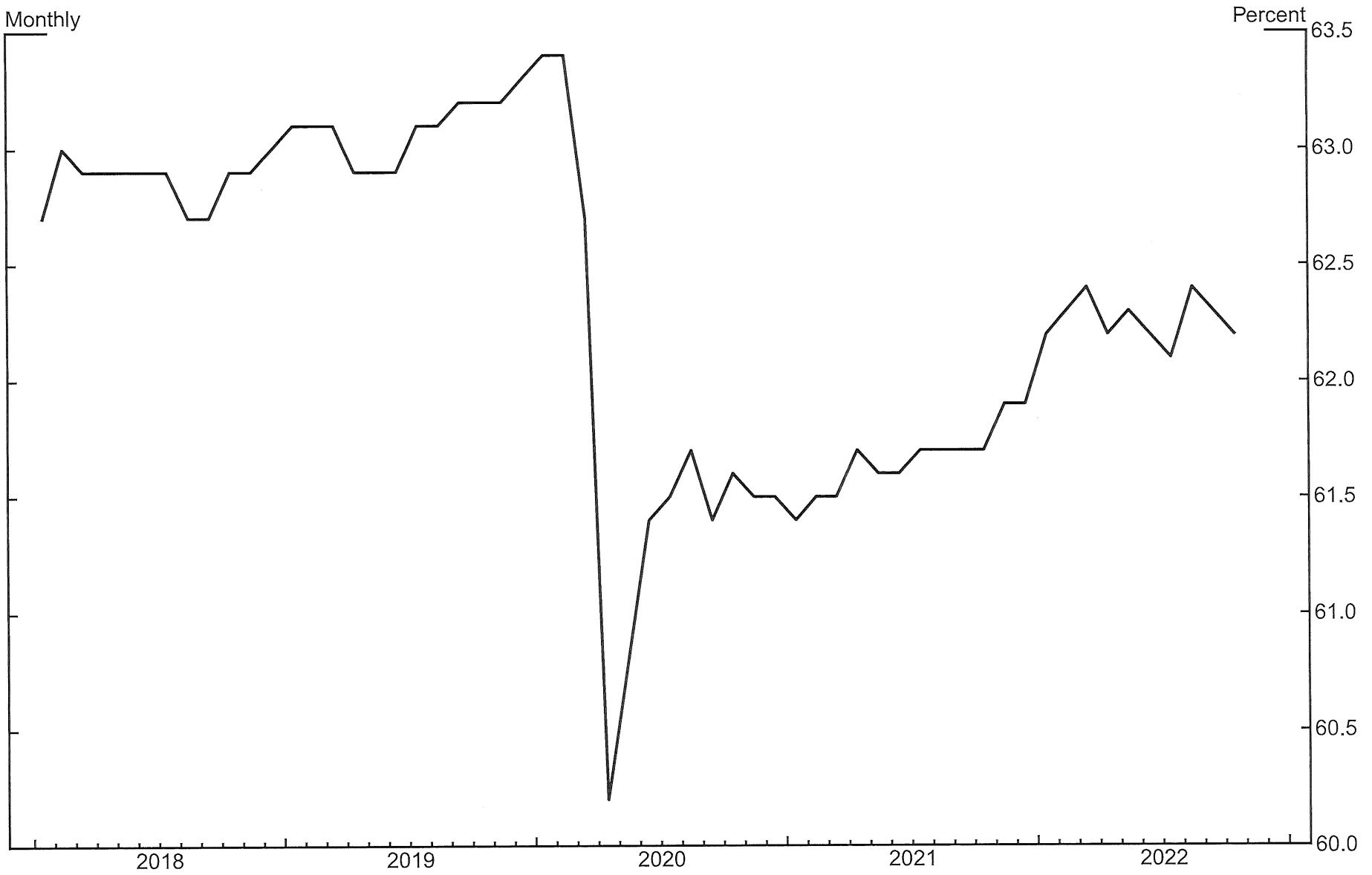
Note: Data go through October 2022.
Source: Federal Reserve Bank of New York.

Figure 8. ISM Supplier Deliveries Index



Note: Data go through October 2022. The ISM Supplier Deliveries Index is an inverse diffusion index, a reading above 50 percent indicates slower deliveries.
Source: Institute for Supply Management.

Figure 9. Labor Force Participation Rate



Note: Data go through October 2022.
Source: Bureau of Labor Statistics.

For release on delivery
10:00 a.m. EDT (8:00 a.m. MDT)
August 23, 2024

Review and Outlook

Remarks by

Jerome H. Powell

Chair

Board of Governors of the Federal Reserve System

at

"Reassessing the Effectiveness and Transmission of Monetary Policy,"
an economic symposium sponsored by the Federal Reserve Bank of Kansas City

Jackson Hole, Wyoming

August 23, 2024

Four and a half years after COVID-19's arrival, the worst of the pandemic-related economic distortions are fading. Inflation has declined significantly. The labor market is no longer overheated, and conditions are now less tight than those that prevailed before the pandemic. Supply constraints have normalized. And the balance of the risks to our two mandates has changed. Our objective has been to restore price stability while maintaining a strong labor market, avoiding the sharp increases in unemployment that characterized earlier disinflationary episodes when inflation expectations were less well anchored. While the task is not complete, we have made a good deal of progress toward that outcome.

Today, I will begin by addressing the current economic situation and the path ahead for monetary policy. I will then turn to a discussion of economic events since the pandemic arrived, exploring why inflation rose to levels not seen in a generation, and why it has fallen so much while unemployment has remained low.

Near-Term Outlook for Policy

Let's begin with the current situation and the near-term outlook for policy.

For much of the past three years, inflation ran well above our 2 percent goal, and labor market conditions were extremely tight. The Federal Open Market Committee's (FOMC) primary focus has been on bringing down inflation, and appropriately so. Prior to this episode, most Americans alive today had not experienced the pain of high inflation for a sustained period. Inflation brought substantial hardship, especially for those least

able to meet the higher costs of essentials like food, housing, and transportation. High inflation triggered stress and a sense of unfairness that linger today.[1]

Our restrictive monetary policy helped restore balance between aggregate supply and demand, easing inflationary pressures and ensuring that inflation expectations remained well anchored. Inflation is now much closer to our objective, with prices having risen 2.5 percent over the past 12 months (figure 1).[2] After a pause earlier this year, progress toward our 2 percent objective has resumed. My confidence has grown that inflation is on a sustainable path back to 2 percent.

Turning to employment, in the years just prior to the pandemic, we saw the significant benefits to society that can come from a long period of strong labor market conditions: low unemployment, high participation, historically low racial employment gaps, and, with inflation low and stable, healthy real wage gains that were increasingly concentrated among those with lower incomes.[3]

Today, the labor market has cooled considerably from its formerly overheated state. The unemployment rate began to rise over a year ago and is now at 4.3 percent—still low by historical standards, but almost a full percentage point above its level in early 2023 (figure 2). Most of that increase has come over the past six months. So far, rising

---

[1] Shiller (1997) and Stantcheva (2024) study why people dislike inflation. Pfafjar and Winkler (2024) study households' attitudes toward inflation and unemployment. Binetti, Nuzzi, and Stantcheva (2024) investigate households' attitudes toward, and understanding of, inflation. Kaplan and Schulhofer-Wohl (2017) and Jaravel (2021) document heterogeneity in the inflation rate experienced by households across the income distribution.

[2] The data for the personal consumption expenditures (PCE) price index is available for June 2024. Over the 12 months to June 2024, the PCE price index increased 2.5 percent. Data for the consumer price index and producer price index are available through July 2024 and can be used to estimate the level of the PCE price index through July. While such an estimate is subject to uncertainty, it suggests that inflation remained near 2.5 percent through July.

[3] Research documenting such benefits include Aaronson and others (2019), who discuss the experience in the 2010s and review related historical evidence.

unemployment has not been the result of elevated layoffs, as is typically the case in an economic downturn. Rather, the increase mainly reflects a substantial increase in the supply of workers and a slowdown from the previously frantic pace of hiring. Even so, the cooling in labor market conditions is unmistakable. Job gains remain solid but have slowed this year.[4] Job vacancies have fallen, and the ratio of vacancies to unemployment has returned to its pre-pandemic range. The hiring and quits rates are now below the levels that prevailed in 2018 and 2019. Nominal wage gains have moderated. All told, labor market conditions are now less tight than just before the pandemic in 2019—a year when inflation ran below 2 percent. It seems unlikely that the labor market will be a source of elevated inflationary pressures anytime soon. We do not seek or welcome further cooling in labor market conditions.

Overall, the economy continues to grow at a solid pace. But the inflation and labor market data show an evolving situation. The upside risks to inflation have diminished. And the downside risks to employment have increased. As we highlighted in our last FOMC statement, we are attentive to the risks to both sides of our dual mandate.

The time has come for policy to adjust. The direction of travel is clear, and the timing and pace of rate cuts will depend on incoming data, the evolving outlook, and the balance of risks.

---

[4] Payroll employment grew by an average of 170,000 per month over the three months ending in July. On August 21, the Bureau of Labor Statistics released the preliminary estimate of the upcoming annual benchmark revision to the establishment survey data, which will be issued in February 2025. The preliminary estimate indicates a downward adjustment to March 2024 total nonfarm employment of 818,000.

We will do everything we can to support a strong labor market as we make further progress toward price stability. With an appropriate dialing back of policy restraint, there is good reason to think that the economy will get back to 2 percent inflation while maintaining a strong labor market. The current level of our policy rate gives us ample room to respond to any risks we may face, including the risk of unwelcome further weakening in labor market conditions.

The Rise and Fall of Inflation

Let's now turn to the questions of why inflation rose, and why it has fallen so significantly even as unemployment has remained low. There is a growing body of research on these questions, and this is a good time for this discussion.[5] It is, of course, too soon to make definitive assessments. This period will be analyzed and debated long after we are gone.

The arrival of the COVID-19 pandemic led quickly to shutdowns in economies around the world. It was a time of radical uncertainty and severe downside risks. As so often happens in times of crisis, Americans adapted and innovated. Governments responded with extraordinary force, especially in the U.S. Congress unanimously passed the CARES Act. At the Fed, we used our powers to an unprecedented extent to stabilize the financial system and help stave off an economic depression.

After a historically deep but brief recession, in mid-2020 the economy began to grow again. As the risks of a severe, extended downturn receded, and as the economy

---

[5] Early examples include Ball, Leigh, and Mishra (2022) and di Giovanni and others (2022). More recent work includes Benigno and Eggertsson (2023, 2024), Blanchard and Bernanke (2023, 2024), Crump and others (2024), Bai and others (2024), and Dao and others (forthcoming).

reopened, we faced the risk of replaying the painfully slow recovery that followed the Global Financial Crisis.

Congress delivered substantial additional fiscal support in late 2020 and again in early 2021. Spending recovered strongly in the first half of 2021. The ongoing pandemic shaped the pattern of the recovery. Lingering concerns over COVID weighed on spending on in-person services. But pent-up demand, stimulative policies, pandemic changes in work and leisure practices, and the additional savings associated with constrained services spending all contributed to a historic surge in consumer spending on goods.

The pandemic also wreaked havoc on supply conditions. Eight million people left the workforce at its onset, and the size of the labor force was still 4 million below its pre-pandemic level in early 2021. The labor force would not return to its pre-pandemic trend until mid-2023 (figure 3).[6] Supply chains were snarled by a combination of lost workers, disrupted international trade linkages, and tectonic shifts in the composition and level of demand (figure 4). Clearly, this was nothing like the slow recovery after the Global Financial Crisis.

Enter inflation. After running below target through 2020, inflation spiked in March and April 2021. The initial burst of inflation was concentrated rather than broad based, with extremely large price increases for goods in short supply, such as motor

---

[6] The Federal Reserve Board staff's estimate of the labor force makes two adjustments to the Bureau of Labor Statistics' published estimates: (i) reweighing Current Population Survey respondents such that the labor force estimates in all years reflect the Census Bureau's latest vintage of population estimates; and (ii) accounting for net immigration that is likely not fully reflected in the Census Bureau's latest population estimates, as detailed in the CBO's 2024 Demographic Outlook (see https://www.cbo.gov/publication/59899). The pre-pandemic trend described here is calculated by appending the CBO's January 2020 projected labor force growth from the start of the pandemic through 2024:Q2 onto the level of the labor force just before the start of the pandemic. (See Congressional Budget Office (2020), The Budget and Economic Outlook: 2020 to 2030; https://www.cbo.gov/publication/56073.)

vehicles. My colleagues and I judged at the outset that these pandemic-related factors would not be persistent and, thus, that the sudden rise in inflation was likely to pass through fairly quickly without the need for a monetary policy response—in short, that the inflation would be transitory. Standard thinking has long been that, as long as inflation expectations remain well anchored, it can be appropriate for central banks to look through a temporary rise in inflation.[7]

The good ship Transitory was a crowded one, with most mainstream analysts and advanced-economy central bankers on board.[8] The common expectation was that supply conditions would improve reasonably quickly, that the rapid recovery in demand would run its course, and that demand would rotate back from goods to services, bringing inflation down.

For a time, the data were consistent with the transitory hypothesis. Monthly readings for core inflation declined every month from April to September 2021, although progress came slower than expected (figure 5). The case began to weaken around midyear, as was reflected in our communications. Beginning in October, the data turned hard against the transitory hypothesis.[9] Inflation rose and broadened out from goods into

---

[7] For example, former Chair Ben Bernanke and Olivier Blanchard summarize the standard approach in their work on inflation the following way: "Standard central banking doctrine holds that, so long as inflation expectations are reasonably well anchored, there is a case for 'looking through' temporary supply shocks rather than responding to the short-run increase in inflation" (Blanchard and Bernanke, 2024, p. 2). Clarida (forthcoming) notes how central banks around the world faced a sharp rise in the relative price of goods and chose, at least initially, to accommodate the price pressures with an expected transitory increase in inflation.

[8] In the September 2021 Summary of Economic Projections (SEP), the median projection for headline inflation in 2022 was 2.2 percent. In the August 2021 Survey of Professional Forecasters (the closest survey to the September SEP), the median projection for headline inflation in 2022 was also 2.2 percent. Projections from the Blue Chip survey were similar around this time.

[9] Beginning with the data for October, readings for monthly core PCE jumped to 0.4 percent or higher and inflationary pressures broadened out across goods and services categories. And monthly job gains, already strong, were consistently revised higher over the second half of 2021. Measures of wage inflation also accelerated.

services. It became clear that the high inflation was not transitory, and that it would require a strong policy response if inflation expectations were to remain well anchored. We recognized that and pivoted beginning in November. Financial conditions began to tighten. After phasing out our asset purchases, we lifted off in March 2022.

By early 2022, headline inflation exceeded 6 percent, with core inflation above 5 percent. New supply shocks appeared. Russia's invasion of Ukraine led to a sharp increase in energy and commodity prices. The improvements in supply conditions and rotation in demand from goods to services were taking much longer than expected, in part due to further COVID waves in the U.S.[10] And COVID continued to disrupt production globally, including through new and extended lockdowns in China.[11]

High rates of inflation were a global phenomenon, reflecting common experiences: rapid increases in the demand for goods, strained supply chains, tight labor markets, and sharp hikes in commodity prices.[12] The global nature of inflation was unlike any period since the 1970s. Back then, high inflation became entrenched—an outcome we were utterly committed to avoiding.

By mid-2022, the labor market was extremely tight, with employment increasing by over 6½ million from the middle of 2021. This increase in labor demand was met, in part, by workers rejoining the labor force as health concerns began to fade. But labor supply remained constrained, and, in the summer of 2022, labor force participation

---

[10] For example, labor supply continued to be materially affected by COVID even after vaccines became broadly available in the U.S. By late 2021, anticipated increases in labor force participation had not yet materialized, likely owing, in part, to the rise of the Delta and Omicron COVID variants.

[11] For example, in March 2022, lockdowns were imposed in the Jilin province, the largest center for auto production. Authorities also ramped up or extended restrictions in manufacturing hubs in the southeast and in Shanghai, where lockdowns had initially been scheduled to end in April 2022.

[12] The global nature of this inflationary episode is emphasized in Cascaldi-Garcia and others (2024) and Clarida (forthcoming), among others.

remained well below pre-pandemic levels. There were nearly twice as many job openings as unemployed persons from March 2022 through the end of the year, signaling a severe labor shortage (figure 6).[13] Inflation peaked at 7.1 percent in June 2022.

At this podium two years ago, I discussed the possibility that addressing inflation could bring some pain in the form of higher unemployment and slower growth. Some argued that getting inflation under control would require a recession and a lengthy period of high unemployment.[14] I expressed our unconditional commitment to fully restoring price stability and to keeping at it until the job is done.

The FOMC did not flinch from carrying out our responsibilities, and our actions forcefully demonstrated our commitment to restoring price stability. We raised our policy rate by 425 basis points in 2022 and another 100 basis points in 2023. We have held our policy rate at its current restrictive level since July 2023 (figure 7).

The summer of 2022 proved to be the peak of inflation. The 4-1/2 percentage point decline in inflation from its peak two years ago has occurred in a context of low unemployment—a welcome and historically unusual result.

How did inflation fall without a sharp rise in unemployment above its estimated natural rate?

Pandemic-related distortions to supply and demand, as well as severe shocks to energy and commodity markets, were important drivers of high inflation, and their

---

[13] It has been argued that the natural rate of unemployment had risen, and that the unemployment rate was less informative about tightness in labor market than other measures such as those involving vacancies. For example, see Crump and others (2024). More generally, research has emphasized that the unemployment rate and the ratio of vacancies to unemployment often provide similar signals, but the signals differed in the pandemic period, and the ratio of vacancies to unemployment is a better overall indicator. For example, see Ball, Leigh, and Mishra (2022) and Benigno and Eggertsson (2023, 2024).

[14] For example, Ball, Leigh, and Mishra (2022) and Cecchetti and others (2023) present analyses emphasizing that disinflation would require economic slack.

reversal has been a key part of the story of its decline. The unwinding of these factors took much longer than expected but ultimately played a large role in the subsequent disinflation. Our restrictive monetary policy contributed to a moderation in aggregate demand, which combined with improvements in aggregate supply to reduce inflationary pressures while allowing growth to continue at a healthy pace. As labor demand also moderated, the historically high level of vacancies relative to unemployment has normalized primarily through a decline in vacancies, without sizable and disruptive layoffs, bringing the labor market to a state where it is no longer a source of inflationary pressures.

A word on the critical importance of inflation expectations. Standard economic models have long reflected the view that inflation will return to its objective when product and labor markets are balanced—without the need for economic slack—so long as inflation expectations are anchored at our objective. That's what the models said, but the stability of longer-run inflation expectations since the 2000s had not been tested by a persistent burst of high inflation. It was far from assured that the inflation anchor would hold. Concerns over de-anchoring contributed to the view that disinflation would require slack in the economy and specifically in the labor market. An important takeaway from recent experience is that anchored inflation expectations, reinforced by vigorous central bank actions, can facilitate disinflation without the need for slack.

This narrative attributes much of the increase in inflation to an extraordinary collision between overheated and temporarily distorted demand and constrained supply. While researchers differ in their approaches and, to some extent, in their conclusions, a consensus seems to be emerging, which I see as attributing most of the rise in inflation to

this collision.[15] All told, the healing from pandemic distortions, our efforts to moderate aggregate demand, and the anchoring of expectations have worked together to put inflation on what increasingly appears to be a sustainable path to our 2 percent objective.

Disinflation while preserving labor market strength is only possible with anchored inflation expectations, which reflect the public's confidence that the central bank will bring about 2 percent inflation over time. That confidence has been built over decades and reinforced by our actions.

That is my assessment of events. Your mileage may vary.

Conclusion

Let me wrap up by emphasizing that the pandemic economy has proved to be unlike any other, and that there remains much to be learned from this extraordinary period. Our Statement on Longer-Run Goals and Monetary Policy Strategy emphasizes our commitment to reviewing our principles and making appropriate adjustments through a thorough public review every five years. As we begin this process later this year, we will be open to criticism and new ideas, while preserving the strengths of our framework. The limits of our knowledge—so clearly evident during the pandemic—demand humility and a questioning spirit focused on learning lessons from the past and applying them flexibly to our current challenges.

---

[15] Blanchard and Bernanke (2023) use a traditional (flexible) Phillips curve approach to reach this conclusion for the U.S. Blanchard and Bernanke (2024) and Dao and others (forthcoming) examine a broader set of countries using similar approaches. Di Giovanni and others (2022) and Bai and others (2024) use different techniques and emphasize supply constraints and shocks in the increase in inflation over 2021 and 2022.

References

Aaronson, Stephanie R., Mary C. Daly, William L. Wascher, and David W. Wilcox (2019). "Okun Revisited: Who Benefits Most from a Strong Economy," Finance and Economics Discussion Series 2019-072. Washington: Board of Governors of the Federal Reserve System, September, http://dx.doi.org/10.17016/FEDS.2019.072.

Bai, Xiwen, Jesus Fernandez-Villaverde, Yiliang Li, and Francesco Zanetti (2024). "The Causal Effects of Global Supply Chain Disruptions on Macroeconomic Outcomes: Evidence and Theory," NBER Working Paper Series 32098. Cambridge, Mass.: National Bureau of Economic Research, February, https://www.nber.org/papers/w32098.

Ball, Laurence, Daniel Leigh, and Prachi Mishra (2022). "Understanding US Inflation during the COVID-19 Era," *Brookings Papers on Economic Activity,* Fall, pp. 1–54, https://www.brookings.edu/articles/understanding-u-s-inflation-during-the-covid-era.

Benigno, Pierpaolo, and Gauti B. Eggertsson (2023). "It's Baaack: The Surge in Inflation in the 2020s and the Return of the Non-Linear Phillips Curve," NBER Working Paper Series 31197. Cambridge, Mass.: National Bureau of Economic Research, April, https://www.nber.org/papers/w31197.

——— (2024). "Insights from the 2020s Inflation Surge: A Tale of Two Curves," paper presented at "Reassessing the Effectiveness and Transmission of Monetary Policy," a symposium sponsored by the Federal Reserve Bank of Kansas City, held in Jackson Hole, Wyo., August 22–24.

Binetti, Alberto, Francesco Nuzzi, and Stefanie Stantcheva (2024). "People's Understanding of Inflation," NBER Working Paper Series 32497. Cambridge, Mass.: National Bureau of Economic Research, June, https://www.nber.org/papers/w32497.

Blanchard, Olivier. J., and Ben S. Bernanke (2023). "What Caused the US Pandemic-Era Inflation?" NBER Working Paper Series 31417. Cambridge, Mass.: National Bureau of Economic Research, June, http://www.nber.org/papers/w31417.

——— (2024). "An Analysis of Pandemic-Era Inflation in 11 Economies," NBER Working Paper Series 32532. Cambridge, Mass.: National Bureau of Economic Research, May, http://www.nber.org/papers/w32532.

Cascaldi-Garcia. Danilo, Luca Guerrieri, Matteo Iacoviello, and Michele Modugno (2024). "Lessons from the Co-Movement of Inflation around the World," FEDS Notes. Washington: Board of Governors of the Federal Reserve System, June 28, https://doi.org/10.17016/2380-7172.3543.

Cecchetti, Stephen G., Michael E. Feroli, Peter Hooper, Frederic S. Mishkin, and Kermit L. Schoenholtz (2023). "Managing Disinflations," paper presented at the U.S. Monetary Policy Forum, New York, February 24.

Clarida, Richard (forthcoming). "A Global Perspective on Post Pandemic Inflation and its Retreat: Remarks Prepared for NBER Conference on 'Inflation in the Covid Era'," *Journal of Monetary Economics*.

Crump, Richard K., Stefano Eusepi, Marc Giannoni, and Ayşegül Şahin, (2024). "The Unemployment–Inflation Trade-Off Revisited: The Phillips Curve in COVID Times," *Journal of Monetary Economics,* vol. 145, Supplement (July), 103580.

Dao, Mai Chi, Pierre-Olivier Gourinchas, Daniel Leigh, and Prachi Mishra (forthcoming). "Understanding the International Rise and Fall of Inflation since 2020," *Journal of Monetary Economics.*

di Giovanni, Julian, Sebnem Kalemli-Ozcan, Alvaro Silva, and Muhammed A. Yildirim (2022). "Global Supply Chain Pressures, International Trade, and Inflation," NBER Working Paper Series 30240. Cambridge, Mass.: National Bureau of Economic Research, July, https://www.nber.org/papers/w30240.

Jaravel, Xavier (2021). "Inflation Inequality: Measurement, Causes, and Policy Implications," *Annual Review of Economics,* vol. 13, pp. 599–629.

Kaplan, Greg, and Sam Schulhofer-Wohl (2017). "Inflation at the Household Level," *Journal of Monetary Economics,* vol. 91 (November), pp. 19–38.

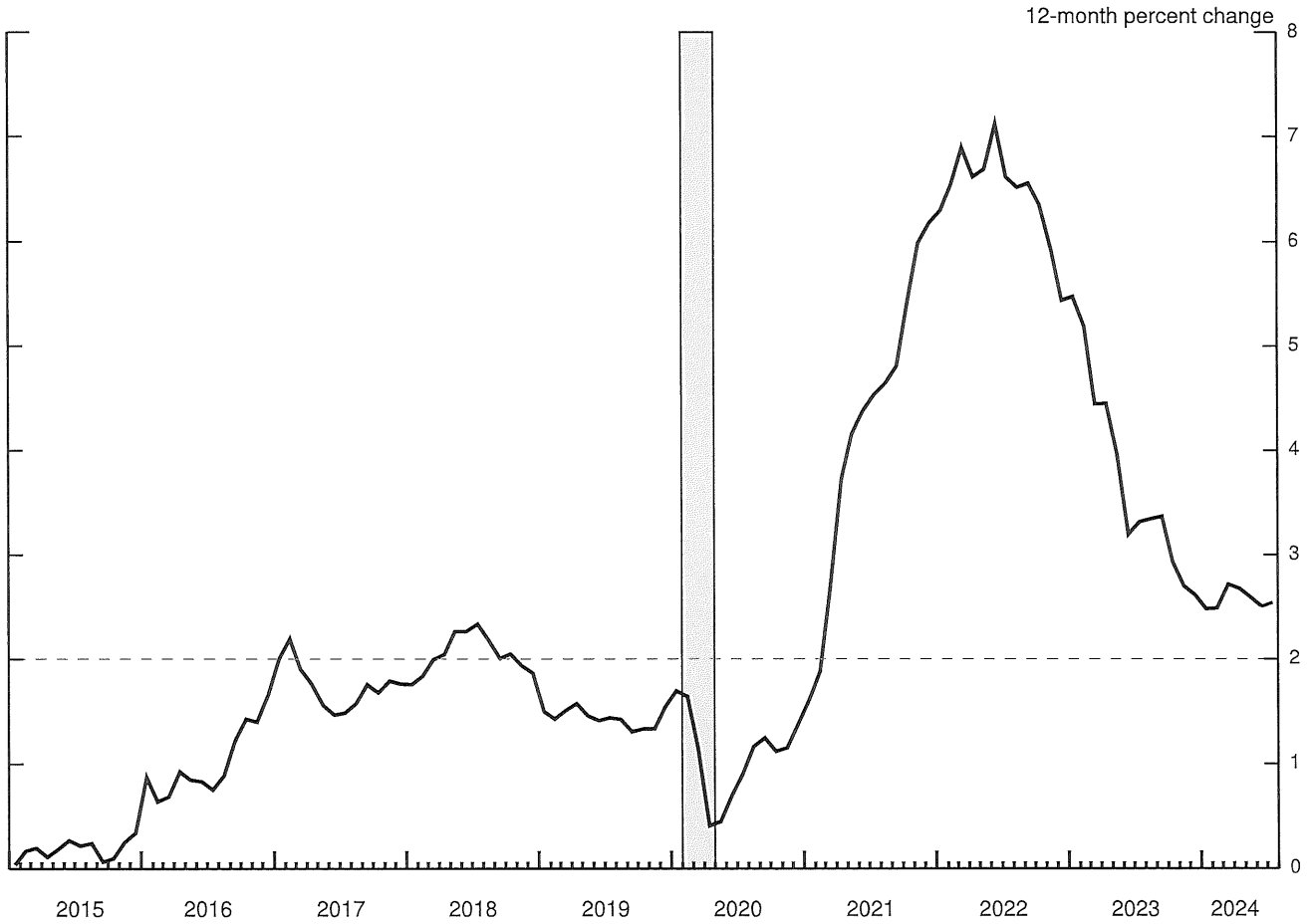
Pfajfar, Damjan, and Fabian Winkler (2024). "Households' Preferences over Inflation and Monetary Policy Tradeoffs," Finance and Economics Discussion Series 2024-036. Washington: Board of Governors of the Federal Reserve System, May, https://doi.org/10.17016/FEDS.2024.036.

Shiller, Robert J. (1997). "Why Do People Dislike Inflation?" in Christina D. Romer and David H. Romer, eds., *Reducing Inflation: Motivation and Strategy.* Chicago: University of Chicago Press, pp. 13–65.

Stantcheva, Stefanie (2024). "Why Do We Dislike Inflation?" NBER Working Paper Series 32300. Cambridge, Mass.: National Bureau of Economic Research, April, https://www.nber.org/papers/w32300.

Figure 1

Personal Consumption Expenditures Price Index

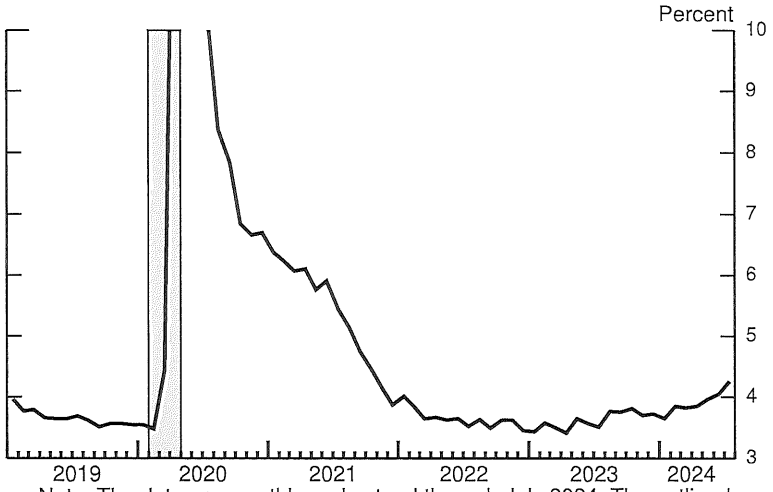


Note: The data are monthly and extend through July 2024. The data for July 2024 are estimates based on consumer price index and producer price index data. The outlined shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research: February 2020-April 2020. PCE is personal consumption expenditures. The dashed line is at the 2 percent longer-run inflation target.

Source: Bureau of Economic Analysis, PCE, via Haver Analytics.

Figure 2

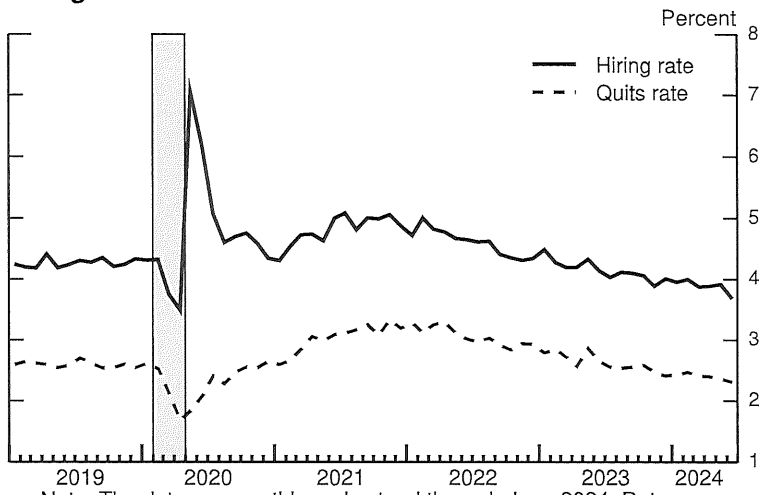
Unemployment Rate



Note: The data are monthly and extend through July 2024. The outlined shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research: February 2020-April 2020. The unemployment rate peaked at 14.8 percent in April 2020. Unemployment rates for April-July 2020 are omitted for readability.

Source: Bureau of Labor Statistics via Haver Analytics.

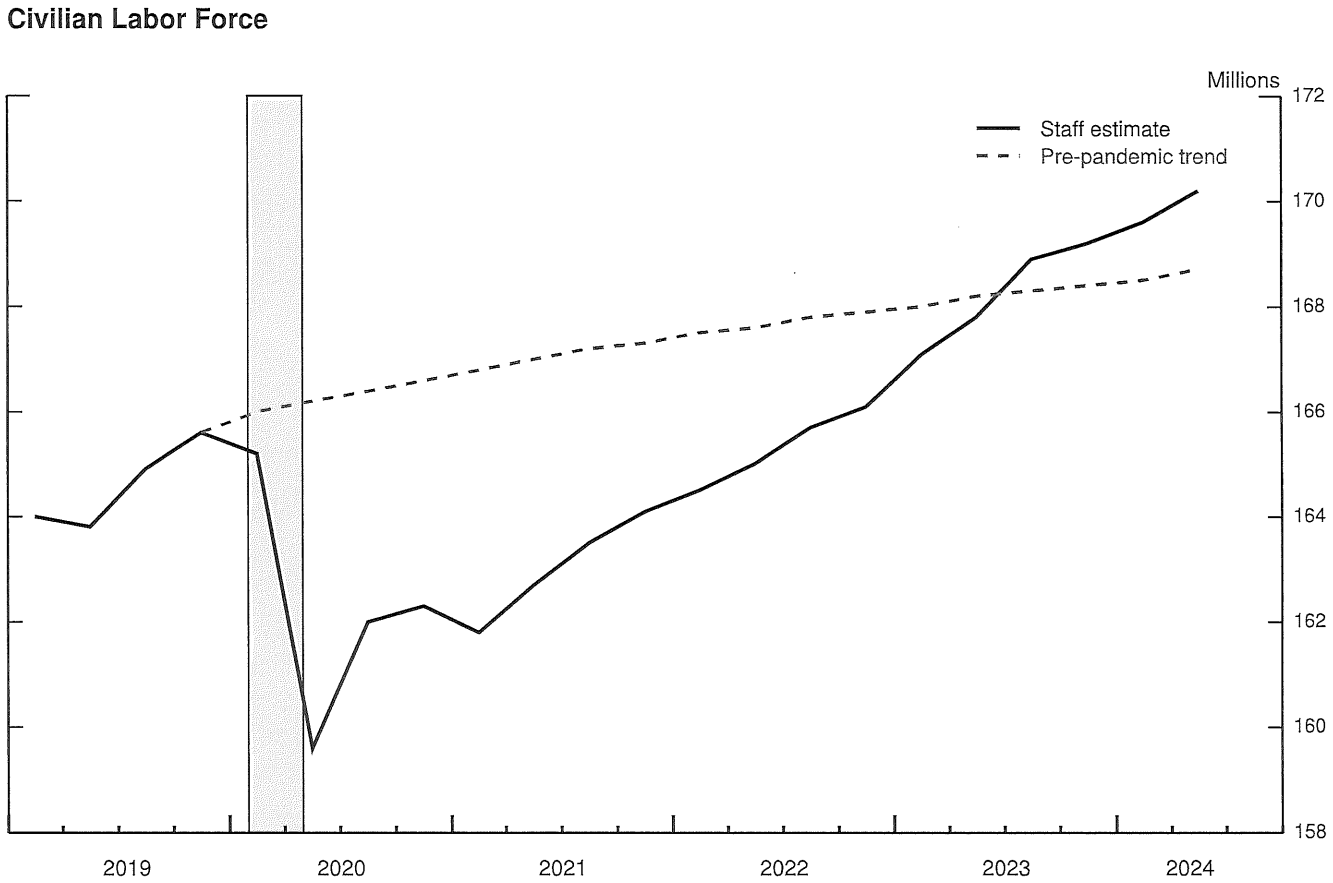
Hiring and Quits Rates



Note: The data are monthly and extend through June 2024. Rates are measured as percent of private employment. The outlined shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research: February 2020-April 2020.

Source: Bureau of Labor Statistics via Haver Analytics.

Figure 3

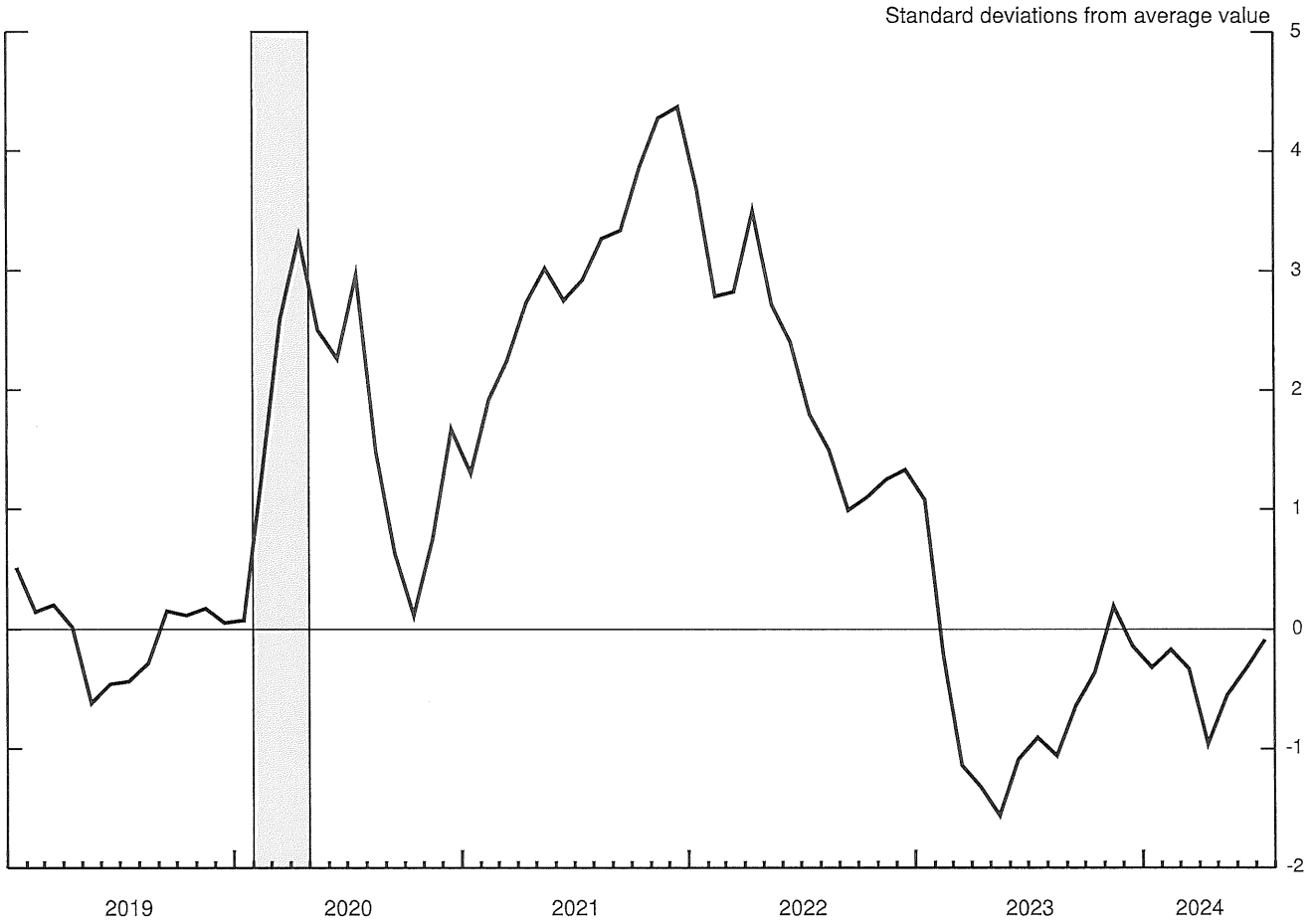


Note: Quarterly and seasonally adjusted data extending through 2024:Q2. The black line is a Federal Reserve Board staff estimate of the labor force, making two adjustments to the Bureau of Labor Statistics' published estimates: (i) reweighing Current Population Survey respondents such that the labor force estimates in all years reflect the Census Bureau's latest population estimates; and (ii) accounting for net immigration that is likely not fully reflected in the Census Bureau's latest population estimates, as detailed in the Congressional Budget Office's (CBO) *The Demographic Outlook: 2024 to 2054,* https://www.cbo.gov/publication/59899. The pre-pandemic trend is calculated by appending the CBO's January 2020 projected labor force growth from the start of the pandemic through 2024:Q2 onto the level of the labor force just before the start of the pandemic. The outlined shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research: February 2020-April 2020.

Source: Bureau of Labor Statistics via Haver Analytics; CBO; Federal Reserve Board staff calculations.

Figure 4

Global Supply Chain Pressure Index

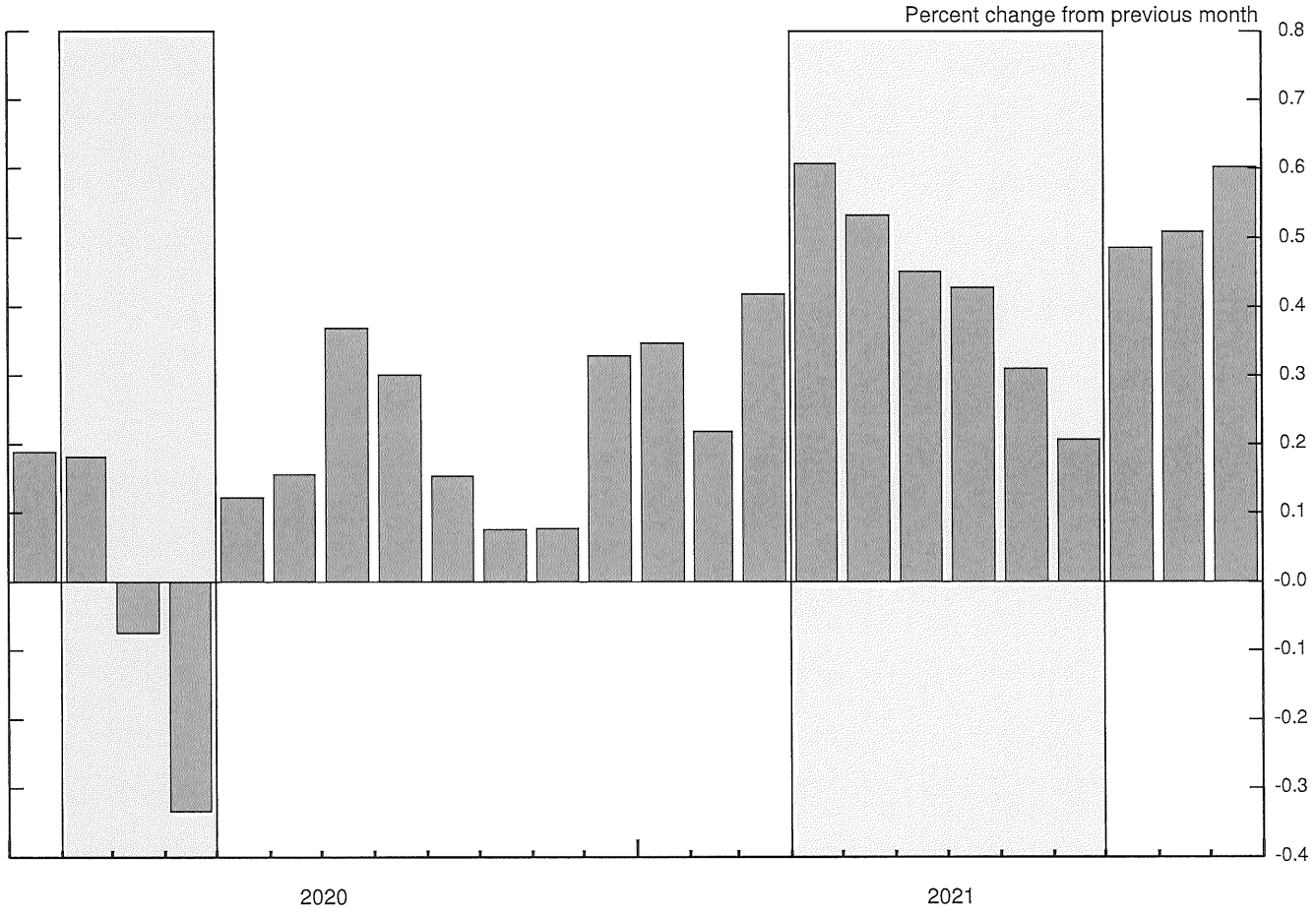


Note: The data are monthly and extend through July 2024. The index is presented as the number of standard deviations from its average value. The outlined shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research: February 2020-April 2020.

Source: Federal Reserve Bank of New York.

Figure 5

Core PCE Prices

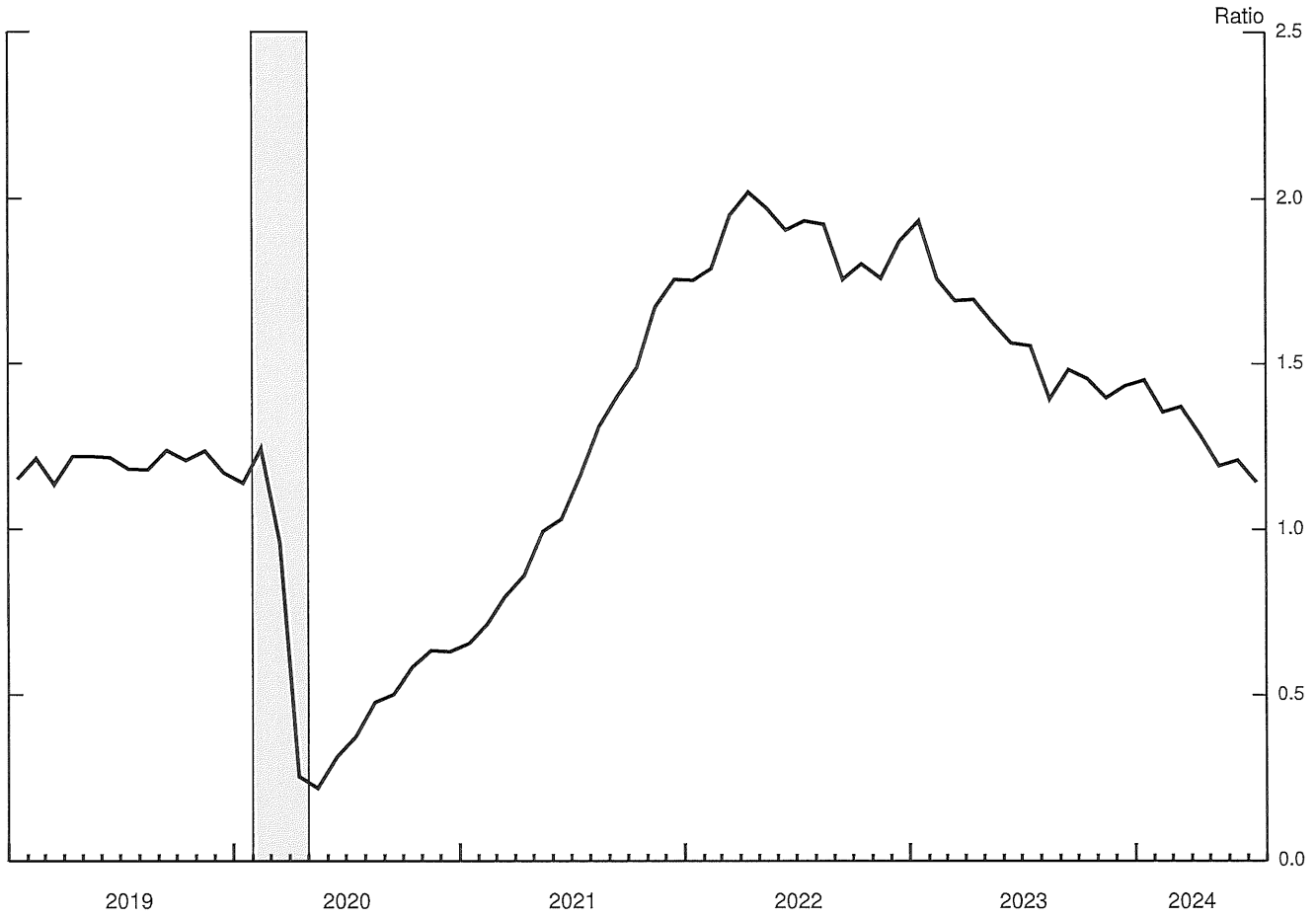


Note: The data are monthly and extend through December 2021. PCE is personal consumption expenditures. The gray outlined shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research: February 2020-April 2020. The light-green outlined shaded region highlights the period from April 2021 to September 2021.

Source: Bureau of Economic Analysis, PCE, via Haver Analytics.

Figure 6

Job Openings to Unemployment

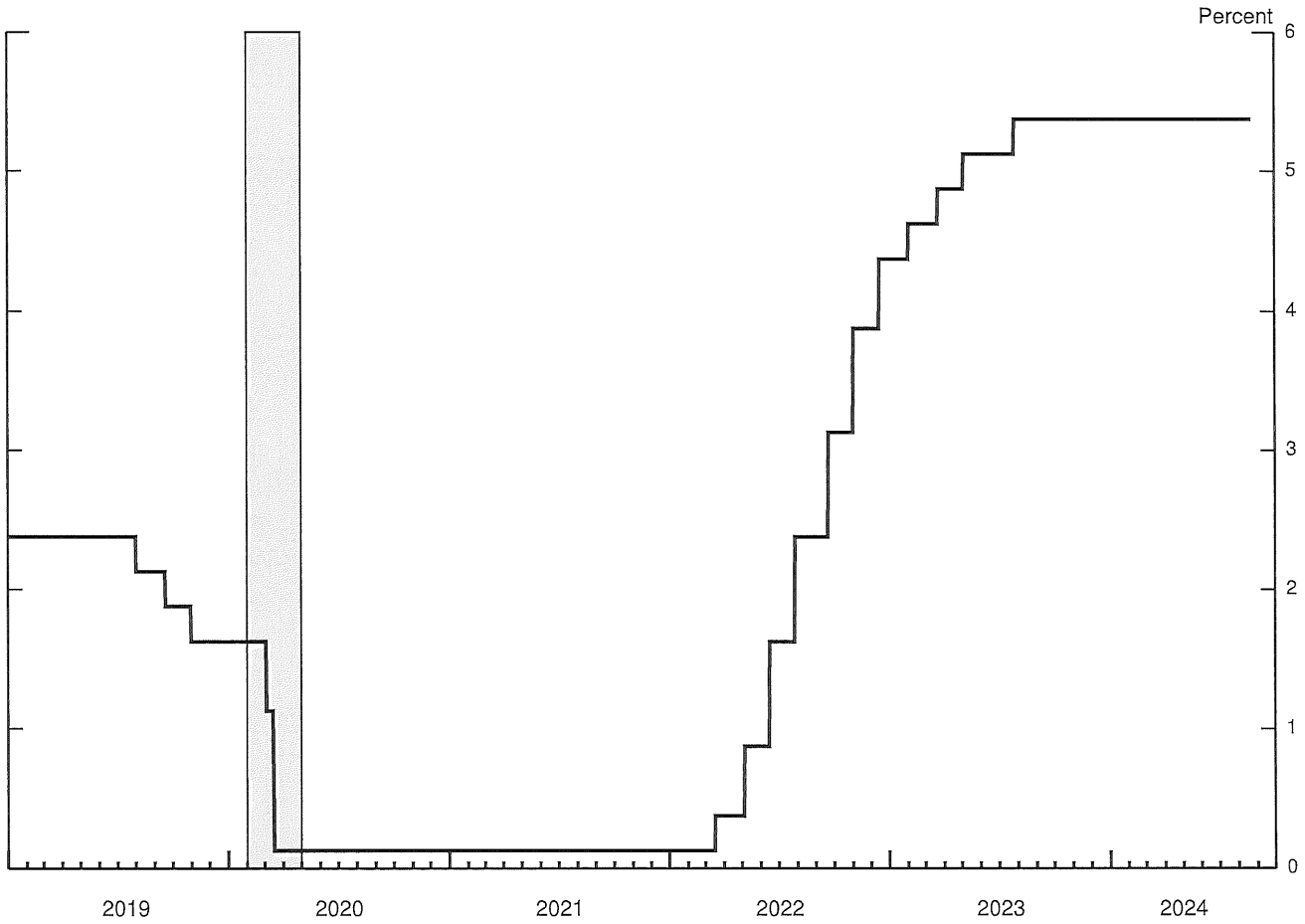


Note: The data are monthly and extend through July 2024. The ratio is calculated as the JOLTS (Job Openings and Labor Turnover Survey) job openings at the end of the previous month divided by current-month unemployed. The outlined shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research: February 2020-April 2020.

Source: Bureau of Labor Statistics via Haver Analytics.

Figure 7

Midpoint of the Target Range for the Federal Funds Rate



Note: The data are daily and extend through August 22, 2024. The outlined shaded bar indicates a period of business recession as defined by the National Bureau of Economic Research: February 2020-April 2020.

Source: Federal Reserve Board.

BROOKINGS

COMMENTARY PODCAST

How will the Federal Reserve revise its monetary policy framework in 2025?

Listen on

0:00 33:22

Janice C. Eberly, Christina D. Romer, Brian Sack, Jón Steinsson, and David Wessel

December 18, 2024

- → The Federal Reserve most recently updated its monetary policy framework—a set of guiding principles used in setting and communicating policy—in 2020.
- → The past four years have presented a variety of economic challenges that tested the Fed framework, with mixed results.
- → At the latest BPEA conference, experts shared research and perspectives on how the Fed should adapt the framework during its upcoming review in 2025.

Downloads

↓ Full Transcript

The Federal Reserve's "Statement on Longer-Run Goals and Monetary Policy Strategy"—commonly referred to as its monetary policy framework—is composed of guiding principles the central bank uses in setting and communicating policy. Since the Fed last updated this framework in 2020, the global economy has faced unique challenges: COVID-19 shutdowns, widespread supply chain issues, and multiple global wars. In 2025, the Fed Board will be tasked with reviewing the framework, identifying what has worked well and what hasn't, and updating it accordingly. On this episode, David Wessel sits down with Brian Sack and Christina Romer, both former policymakers and authors of new research on the Fed framework's successes and shortfalls.

- Listen to the Brookings Podcast on Economic Activity on Apple ↗, Spotify ↗, YouTube ↗, or wherever ↗ you like to get podcasts.
- Learn about other Brookings podcasts from the Brookings Podcast Network

WESSEL: Thank you, Jan and Jón. Christie, it's good to be with you today.

ROMER: Nice to be with you.

WESSEL: And it's good to be with you, Brian.

SACK: Thanks for having me.

WESSEL: So, Christie, let me start with you. The focus of this discussion at the *Brookings Papers on Economic Activity* was the Fed's framework. When you look at the framework that the Fed adopted in August 2020, what do you think of it and what role does it play in the Fed's slow response to the increase of inflation that was triggered by the COVID episode?

[2:50]

ROMER: Well, the framework that was reviewed before August 20th, and then they came out with a new one, had what we see is kind of at least four important changes from their previous framework. One was the introduction of what's called flexible average inflation targeting, which is just simply the idea that the Fed says if inflation's been running below our target for a while, we'll have a period when inflation runs above our target. So, we're on target on average. That was one change.

A second change that got a lot of notice was in terms of the second part of their mandate, maximum employment. One of the things that they've said is they would respond when employment was below maximum, but not when employment was above maximum unless there were some other problems.

And then two other changes that were more subtle, but in our paper, we argue are actually probably more important to the slow response to inflation are first, an elevation or a strengthening of the maximum employment goal. All the legislation says the Fed is supposed to head for maximum employment, but how they interpret it is obviously very important. And traditionally, the Fed has interpreted it as something closer to a normal level of employment or a sustainable level of employment. And the new framework really elevated that and had it much closer to something like we're going to aim for a hot labor market, not just a sustainable, comfortable labor market.

And then the other subtle change was a move away really from preemption. This notion that the Fed is going to respond to what they see happening in the future rather than to just where inflation and employment are right now. And in our going through where did the slow response to inflation come from, we think it's that elevation of the maximum employment goal to be in a hot labor market goal, and the moving away from having a very forward looking monetary policy.

WESSEL: Thanks, Christie. Brian, do you see it similarly? Are there other parts of the framework that you think are worth noting?

[5:12]

But in this case, by requiring both of those conditions to be met they, in my view, tied their hands too firmly and unnecessarily did so. And in particular, first of all, it's already relatively aggressive to say we're going to keep the policy rate at zero until we get inflation back to the target and the unemployment rate to full employment. So, even if you knew you were going to hit those conditions at the same point in time, that's already a relatively aggressive policy because in most cases you would think when you get to those conditions, which are sort of like equilibrium conditions for the economy, the policy rate should be near its equilibrium level or its neutral level, which is typically above zero. So, that was aggressive to begin with.

But I think the real problem was this structure meant that both conditions had to be met. So, in circumstances where inflation was moving up rapidly and the full employment condition had not yet been met, this effectively tied the FOMC's hands in a way that really didn't put a bound on how far off track they could get in terms of having their policy rate respond to inflation.

We often talk about, in the academic research literature we talk about monetary policy rules, which are devices, formulas that describe how monetary policy is typically set for economic conditions. And those rules in many models deliver very good performance. So, it's not that the central bank always follows a rule, but they give a nice reference point for thinking about good policy. And in the context of thinking about policy rules, basically this guidance allowed the deviation from the rule to be very large in size. So, the FOMC fell many percentage points below what the rule said policy should have been set at because of this form of the guidance that required both conditions to be met before liftoff.

WESSEL: Right. And, Christie, that that echoes some of the comments that you've made. You and your coauthor, David Romer, argue that the Fed's desire to have a hot labor market, one in which unemployment is as low as possible and as many people as possible are working, and its unwillingness to act preemptively, as Brian described, contributed to the slow response to inflation. And in your paper, you put this in historical perspective, and I wonder if you can explain a bit the technique that you and David used to examine the Fed decision-making in the past and what conclusions you draw from it.

[11:04]

ROMER: Absolutely. So, first, I think it is important to discuss what do we mean when we say the Fed was slow to respond. And I think the basic facts are by March of 2021, inflation had already gone above the Fed's 2% target. And what's really striking is, as Brian's been suggesting, is that they waited a full year until March of 2022 before we had the first rise in the funds rate. And so, that's what we were trying to investigate in our papers—what role did that change in the framework perhaps play in that year-long wait to raise the funds rate.

And the method that we use is basically to listen to what policymakers said. So, we read the minutes of the FOMC meetings. We look at the speeches that the Fed chair, Jerome Powell, made, that vice chair of the FOMC and president of the Federal Reserve Bank of New York Don Williams made, to try to tease out what how they were interpreting their new framework, how it was influencing what they did. And so, what we do is to just read a lot and try to figure out what they were saying and what they

correct the mistake later on is a riskier strategy. They had to raise rates very rapidly to restore their inflation credibility. That certainly risked a more dramatic slowdown in the economy. It creates more risk of financial accidents. We did have some financial stress, of course, in the banking sector. And it also created risks on inflation. And in the end, they were able to keep inflation expectations contained and bring inflation back down to date. But if inflation expectations had proven somewhat more fragile, it could have been even costlier.

So, I think a path that puts you so far from normal benchmarks for policy rules and then requires an aggressive correction is not an optimal path, and we shouldn't give the framework a free pass just because we avoided the absolute worst outcomes.

WESSEL: Right. Right. In other words, it was a risk you don't think they should take. And they got lucky. That's the headline I put on what you just said.

SACK: It's a risk they didn't have to take. They got lucky, but they also, you know, I mean, they did correct. I think they, you know, deserve credit for realizing that as the tightening cycle got underway, they had to get more aggressive to achieve this outcome. But it was a riskier path than I think they had to be on.

[17:20]

ROMER: Let me just add one thing, David, which is that I agree with everything that Brian said, but there's also just this other element that people really hate inflation. We've been through such a long period where inflation has been low. I think we policymakers may have forgotten just how much people really dislike inflation, even if their wages are going up at the same rate, they still ... it just is a visceral response.

And now we see, right, inflation's low, but all people are noticing is, yeah, but the price of eggs is still not back down to where it was in 2019 or 2020. And so, we don't want to lose sight of just that it makes people really unhappy, and it may affect how they view the economy, how they vote, their expectations, and spending. So, we need to realize that going through a year of quite high inflation may have had important consequences.

WESSEL: Yeah, that's a very good point. So, the Fed is sitting down now to begin this review of the framework. I know for a fact that they have read your papers and listened to the discussion because one of the Fed governors mentioned it to me. So, Christie, let me start with you. What should they do differently? What should they change? And what should they keep the same?

[18:42]

ROMER: There are a couple things I wanted to echo from Brian's comments. Which one is just the Fed does deserve a lot of credit, both for having a framework review back in 2019 and 2020 because it's just good policymaking to look at what you've done, what's gone right, what's gone wrong, and see if you want to change it. And I think it's great that they're doing this again. And the fact that they're reading what academics and people in markets are saying, I think is really valuable.

ROMER: Well, there were real problems with policy coming out of the Great Recession. I think policy was often too tight. But the answer to that is to not say, so what we're going to do is aim for a much hotter economy; is to say, why did we make that mistake? Why did we not do enough after the Great Recession? And that really comes to this notion that they need to keep doing preemption, they need to keep looking forward because monetary policy affects the economy a very long way.

But in a case like after the Great Recession, where they kept their forecasts, kept being very wrong, the answer is not to throw away the forecast. It's to say, what did we do wrong and how do we get better forecasts and how do we have a better read on where the economy's headed?

So, I think that the right message for the framework is keeping forward looking, have a sensible estimate of what maximum employment is, but then do a really good job and invest, put a lot of resources into making a very good projection of where the economy is headed.

WESSEL: So, Brian, what would you do if you were at the pen rewriting the framework?

[24:00]

SACK: I think I agree with Christie in almost every way. I think the framework document itself should be more what we call a constitutional. It should provide a structure for effective policymaking that applies to a wide range of economic circumstances. It's not tailored to the one particular circumstance that that's been in place. And so, for me, in terms of the current framework document, that would mean going back and reversing the change that was made on shortfalls. I think this idea of only responding to shortfalls to full employment as opposed to deviations was very asymmetric and very aimed at those particular circumstances.

WESSEL: Let me just interrupt you to just explain what that you mean is the Fed framework basically said when unemployment is high, we're going to react aggressively. And when it's low, we're going to not react aggressively.

SACK: Yes, exactly. So, I think I would just take that out of the framework document. I think it's too specific and it's too problematic in some circumstances to be in the framework document.

In terms of the other large asymmetry or change in the framework document, the average inflation targeting, I'm a bit more against average inflation targeting than I think Christie is. It's a bit of a different argument. I don't think it's problematic necessarily. I just think it's not that far from just flexible inflation targeting. And the averaging part was vague enough in the framework that I don't think it's actually helping a great deal. So, I don't think it's problematic to keep it. But on the other hand, I just don't think it's that that beneficial. So, I would basically remove both of those pieces and just have the framework document focus on a set of principles that I think are very robust across economic circumstances.

where they think the economy's headed. The trouble with them making a where they say they think the funds rate is headed is people focus in on that in a very counterproductive way. Right? They say what's the dot in the middle? That's where the Fed's going to be. Well, it's not. There are 19 people on that committee and there's sometimes a huge range and sometimes there's a little range.

And so, I think often the dot plots just end up confusing people because of the way they're either reported or interpreted by a lot of people out there in the economy. So, it's not a hill I'm going to die on—let's get rid of those. But I think they can cause problems.

WESSEL: Okay, Brian, defend the dot.

[29:53]

SACK: I'd be very sad if the dot's going away. Well, first of all, let me say that, I mean, I think the Fed and other central banks they're in the business of communicating about their policy path. It's really unavoidable. So, to Christie's point, there are times when you want to turn it up with explicit guidance and maybe those times you say for the right circumstances and when you're stuck at the effective lower bound, those are certainly circumstances where that's productive. But at other times, you're still communicating about at least your expected path for policy. And that's really what the dot plot provides as well. So, I think the dot plot's an important part of that.

And I would argue it's a highly effective part of that. It's not perfect, but it's pretty effective. And the reason is it's quantitative, whereas we get an FOMC statement that's qualitative and descriptive, but the dot plot and the whole SEP [Summary of Economic Projections] forecast gives you that quantitative reading on explicitly about what FOMC members are seeing for the economy. And then by tying that with the dots, it gives you a lot of information about their reaction function and their policy intentions.

So, I think it's a very important communication device for the markets. And I don't think the markets just oversimplify and take it on board. I think markets understand these are forecasts that won't necessarily come true. They understand that there's a variety of views. They understand that they may want to weight different views differently. So, to me, it's a piece of information that gets used pretty efficiently by the markets and helps policy be effective.

WESSEL: Well, great. I'm glad that by the end of the conversation, I found something in which you're not in furious agreement.

[music]

Brian Sack and Christie Romer, thanks very much for your time and for the work you put into these papers, because I know that they're having influence on policymakers as they try and do better next time.

ROMER: Well thanks, David. Thanks, Brian. It was nice to have the conversation.

values and policies (/about-us/research-independence-and-integrity-policies/) , each Brookings publication represents the sole views of its author(s).