

# Did the Federal Reserve Anchor Inflation Expectations Too Low?

*By Brent Bundick and A. Lee Smith*

In 2012, the Federal Reserve adopted a 2 percent target for inflation to firmly anchor longer-term inflation expectations. Through 2019, inflation, as measured by the annual change in the price index for personal consumption expenditures (PCE), averaged about 1.4 percent. Many factors have contributed to this shortfall, including the protracted labor market recovery from the Great Recession and, at times, large declines in energy and import prices. Nevertheless, modern theories of inflation suggest that inflation should eventually gravitate toward measures of longer-run inflation expectations. The tendency for inflation to reside below the Federal Reserve's 2 percent inflation target over much of the past decade therefore raises questions of whether longer-run inflation expectations are anchored—and, if so, whether they are anchored below 2 percent.

In this article, we argue that the Federal Reserve's communication of a numerical objective for inflation better anchored longer-term inflation expectations; however, Federal Open Market Committee (FOMC) projections for longer-run inflation from 2009–11 may have anchored them below 2 percent. Drawing on our recent research, we present evidence that the 2009 addition of longer-run inflation to the

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FOMC's Summary of Economic Projections (SEP), together with the eventual adoption of a longer-run 2 percent inflation objective in 2012, made investors' inflation expectations more stable (Bundick and Smith 2020). At the same time, SEP projections for longer-run inflation from 2009 to 2011 generally resided below 2 percent, which may have led inflation expectations to anchor below 2 percent. The prospect that inflation expectations are anchored below 2 percent helps to explain the persistently low rates of inflation in the recent era. Moreover, this result underscores the rationale behind the FOMC's recent shift to a new framework that conveys a clear preference for inflation that averages 2 percent over time in an effort to anchor longer-run inflation expectations at 2 percent.

Section I describes how the FOMC's communication about its longer-run inflation objective has evolved in recent decades. Section II estimates whether these changes in FOMC communication better anchored longer-run inflation expectations. Building on this analysis, Section III argues that the distribution of FOMC projections for longer-run inflation from 2009 to 2011 conveyed a preference for inflation below 2 percent, underscoring the need to shift long-run inflation expectations to sustainably achieve 2 percent inflation.

## **I. The Federal Reserve's Shift to Communicating a Numerical Inflation Target**

With the passage of the Federal Reserve Reform Act in 1977, Congress tasked the Federal Reserve with promoting maximum employment, moderate long-term interest rates, and stable prices. Taken literally, long-run price stability would necessitate inflation averaging zero over time. However, pursuing a zero inflation rate is problematic for several reasons. For instance, any measure of inflation is imperfectly calculated, owing to biases that tend to overstate the true rate of inflation. Based on the estimate of this bias from Boskin and others (1996), targeting a measured rate of zero would likely yield a rate of true inflation around -1 percent (that is, deflation), which would be inconsistent with price stability.<sup>1</sup> Another issue with targeting a zero rate of inflation is that zero or very low rates of inflation may themselves impede the Federal Reserve's pursuit of its maximum employment objective. In particular, given the reluctance of workers to accept nominal wage

cuts during economic downturns, some positive rate of inflation helps to “grease the wheels” of labor markets by allowing real (inflation-adjusted) wages to vary more freely in line with labor market conditions.

In recent decades, the effective lower bound on interest rates has provided a more salient rationale for pursuing positive rates of inflation. One component of every nominal interest rate, including the federal funds rate—the primary monetary policy instrument of the Federal Reserve—is expected inflation. Persistently low inflation and correspondingly low rates of expected inflation can depress nominal interest rates. Therefore, targeting a very low or zero rate of inflation may limit the amount by which policymakers can reduce the federal funds rate during a recession due to the challenges associated with setting interest rates below zero. Conversely, persistently higher rates of inflation generally lead to higher levels of nominal interest rates, allowing policymakers more space to reduce the federal funds rate in an economic downturn.

Instead of identifying a numerical objective for inflation consistent with price stability, for some time Federal Reserve officials interpreted price stability as summarized by former Federal Reserve Chair Paul Volcker: “A workable definition of reasonable ‘price stability’ would seem to me to be a situation in which expectations of generally rising (or falling) prices over a considerable period are not a pervasive influence on economic and financial behavior” (Volcker 1983). While the high rates of inflation in the late 1970s and 1980s clearly did not meet this general notion of price stability, Federal Reserve officials began to consider a more precise notion of the rate of inflation that they deemed to be consistent with price stability as inflation trended lower into the 1990s.

Given the shortcomings of targeting a zero inflation rate, the FOMC broadly agreed during internal policy deliberations in 1996 that a measured rate of inflation around 2 percent over the long run is most consistent with its congressional mandates (Board of Governors 1996). However, the Committee stopped short of communicating this 2 percent inflation objective to the public. Instead, Committee members continued to deliberate issues surrounding the formal adoption of an inflation objective, such as which measure of inflation to target, over which horizon policymakers should seek 2 percent inflation, and whether to specify a single target rate or a target range for inflation outcomes.

At the same time, many other central banks around the world moved forward with adopting and communicating formal inflation targets. Research prior to the FOMC's decision to adopt a numerical inflation target suggests that in the United Kingdom, the euro area, and Sweden, communicating a numerical inflation target provided a nominal guidepost for the public and led to better-anchored inflation expectations compared with the United States (Gürkaynak, Levin, and Swanson 2010; Beechey, Johannsen, and Levin 2011). This research concludes that before the global financial crisis, the FOMC had the scope to better anchor U.S. inflation expectations by adopting and communicating a numerical inflation target like many central banks around the world.

Better-anchored inflation expectations enhance the ability of central banks to achieve their government mandates. Because inflation expectations are thought to be a key determinant of realized inflation, central banks tasked solely with price stability mandates can better stabilize inflation when inflation expectations are well anchored. However, even central banks with multiple mandates, such as the Federal Reserve, can better achieve their desired outcomes with well-anchored inflation expectations. For instance, anchored inflation expectations enable policymakers to respond aggressively to cyclical swings in the real economy, such as rising unemployment, without unseating inflation expectations and threatening price stability.

The global financial crisis and ensuing Great Recession elicited such an aggressive policy response from the Federal Reserve. Beginning in 2008, as financial markets seized, the Federal Reserve rapidly expanded its balance sheet to provide liquidity and support to credit markets. These actions resulted in a corresponding surge in the monetary base that sparked concerns inflation might accelerate in the future. At the same time, the severe deterioration of the economic outlook led the FOMC to successively reduce the target federal funds rate until it reached its effective lower bound in December 2008. The exhaustion of conventional monetary policy led to greater concern around the possibility of deflation. Threats had emerged on both sides of the Federal Reserve's price stability mandate, underscoring the need to better anchor inflation expectations.

In an attempt to stabilize inflation expectations, the FOMC added numerical projections for longer-run inflation to its quarterly Summary of Economic Projections (SEP) in 2009.<sup>2</sup> In a January 2009 conference call, Janet Yellen, then president of the Federal Reserve Bank of San Francisco, argued that such projections could convey the Committee's commitment to low but positive rates of inflation and thereby better anchor inflation expectations: "Greater transparency about how we think the future will likely unfold could help anchor inflationary expectations ... But our existing FOMC projections, which have the three-year forecast horizon, obviously aren't up to the task ... The obvious solution to this problem is to provide economic projections with a longer horizon" (Board of Governors 2009, p. 19). Despite dispersion across participants' initial projections for longer-run inflation, which ranged from 1.5 to 2.0 percent, the SEP projections marked an early step in the FOMC's evolution toward adopting and communicating a formal inflation target.

In January 2012, the FOMC formalized its inflation target in a consensus statement on longer-run goals and strategies for monetary policy. This statement communicated, for the first time, the Committee's adoption of a numerical, longer-run goal for inflation—2 percent as measured by annual changes in the PCE price index. The statement also articulated a clear rationale for adopting such a target: "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" (Board of Governors 2012).

The FOMC has continued to refine its Statement on Longer-Run Goals and Monetary Policy Strategy since 2012. In January 2016, the Committee clarified that the 2 percent inflation target is symmetric, meaning policymakers would be "concerned if inflation were running persistently above or below this objective" (Board of Governors 2016). The Committee further modified the consensus statement in August 2020 to specify that to anchor longer-term inflation expectations at 2 percent, "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” (Board of Governors 2020). Despite these qualitative adjustments, each iteration of the consensus statement has reaffirmed the 2 percent inflation target over the longer run. Whether communicating this target has actually anchored inflation expectations, and whether these expectations are anchored at 2 percent, remain empirical questions.

## **II. Did FOMC Communication Better Anchor Inflation Expectations?**

Economists often measure the degree to which inflation expectations are anchored by analyzing how financial markets respond to incoming economic news. Inflation expectations are considered to be well anchored if investors do not adjust their expectations for longer-run inflation in response to new information about inflation today. In this way, anchored inflation expectations can be seen as a sign of confidence that the central bank will adjust monetary policy to prevent unexpected fluctuations in inflation from persisting far into the future.<sup>3</sup> For example, Gürkaynak, Levin, and Swanson (2010) and Beechey, Johansen, and Levin (2011) collectively show that following the announcement of a numerical inflation target, investors in the United Kingdom, the euro area, and Sweden stopped incorporating recent inflation developments into their expectations for future inflation, suggesting inflation expectations became better anchored in those countries. In contrast, the same authors find that, before 2008, investors in the United States did adjust their expectations for future inflation in response to news about current inflation, suggesting the Federal Reserve had some scope to better anchor inflation expectations before the global financial crisis.

In light of this previous research, we examine whether investors ceased to incorporate news on realized inflation into their expectations for future inflation after the FOMC adopted a formal inflation objective in 2012. Specifically, we study whether investors’ expectations for future inflation changed on days the Bureau of Labor Statistics (BLS) released its monthly reports on the Consumer Price Index (CPI), which measures the change in the price of a bundle of consumer goods and services over the previous month. Although the Federal Reserve formally targets the PCE measure of inflation, investors in the U.S. government bond market pay close attention to CPI reports because

interest payments on a class of U.S. government debt called Treasury Inflation-Protected Securities (TIPS) are indexed to the CPI. As a result, the nominal interest payments on TIPS automatically adjust in response to CPI inflation. In contrast, interest payments on nominal government debt instruments are fixed at issuance and do not adjust in response to CPI inflation. Thus, the spread between yields on nominal government debt securities and TIPS provides a measure of the compensation investors require to be exposed to inflation, which we use to proxy for investors' inflation expectations.

To capture changes in inflation expectations far into the future, we focus on how yields on nominal Treasury notes maturing five to 10 years into the future behave relative to TIPS notes maturing five to 10 years into the future. The spread between these two forward yields is referred to as the five-year, five-year forward inflation compensation. By studying the change in this forward rate of expected inflation, we can isolate changes in long-run inflation expectations from movements in near-term inflation expectations that occur on CPI release days irrespective of the degree to which long-run inflation expectations are anchored.

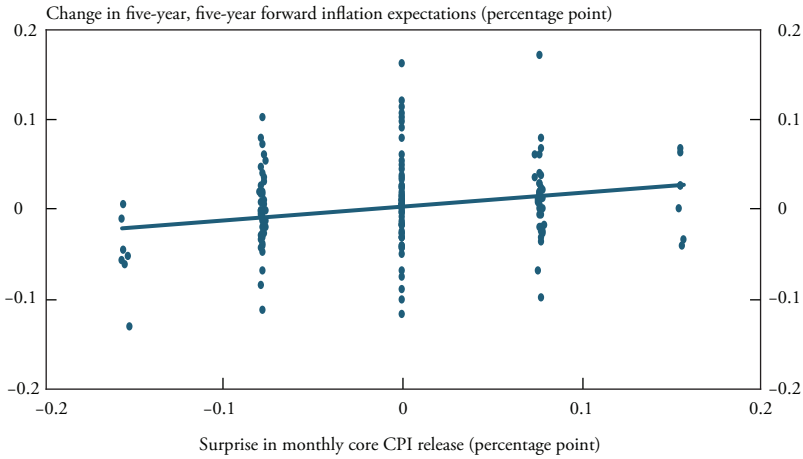
Although the CPI report contains information on many price aggregates, we focus on the month-over-month change in core CPI, which strips out changes in more volatile food and energy prices.<sup>4</sup> To isolate the surprise or unexpected movement in core CPI inflation, we compare the actual monthly rise or fall in core CPI to the median forecast from Bloomberg's panel of about 60 financial market participants, who submit their forecast for the CPI shortly before the report's release. Although these forecasts have been available since 1997, we start our sample in 1999, the year the TIPS market was created. We end our sample in 2019, prior to the onset of the COVID-19 pandemic.

A visual inspection of the data suggests a meaningful change in the way that investors revise their inflation expectations in response to inflation news after 2012. Chart 1 presents a scatter plot of the surprise or unexpected component of the monthly core CPI inflation rate (horizontal axis) versus the daily change in five-year, five-year forward inflation expectations on release days of the monthly CPI report (vertical axis). Each dot in the chart represents these measures on the day of a CPI release. Panel A shows that from 1999 to 2011, prior to the adoption of a formal 2 percent inflation target, changes in inflation

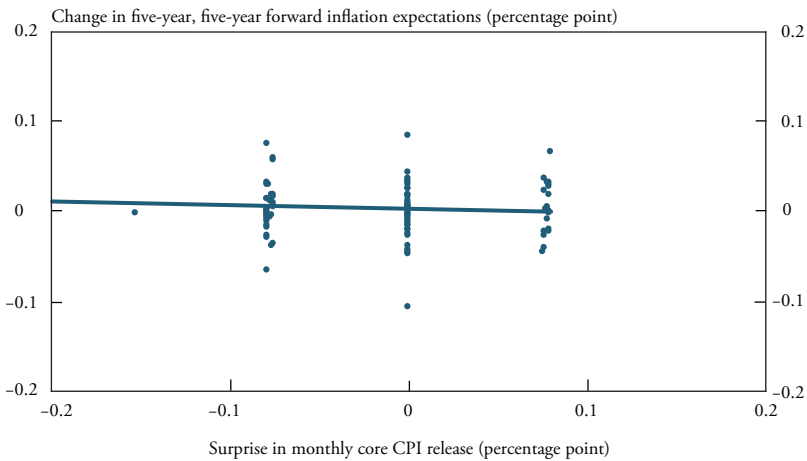
## Chart 1

## Long-Run Inflation Expectations and Core CPI Surprises

Panel A: 1999–2011



Panel B: 2012–19



Notes: Each dot represents the surprise in monthly core CPI and the change in five-year, five-year forward inflation expectations on the day of a CPI release. Bloomberg's survey asks for CPI release predictions rounded to the nearest tenth. Surprises are calculated to the nearest tenth, then scaled by the share of core CPI in overall CPI (around 0.75). Therefore, most core CPI surprises are concentrated at 0,  $\pm 0.075$  and  $\pm 0.15$ .

Sources: Bloomberg LP, Board of Governors of the Federal Reserve System (Haver Analytics), BLS (Haver Analytics), and authors' calculations.



expectations appeared to be positively correlated with inflation surprises. However, Panel B shows that from 2012 to 2019, inflation expectations appear to have become more stable in the face of unexpected fluctuations in inflation.<sup>5</sup>

To more formally examine the changing relationship between inflation expectations and inflation news, we use three alternative statistical approaches. We begin by regressing the change in five-year, five-year forward inflation expectations on the days of CPI releases against the surprise component of monthly core CPI inflation over the sample periods 1999–2011 and 2012–19. These two regressions help us measure the extent to which inflation expectations have become less sensitive to unexpected changes in core CPI since 2012. Table 1 shows the relevant coefficient estimates from these regressions. The first column of Table 1 shows that, prior to 2012, an unexpected 10 basis point change in monthly core CPI typically led investors to revise their five-year, five-year forward inflation expectations by about 1.5 basis points in the same direction as the change. The positive and statistically significant coefficient suggests that from 1999 to 2011, inflation expectations were not well anchored in the sense that they drifted in the direction of the CPI surprise. However, the second column of Table 1 shows that since 2012, that responsiveness has declined to essentially zero ( $-0.04$ ), suggesting longer-term inflation expectations became better anchored. Finally, the second row of the third column of Table 1 formally tests for a change in the sensitivity of inflation expectations to core CPI surprises between periods. The negative, statistically significant coefficient indicates that inflation expectations became less sensitive to CPI surprises after 2012.

Although these regressions demonstrate a change in sensitivity after 2012, they do not necessarily demonstrate that the FOMC's adoption of the numerical target led to the change. To more precisely estimate the date on which the relationship between inflation expectations and CPI surprises changed, we next produce a time series that does not impose a break in January 2012 but instead estimates the date when the regression coefficient most likely changed. If a change in the behavior of inflation expectations reflected better anchoring, we would expect the estimated date to follow a change in Federal Reserve policy. Chart 2 shows the time series of the statistic,

Table 1

## Regression Model of Inflation Expectations on Core CPI Surprises

Independent variable	Five-year, five-year forward inflation expectations		
	1999–2011	2012–19	1999–2019
Core CPI surprise	0.15* (0.07)	-0.04 (0.06)	0.15* (0.07)
Core CPI surprise with post-2012 interaction			-0.20* (0.09)
Regression R <sup>2</sup>	0.04	0.01	0.03
Observations	155	94	249

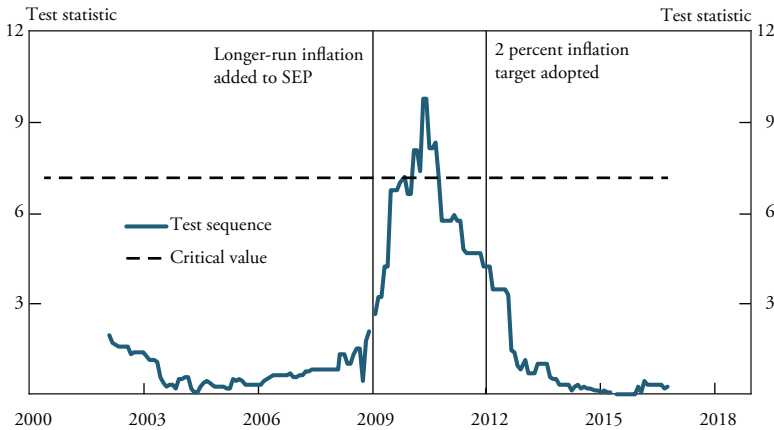
\* Statistically significant at the 5 percent level.

Note: Eicker-White standard errors are in parentheses.

Sources: Bloomberg LP, Board of Governors of the Federal Reserve System (Haver Analytics), BLS (Haver Analytics), and authors' calculations. See Bundick and Smith (2020) for the full regression model.

Chart 2

## Estimated Break Date of Core CPI Inflation Coefficient



Notes: Chart shows the sequence of Chow test statistics as a function of candidate break dates. The 10 percent critical value is obtained from Andrews (1993). See Bundick and Smith (2020) for more details.

Sources: Bloomberg LP, Board of Governors of the Federal Reserve System (Haver Analytics), FOMC, BLS (Haver Analytics), and authors' calculations.

which measures how much better the regression model fits the observed data when a change in the regression coefficient on core CPI inflation is permitted at the date shown. Larger values of this statistic indicate larger improvements in the regression model's fit. The dashed line represents the critical value for this test statistic: values of the test statistic above this critical value indicate strong evidence of a change in the sensitivity of inflation expectations to core CPI surprises at the corresponding date. The vertical lines

denote meaningful changes in FOMC communication around its inflation objective, either communicated through the consensus statement or the SEP.

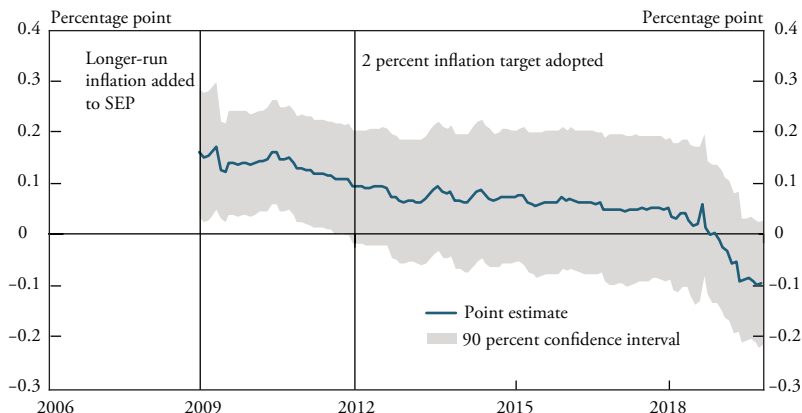
The test statistic (blue line) in Chart 2 peaks above the critical value (dashed line) in May 2010, indicating a structural change in the behavior of inflation expectations is most likely to have occurred on that date. Notably, this date precedes the 2012 adoption of the formal 2 percent target. However, it follows the 2009 SEP enhancement in which FOMC participants began to provide their projections for longer-run inflation. Therefore, Chart 2 suggests that this 2009 shift in SEP communication—rather than the formal adoption of the 2 percent inflation target in 2012—may have been instrumental in anchoring inflation expectations.

The time lag between the January 2009 introduction of longer-run inflation projections to the SEP and the mid-2010 estimated date of change in the relationship between inflation surprises and inflation expectations in Chart 2 suggests that the anchoring process may have been gradual. However, the two preceding statistical approaches both isolate a specific month in which the relationship between unexpected inflation data and inflation expectations abruptly changed. To model the potentially gradual change in the sensitivity of inflation expectations to unexpected inflation data, we now turn to a rolling-window regression. Chart 3 shows the sensitivity of longer-term inflation expectations to core CPI releases over the 10-year window ending at the date shown. The solid blue line shows the point estimate, and the gray shaded region shows 90 percent confidence intervals. Periods with a positive estimate suggest that inflation expectations are unanchored in the sense that they drift in the direction of the core CPI surprise. This was the case dating back to 2008. Thereafter, the estimated sensitivity of inflation expectations gradually declines. By 2012, the point estimate is no longer statistically significant, suggesting inflation expectations ceased to meaningfully vary in response to recent inflation data. These estimates offer further evidence that providing longer-run inflation projections through the SEP may have served as a catalyst for anchoring inflation expectations.

All three statistical approaches used to detect a change in the sensitivity of long-term inflation expectations to unexpected movements in inflation direct us to the same conclusion: financial market measures of inflation expectations became better anchored after the FOMC

Chart 3

### Rolling Window Regression Estimates of the Response of Inflation Expectations to Core CPI Surprises



Notes: Dates indicate the end point of a 10-year rolling sample with estimates shown from December 2008 through December 2019. The 90 percent confidence intervals are computed as the point estimate plus or minus 1.645 times the Eicker-White standard error.

Sources: Bloomberg LP; Board of Governors of the Federal Reserve System (Haver Analytics), FOMC, BLS (Haver Analytics), and authors' calculations.

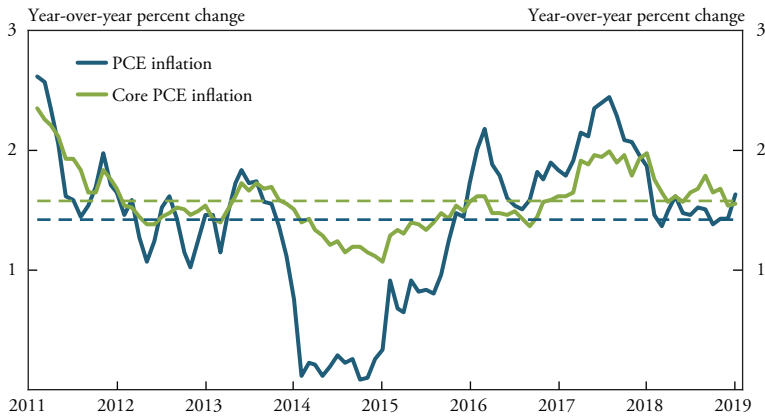
began communicating a numerical target for inflation. The latter two approaches underscore the perhaps underappreciated role as a catalyst for this anchoring played by the FOMC's 2009–11 SEP projections for longer-run inflation.<sup>6</sup> However, the approaches do not reveal at what level inflation expectations were anchored, leaving open the possibility that Federal Reserve communications anchored inflation expectations at too low a level.

### III. Could Inflation Expectations Be Anchored below 2 Percent?

Although the FOMC established an explicit longer-run target of 2 percent inflation in 2012, annual inflation since then has persisted below 2 percent. Chart 4 shows the PCE price index—the inflation measure formally targeted by the FOMC—along with a horizontal line representing its sample average. From 2012 through 2019, annual PCE inflation averaged about 1.4 percent. Absent any disturbances, inflation would be expected to eventually converge to the FOMC's 2 percent target if inflation expectations were well anchored at 2 percent. Of course, the economy is constantly being buffeted by disturbances,

Chart 4

## PCE and Core PCE Inflation over the Formal Inflation Targeting Era



Note: Dashed lines represent average annual inflation for each measure over the 2012–19 period.  
Source: Bureau of Economic Analysis (Haver Analytics).

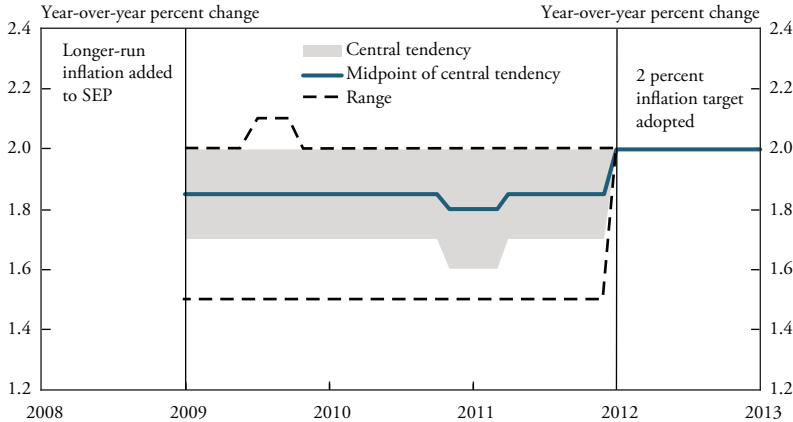
including deflationary forces that could help explain the recent period of low inflation.

Several explanations other than the level of inflation expectations have been proposed for the persistent inflation shortfall. For instance, U.S. prices are exposed to foreign developments through global trade and supply chain linkages. Since 2012, global disinflationary forces have put downward pressure on U.S. inflation. Indeed, Federal Reserve Chair Jerome Powell highlighted that “there are significant disinflationary pressures around the world, and there have been for a while” (Powell 2020b). As an example, from 2014 to 2016, large declines in energy prices visibly weighed on inflation measures. Chart 4 illustrates these forces by comparing core PCE inflation, which removes the direct effect of food and energy prices, to total PCE inflation. From 2012 through 2019, core PCE inflation has averaged about 1.6 percent, above the 1.4 percent average for PCE inflation. This gap between PCE inflation and core PCE inflation suggests that global forces, such as energy prices, have directly restrained U.S. inflation over the past decade.<sup>7</sup> However, the fact that even core PCE inflation has failed to sustainably converge to 2 percent suggests that other factors are at play.

Another possible explanation for the recent period of low inflation is that longer-run inflation expectations are anchored below 2

Chart 5

## FOMC Summary of Economic Projections for Longer-Run PCE Inflation



Notes: Longer-run projections represent each FOMC participant's assessment of the rate to which inflation would be expected to converge under appropriate monetary policy and in the absence of further shocks to the economy. The central tendency discards the three highest and three lowest projections.

Source: FOMC SEP (Haver Analytics).

percent. Given our evidence that the 2009–11 SEP projections for longer-run inflation helped anchor inflation expectations, low SEP projections could conceivably have anchored expectations at a lower level. To test this possibility, Chart 5 shows the range, central tendency, and midpoint of the FOMC's SEP projections for longer-run PCE inflation from January 2009 through January 2013. From 2009 through 2011, the period preceding the adoption of a formal 2 percent inflation target, FOMC projections were centered below 2 percent. Specifically, SEP projections from this period communicated that the Federal Reserve's longer-run goal for inflation was between 1.5 and 2 percent, with a central tendency ranging from 1.6 to 2 percent. Although the FOMC's projections for longer-run inflation have been entirely concentrated at 2 percent since 2012, the earlier projections may have led the public to perceive the 2 percent target announced in 2012 as a "ceiling" on inflation rather than a symmetric target.<sup>8</sup> In other words, the FOMC's implicit target for inflation may have been perceived as near but below 2 percent.

A December 2011 speech by former Federal Reserve Chair Ben Bernanke may have bolstered this public perception of 2 percent as a ceiling

rather than a symmetric target. Just prior to the January 2012 formal adoption of a 2 percent target, then-Chair Bernanke summarized Committee projections by stating (emphasis added), “My colleagues and I on the Federal Reserve’s monetary policymaking committee equate price stability with inflation being at 2 percent *or a little less*” (Bernanke 2011). Therefore, perhaps complemented by non-monetary explanations, low inflation over the 2012–19 period may have its origins in the FOMC’s early SEP projections that indicated a preference for longer-run inflation somewhat below 2 percent.<sup>9</sup> To the extent these projections helped anchor longer-run inflation expectations, they may well have anchored them below 2 percent.

Long-run inflation expectations anchored below 2 percent can pose a challenge to the successful conduct of monetary policy. Although short periods of low inflation do not pose any harm to the economy, persistently low inflation stemming from low levels of inflation expectations tend to be associated with persistently low nominal interest rates. Therefore, an economy beset by persistently low inflation is likely to also be perpetually mired with low interest rates, leaving little room for monetary policymakers to maneuver in a downturn. With longer-term real interest rates also trending lower in recent years, the cost of low inflation appears to have risen, as, holding inflation expectations fixed, lower real interest rates increase the odds that monetary policy will be constrained by the effective lower bound. In this sense, inflation expectations anchored below 2 percent may be “too low” for the Federal Reserve to effectively achieve its mandates of maximum employment, moderate long-term interest rates, and stable prices.

## Conclusion

Shifts toward greater transparency and clarity in how the Federal Reserve interprets its price stability mandate have accompanied marked changes in the behavior of inflation and inflation expectations. Most notably, in 2012, the FOMC adopted a formal 2 percent longer-run target for inflation in its first-ever Statement on Longer-Run Goals and Monetary Policy Strategy. Since 2012, U.S. inflation has been low, and inflation expectations have been more stable than in previous decades. Our research shows that, to a large extent, these changes in inflation and inflation expectations can be linked to changes in FOMC

communication. However, we also find some evidence from the 2009–11 SEP projections that the FOMC conveyed a preference for inflation near but below 2 percent for several years, perhaps leading longer-run inflation expectations to anchor at a level below 2 percent.

The prospect that inflation expectations are anchored below 2 percent—and the challenges posed by low levels of inflation expectations—underscores the rationale for the FOMC’s recent decision to adopt a revised Statement on Longer-Run Goals and Monetary Policy Strategy that codifies a new framework for achieving 2 percent inflation. As outlined by Chair Powell at the Federal Reserve Bank of Kansas City’s 2020 Economic Policy Symposium, this new consensus statement expresses a clear preference to anchor longer-run inflation expectations at 2 percent, stressing that merely achieving 2 percent inflation over the longer run may lead inflation expectations to settle below 2 percent if inflation runs below target for a prolonged period (Powell 2020a). While it is far too soon to evaluate the effectiveness of this new strategy, our research provides some support for the idea that by clearly communicating its preferences for longer-run inflation, the FOMC has the potential to shape longer-term inflation expectations.



## Endnotes

<sup>1</sup>While this bias is unobservable and time-varying, more recent estimates from Gordon (2006) and Groshen and others (2017) conclude that a similar magnitude of bias remains in annual measures of inflation.

<sup>2</sup>See Kahn and Palmer (2016) for a detailed review of the SEP.

<sup>3</sup>This notion of anchored expectations also applies to households and firms, not just investors. However, as previous research has stressed, the high-frequency nature of asset prices allows us to more directly test whether realized inflation causes investors to change their longer-run inflation expectations than is possible with lower-frequency household or firm surveys. Because changing prices can be costly—firms may need to reprint catalogues, change signs, and communicate new prices to consumers—firms try to avoid frequent price adjustments. As a result, most firms consider how prices are expected to evolve into the future when setting prices. This forward-looking nature of price setting creates a direct link from inflation expectations to realized inflation. Without high-frequency data, observed changes in inflation and inflation expectations could either reflect this forward-looking nature of price setting or evidence of unanchored inflation expectations shifting in response to a change in realized inflation.

<sup>4</sup>We also include a constant and the unexpected component of food and energy price inflation in the regression and we weight the core and food and energy components by their respective weights in the CPI. In our research working paper, “Did the Federal Reserve Break the Phillips Curve? Theory and Evidence of Anchoring Inflation Expectations,” we show robustness to several variants on this regression model (Bundick and Smith 2020).

<sup>5</sup>This period also had fewer large inflation surprises, and these surprises may drive the positive relationship in Panel A. In Bundick and Smith (2020) we address this concern in two ways. First, we show that the distribution of CPI releases did not significantly change between the two samples. Second, we show that the positive correlation in the 1999–2011 sample and the reduction in that correlation from 2012–19 is robust to controlling for outliers.

<sup>6</sup>Using a different approach, Doh and Oksol (2018) also find evidence that long-term inflation expectations became better anchored after 2010.

<sup>7</sup>Forbes (2019) more formally analyzes the role that global forces have played in shaping recent U.S. inflation dynamics. Smith (2016) also presents evidence that oil and import prices have weighed on core measures of inflation over this time.

<sup>8</sup>In support of this interpretation, the FOMC amended its statement of longer-run goals and policy strategy in 2016 to specify that 2 percent inflation is “symmetric” and therefore not a ceiling.

<sup>9</sup>Shapiro and Wilson (2019) take an entirely different approach and analyze text from internal FOMC discussions. They argue similarly that the FOMC’s implicit inflation target from 2000 to 2013 was closer to 1.5 percent.

## References

- Beechey, Meredith J., Benjamin K. Johannsen, Andrew T. Levin. 2011. "Are Long-Run Inflation Expectations Anchored More Firmly in the Euro Area than in the United States?" *American Economic Journal: Macroeconomics*, vol. 3, no. 2, pp. 104–129. Available at <https://doi.org/10.1257/mac.3.2.104>
- Bernanke, Ben S. 2011. "Town Hall Meeting Remarks." Speech at the Town Hall Meeting with Soldiers and Their Families, Fort Bliss, Texas, November 10.
- Board of Governors of the Federal Reserve System. 2020. "Statement on Longer-Run Goals and Monetary Policy Strategy." Federal Open Market Committee, August 27.
- . 2016. "Statement on Longer-Run Goals and Monetary Policy Strategy." Federal Open Market Committee, January 26.
- . 2012. "Statement on Longer-Run Goals and Monetary Policy Strategy." Federal Open Market Committee, January 24.
- . 2009. "Conference Call of the Federal Open Market Committee." January 16.
- . 1996. "Transcript of the Meeting of the Federal Open Market Committee, July 2–3, 1996."
- Boskin, Michael J., Ellen R. Dulberger, Robert J. Gordon, Zvi Griliches, and Dale Jorgenson. 1996. "Toward a More Accurate Measure of the Cost of Living." Final Report to Senate Finance Committee from the Advisory Commission to Study the Consumer Price Index, December 4.
- Bundick, Brent, and A. Lee Smith. 2020. "Did the Federal Reserve Break the Phillips Curve? Theory and Evidence of Anchoring Inflation Expectations." Federal Reserve Bank of Kansas City, Research Working Paper no. 20-11, September. Available at <https://doi.org/10.18651/RWP2020-11>
- Doh, Taeyoung, and Amy Oksol. 2018. "Has the Anchoring of Inflation Expectations Changed in the United States during the Past Decade?" Federal Reserve Bank of Kansas City, *Economic Review*, vol. 103, no. 1, pp. 31–58. Available at <https://doi.org/10.18651/ER/1q18DohOksol>
- Forbes, Kristin, 2019. "Inflation Dynamics: Dead, Dormant, or Determined Abroad?" National Bureau of Economic Research, working paper no. 26496, November. Available at <https://doi.org/10.3386/w26496>
- Gordon, Robert J. 2006. "The Boskin Commission Report: A Retrospective One Decade Later." National Bureau of Economic Research, working paper no. 12311, June. Available at <https://doi.org/10.3386/w12311>
- Groshen, Erica L., Brian C. Moyer, Ana M. Aizcorbe, Ralph Bradley, and David M. Friedman. 2017. "How Government Statistics Adjust for Potential Biases from Quality Change and New Goods in an Age of Digital Technologies: A View from the Trenches." *Journal of Economic Perspectives*, vol. 31, no. 2, pp. 187–210. Available at <https://doi.org/10.1257/jep.31.2.187>
- Gürkaynak, Refet S., Andrew Levin, and Eric Swanson. 2010. "Does Inflation Targeting Anchor Long-Run Inflation Expectations? Evidence from the U.S., UK, and Sweden." *Journal of the European Economic Association*, vol. 8, no. 6, pp. 1208–1242. Available at <https://doi.org/10.1111/j.1542-4774.2010.tb00553.x>

- Kahn, George A., and Andrew Palmer. 2016. "Monetary Policy at the Zero Lower Bound: Revelations from the FOMC's Summary of Economic Projections." Federal Reserve Bank of Kansas City, *Economic Review*, vol. 99, no. 1, pp. 5–37.
- Powell, Jerome H. 2020a. "New Economic Challenges and the Fed's Monetary Policy Review." Speech to the Federal Reserve Bank of Kansas City Economic Policy Symposium, *Navigating the Decade Ahead: Implications for Monetary Policy* (webcast), August 27.
- . 2020b. "Post-FOMC Meeting Press Conference." Board of Governors of the Federal Reserve, Washington, DC (webcast), December 16.
- Shapiro, Adam Hale, and Daniel Wilson. 2019. "Taking the Fed at Its Word: A New Approach to Estimating Central Bank Objectives Using Text Analysis." Federal Reserve Bank of San Francisco, working paper no. 2019-02, November. Available at <https://doi.org/10.24148/wp2019-02>
- Smith, A. Lee. 2016. "How Much of the Fall in Inflation Can Be Explained by Energy and Import Prices?" Federal Reserve Bank of Kansas City, *The Macro Bulletin*, January 15.
- Volcker, Paul A. 1983. "Can We Survive Prosperity?" Remarks before the Joint Meeting of the American Economic Association and the American Finance Association, San Francisco, December 28.