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The evolution of disagreement about long-run inflation, 2007–24

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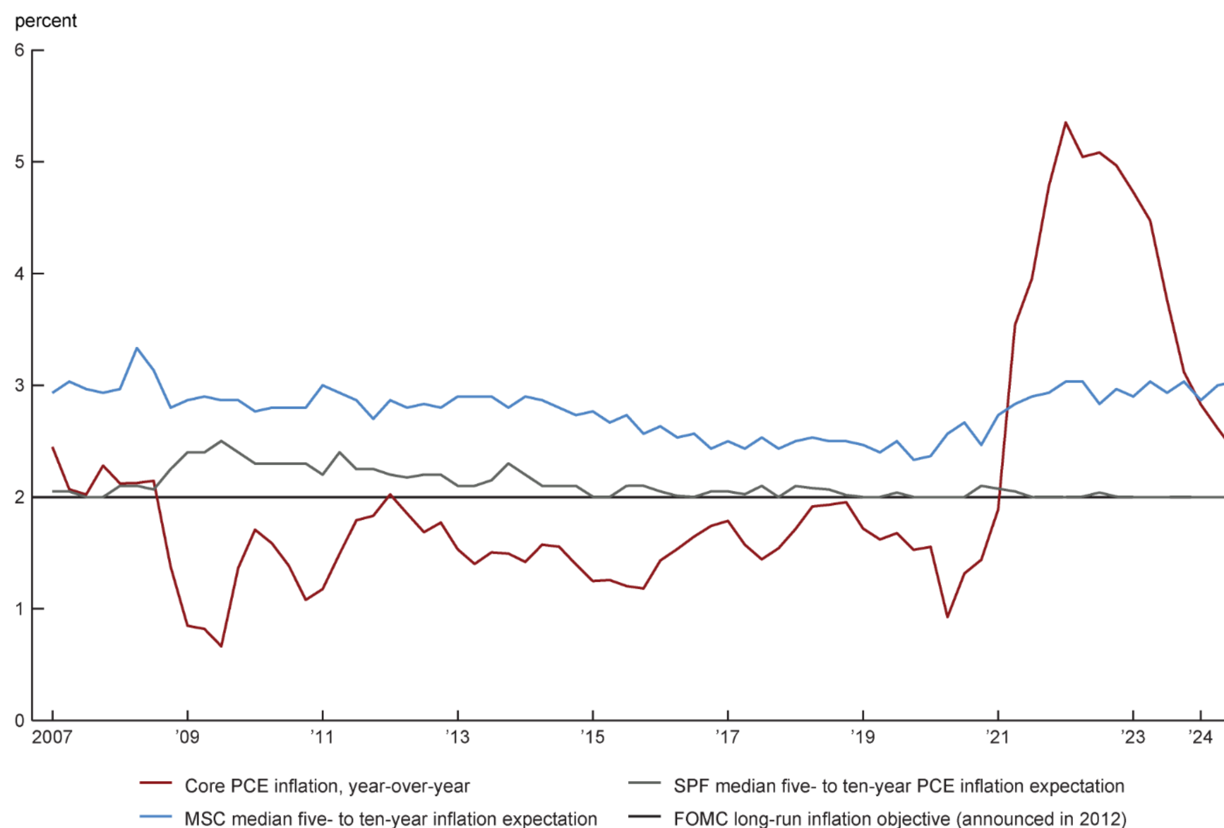
In this article, we examine disagreement about long-run U.S. inflation in two closely watched surveys over the period 2007–24.[1] This was a tumultuous period. The economy was hit by two very large shocks: the Global Financial Crisis (GFC) in 2007–08 and the Covid-19 pandemic in 2020–21. Unemployment soared from 5% to 10% over the 2008–09 period and took six years to reach pre-crisis levels. In March 2020, unemployment surged to 10% from historically low levels, but it returned to pre-pandemic levels in the second half of 2021. Inflation ran below 2% from early 2008 until early 2021, but it soared to historically high levels in 2021–23. Over the period 2007–24 there were developments in the Federal Reserve's communications about its long-run inflation objective and unprecedented policy actions. How did disagreement about long-run inflation evolve within this context?

Before beginning to answer that question, we go over why expectations for long-run inflation are so vital. Stable (or anchored) long-run inflation expectations are essential to successful monetary policy. If households, businesses, and financial market participants expect inflation to settle down where the central bank wants it to be, then they will make decisions that are consistent with this. However, if their expectations deviate from the central bank's objective, then their decisions could be incompatible with the objective and thus make it harder for the central bank to achieve success. As such, central banks pay close attention to long-run inflation expectations.

Policymakers often focus on median expectations from surveys of households, businesses, and professional forecasters. Figure 1 shows median expectations for inflation five to ten years ahead from the *Survey of Professional Forecasters* (SPF) and the University of Michigan *Surveys of Consumers* (MSC) alongside year-over-year core inflation according to the Price Index for Personal Consumption Expenditures (PCE) at a quarterly frequency from 2007:Q1 through 2024:Q3.[2] The SPF specifically asks about expectations for PCE inflation, while the MSC is not specific when it asks about inflation expectations. Since the SPF only began asking questions about long-run PCE inflation in 2007, we begin our study in that year.

Figure 1 shows that from 2009 through 2019, core PCE inflation ran persistently below 2%—the Fed's long-run inflation objective announced in 2012. Yet median expectations in the SPF remained at or above 2% throughout this period.[3] These expectations peaked at 2.5% in the aftermath of the GFC and Great Recession and fell gradually to 2% or close to 2% in 2015. During the pandemic, core PCE inflation surged to over 5%, yet median SPF expectations remained very close to 2%. Median MSC expectations remained stable at nearly 3% until 2014. Amid the persistently low core PCE inflation throughout the

1. Core PCE inflation and long-run inflation expectations, 2007:Q1–2024:Q3



Notes: Core PCE inflation stands for inflation according to the Price Index for Personal Consumption Expenditures excluding the volatile food and energy components. FOMC stands for the Federal Open Market Committee—the Federal Reserve's policymaking arm. The MSC reports the median (and mean) of the five- to ten-year inflation expectations of its respondents on a monthly basis; we calculate the mean of the reported monthly median values for each quarter and plot those within this figure.

Sources: U.S. Bureau of Economic Analysis and Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters* (SPF), from Haver Analytics; and authors' calculations based on data from the University of Michigan, *Surveys of Consumers* (MSC), from Haver Analytics.

2010s, median MSC expectations fell gradually to around 2.5% just before the pandemic. During the period of surging inflation that started in 2021, these expectations rose back to 3% and stabilized near that level from then to the present.

The medians mask considerable heterogeneity in the inflation forecasts of survey respondents and such heterogeneity, often called *disagreement,* can be informative for policymakers. For example, the median could be at the Fed's 2% inflation objective from one period to the next, but forecasts in the upper half of the distribution could become more dispersed. This might indicate that some people in the economy are losing confidence in the Fed's will or ability to achieve its objective and thus could be a warning sign that inflation expectations are becoming unanchored.

There is always disagreement about inflation expectations, but in a stable economic environment, expectations for long-run inflation should not change very much and so disagreement about it should be stable as well. Yet the economy faces shocks, and the Fed makes and communicates policy in response to those shocks. Both shocks and the Fed's responses to shocks could affect respondents' perceptions about inflation in heterogeneous ways and change the pattern of disagreement. Additionally, at times the central bank may have difficulty communicating its objectives or individuals may have varying degrees of trust in the credibility of the Fed. These factors could also change the pattern of disagreement.

Disagreement about long-run inflation, 2007–12

Figures 2 and 3 display histograms of disagreement about long-run inflation by year using the SPF and MSC respondent-level data.[4] In both cases we pool observations above and below the thresholds indicated in the figures in the highest and lowest bins. We refer to observations in these bins as outliers. The SPF responses are plotted in 20 basis point bins. The MSC responses are reported as integers, so responses are plotted in percentage point bins.[5] Finally, the circles in each figure indicate the annual averages of as-reported medians from the quarterly SPF and monthly MSC (see note 2).[6]

The Federal Open Market Committee (FOMC)—the Federal Reserve's policymaking arm—communicates with the public in many ways, including through post-meeting statements, speeches, congressional testimony, and statements about long-run objectives.[7] There is evidence that households generally do not pay much attention to the Fed.[8] This suggests forecasts of long-run inflation in the MSC are most likely driven by personal experience.[9] The SPF respondents include analysts at Wall Street financial firms, banks, and economic consulting groups, as well as forecasters at large corporations; these respondents are far more likely to pay attention to the Fed.

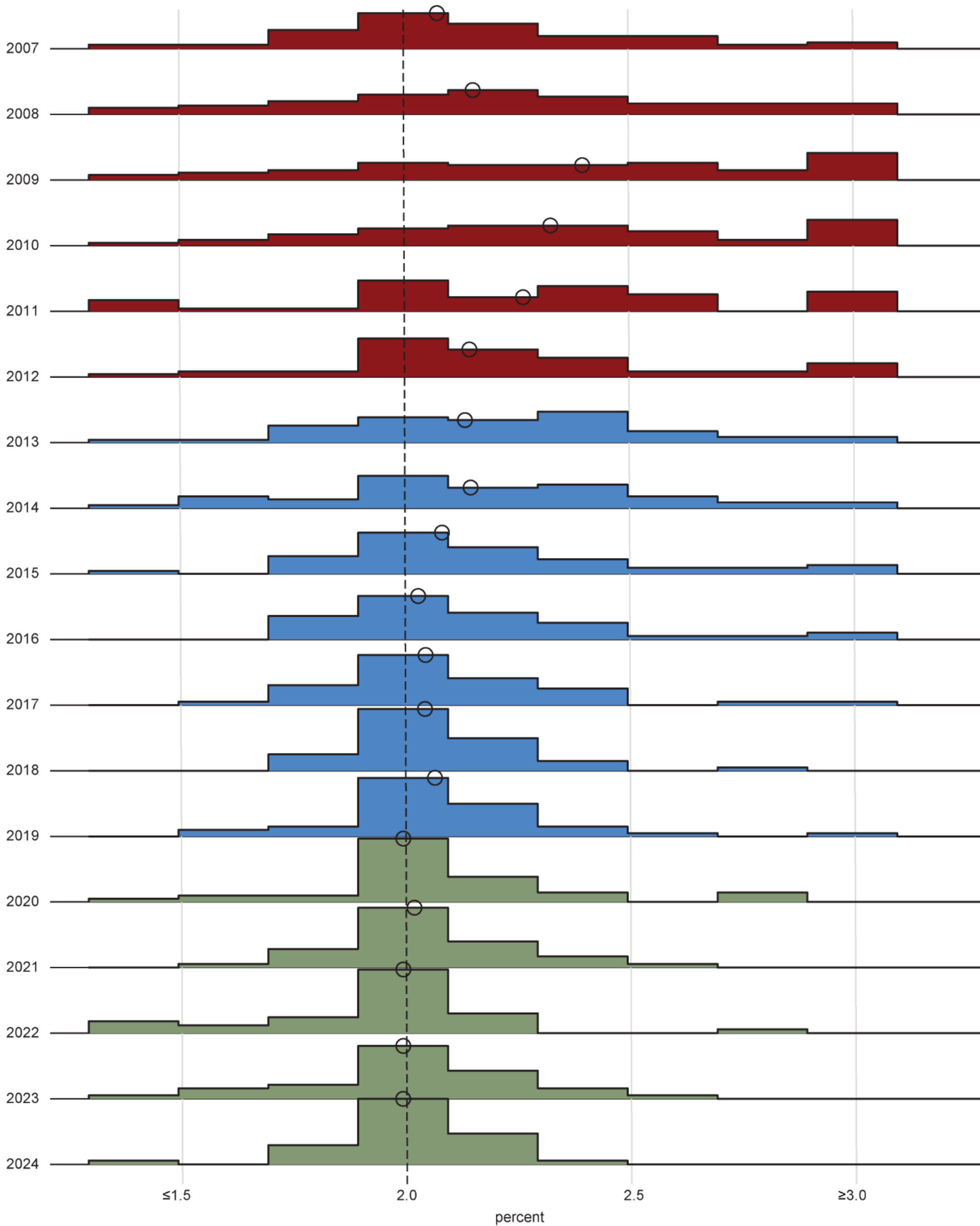
Developments in the Fed's communications about its policies and long-run inflation objective as well as its policy actions may have influenced disagreement over our sample. The FOMC was silent on its long-term inflation objective for a very long time, but it did seem to reach a consensus that the goal should be 2% at its July meeting in 1996. However, this consensus was kept private until the transcript of that July 1996 meeting was released in 2002.[10]

The first timely indication of the Fed's long-run inflation objective came with the introduction of long-run projections of PCE inflation by FOMC participants in the April 2009 Summary of Economic Projections (SEP).[11] The central tendency (range of projections that excludes the three lowest and three highest) ranged from 1.7% to 2.0%. In December 2008, the Fed cut the federal funds rate (FFR)[12] to near zero as the economy had plunged into a deep recession. During the long recovery and an extended period of low inflation, the Fed kept the FFR near zero, introduced relatively explicit guidance about the likely path of the FFR, and made an unprecedented series of large-scale asset purchases (LSAPs), all of which were designed to foster the recovery and maintain anchored long-run inflation expectations.[13]

The Fed set a formal goal of 2% in January 2012, when it released its first "Statement on longer-run goals and monetary policy strategy." This policy framework statement made clear that communicating a specific goal was intended to help keep longer-term inflation expectations firmly anchored at 2%. The goal was affirmed in similar statements released each January afterward through 2019.[14]

As figure 2 shows, there were notable changes in disagreement in the SPF before the 2% objective was announced in January 2012. The SPF forecasts became increasingly dispersed, more skewed to the upside, and the share of high outliers increased.[15] The change in the share of high outliers is particularly notable as it rises from roughly 3.5% in 2007 and 2008 to 18% or more in 2009 and 2010. It's still above 10% in 2011 and 2012. (The share of low outliers changes by much less, except in 2011 when it rises to over 9%.) The large share of outliers is the primary reason the median forecast increased to its highest levels in 2009–11.[16] Through 2012, disagreement in the MSC was relatively stable, apart from an uptick in responses that were less than zero in 2008, as figure 3 shows.

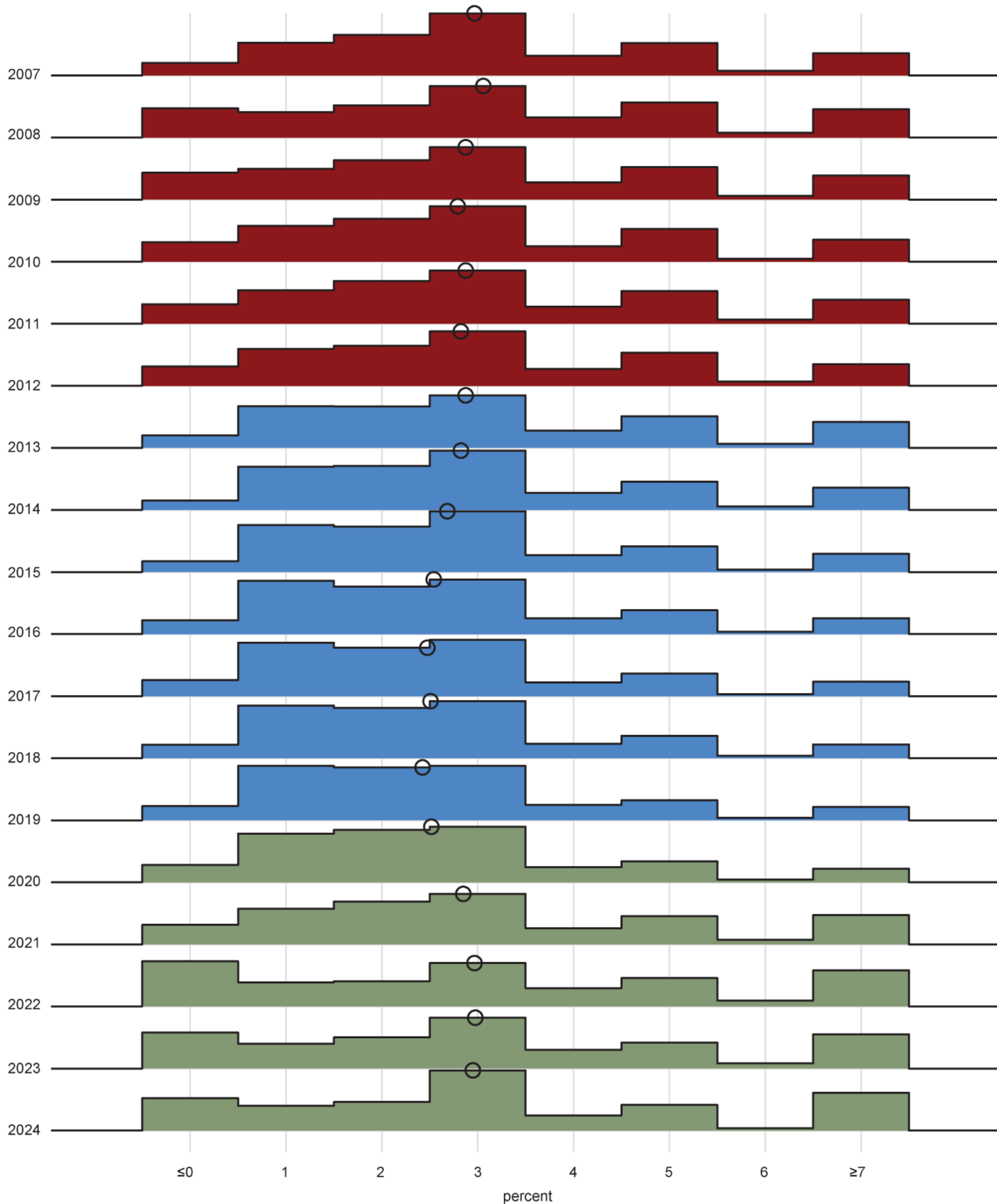
2. Distribution of SPF five- to ten-year PCE inflation expectations, 2007–24



Notes: PCE inflation stands for inflation according to the Price Index for Personal Consumption Expenditures. The histograms display the distribution of the forecasters' average SPF response within a year in 20 basis point intervals for the indicated years. All histograms have the same scale with the maximum value equal to the frequency of the mode (i.e., the bin with largest share) in 2024 (53.1%). The circles represent the annual averages of as-reported medians. Responses below 1.5% are plotted with responses of 1.5% and responses above 3% are plotted with responses of 3%. The histograms are colored by subsample (2007–12, 2013–19, and 2020–24); each subsample is discussed in the text.

Source: Authors' calculations based on data from the Federal Reserve Bank of Philadelphia, *Survey of Professional Forecasters* (SPF).

3. Distribution of MSC five- to ten-year inflation expectations, 2007–24



Notes: The histograms display the distribution of the respondents' average MSC response within a year in percentage point intervals for the indicated years. All histograms have the same scale with the maximum value equal to the frequency of the mode (i.e., the bin with largest share) in 2024 (26.5%). The MSC reports individual responses as integers and only reports mean and medians at the monthly level. The circles represent the annual averages of as-reported medians. Responses below 0% are plotted with responses of 0% and responses above 7% are plotted with responses of 7%. The histograms are colored by subsample (2007–12, 2013–19, and 2020–24); each subsample is discussed in the text.

Source: Authors' calculations based on public microdata from the University of Michigan, *Surveys of Consumers* (MSC).

Disagreement about long-run inflation, 2013–19

Beginning with the September 2012 FOMC meeting, the post-meeting statements included references to the 2% goal. These references appear in virtually all the statements afterward. An important change was made to the policy framework statement in January 2016: 2% was clarified to be a "symmetric" goal. The intent was to clarify that the Fed would be equally concerned if inflation were running persistently above or below its objective. That is, the 2% goal was not to be interpreted as either a floor or a ceiling. With core PCE inflation running persistently below the 2% goal, the March 2017 statement explicitly referred to 2% as a "symmetric inflation goal." This phrase appears in subsequent statements through July 2020.

Following the introduction of the formal inflation objective and the subsequent clarifications, the distribution of disagreement in the SPF gradually coalesced to around 2%. Apart from 2013, the mode (i.e., the bin with largest share) was 2%, with the share of responses of 2% rising to nearly 50% from 2017 through 2019 (see figure 2). The distribution remained skewed to the upside, yet the share of low and high outliers diminished substantially—in some years to zero. In the MSC the mode remained at 3% and the distribution was roughly stable from 2013 through 2019 (see figure 3). Interestingly, the share of outliers fell dramatically from before the formal inflation objective had been set. During the 2013–19 period, the shares of responses of 1% or 2% were nearly as high as the share of responses of 3%. This may reflect households' experience of persistently low inflation.

Disagreement about long-run inflation, 2020–24

In August 2020 the Fed released a substantial revision to its policy framework statement. The monetary policy strategy outlined is often referred to as flexible average inflation targeting, or FAIT.[17] Subsequent speeches by Fed officials indicated that this strategy was meant to address that the zero lower bound (ZLB) on the FFR imparts a downward bias to inflation and inflation expectations.[18] FAIT involves the Fed tolerating above 2% inflation for some time after periods in which it is persistently below 2%. Subsequent post-meeting statements from the FOMC included language to reinforce this strategy.[19]

The Fed cut the FFR to zero at the beginning of the pandemic and gave guidance that it would stay there until the labor market and inflation were on track to reach their mandated goals. The FFR was not raised until March 2022. The Fed also embarked on another round of LSAPs in 2020. This was during a period of sub-2% inflation. As inflation surged in 2021 (eventually reaching a near-historic high in June 2022), the Fed initially stated it believed the high inflation was transitory. When the high inflation turned out to be more persistent, the Fed started signaling a tightening of policy. LSAPs were stopped in March 2022, and then that same month the Fed embarked on an unusually rapid pace of rate increases culminating in rates not seen since before the GFC.

With inflation near its peak in June 2022, the FOMC added to its post-meeting statements the following sentence: "The Committee is strongly committed to returning inflation to its 2 percent objective." The commitment of the Fed to return inflation to its objective was reinforced when Chair Jerome Powell gave an unusually brief speech at the annual Jackson Hole, WY, conference hosted by the Kansas City Fed in late August 2022; that speech focused squarely on the Fed's commitment to bring inflation back to 2% even if it meant inflicting "pain."

In 2020, with LSAPs in motion, disagreement in the SPF barely budged. Apart from 2022, when the distribution became skewed to the *downside*, the distribution of expectations appeared much like the distributions in the years leading up to the pandemic. Not only had the median stuck near 2%, disagreement was also largely unchanged by the rapid rise in inflation. In this sense long-run expectations were firmly anchored.

The pattern of disagreement in the MSC over the period 2020–24 is very different from that of previous periods. In 2020 disagreement was much like that in 2019. But afterward, while the median returned to 3% in figure 3, outliers became much more prevalent. While more high outliers might be expected, *low* outliers (observations at zero or below) doubled and tripled from pre-pandemic levels.[20] This seems much less like firmly anchored expectations.

Conclusion

Long-run inflation expectations as measured by medians from the SPF and MSC have been relatively stable since 2007 and largely consistent with the Fed's 2% long-run inflation goal. Disagreement about long-run PCE inflation in the SPF began to decline slowly after the Fed's 2% goal was announced in 2012. Such disagreement has remained remarkably stable despite the relatively high inflation in 2021–23. Disagreement about long-run inflation in the MSC over the period 2007–12 was largely stable. While skewed to the downside more than before, disagreement about long-run inflation was largely stable from 2013 up until the pandemic. While the median in the MSC was stable at around 3% from the pandemic onward, both high and low outliers became much more prevalent.

Notes

[1] There is a very large literature that studies forecast disagreement (too large to review here). Most of this literature focuses on short-run expectations. Glick and Kouchekinia (2021) is a recent study of disagreement about long-run expectations.

[2] The Federal Reserve's 2% long-run inflation objective is stated in terms of the annual change in the price index for total PCE (further details are available online). In figure 1, we plot core PCE inflation, which excludes the volatile food and energy components, as it provides a better indication of underlying inflation trends. Our most recent data point for inflation expectations is in August 2024. The SPF is released quarterly, while the MSC is released monthly. The quarterly median inflation expectations value for the MSC is the mean of the monthly median values in a quarter.

[3] Fisher, Melosi, and Rast (2024) use a model of individual forecaster behavior and panel data from the SPF to study the stability of mean long-run inflation expectations in the face of persistently low inflation.

[4] The SPF is a quarterly panel—which means individual respondents are tracked quarter by quarter—and the MSC is (for the most part) a monthly repeated cross section. Long-term expectations generally do not change within a year for any given SPF forecaster. To avoid counting these observations multiple times, we average them by year. The MSC is mostly a repeated cross section. In a limited number of cases, individuals are tracked twice or thrice in intervals of six months. We average these observations within a year. The MSC prompts respondents with responses above 5% to clarify whether their response reflects an annual rate or the cumulative price inflation over the next five to ten years and corrects responses to annual rates.

[5] Mankiw, Reis, and Wolfers (2003) study histograms of short-run expectations from the SPF and MSC.

[6] The MSC is a much larger survey than the SPF. The number of observations by year in our sample averages about 4,500 for the MSC. The corresponding number for the SPF has declined steadily over our sample from 59 to 30.

[7] Coibion, Gorodnichenko, and Weber (2022) use a randomized controlled trial to examine how different kinds of Fed communications might influence household inflation expectations and conclude that there may be better ways for the Fed to communicate.

[8] For example, Coibion et al. (2023) and Lamla and Vinogradov (2019).

[9] Conrad, Enders, and Glas (2022) provide some evidence on the role of personal experience in household expectations formation. Braggion et al. (2024) provide evidence that personal experience appears to have very long-lasting effects on beliefs.

[10] See Wells (2024) for a discussion of this meeting and the emergence of the 2% inflation consensus.

[11] The SEP was first released as an addendum to the minutes of the October 2007 FOMC meeting, and it is now released quarterly after the March, June, September, and December FOMC meetings. The SEP includes FOMC participants' projections based on their own views about appropriate monetary policy. Longer-run projections represent participants' assessments of the value to which a variable would be expected to converge under appropriate monetary policy and in the absence of further shocks to the economy. The April 2009 SEP is the first to include projections for long-run PCE inflation; however, it includes values from the January 2009 SEP that were not released with the January projections.

[12] The FFR is the FOMC's main policy tool. The FFR is the interest rate at which depository institutions lend reserve balances to other depository institutions overnight. Changes in the FFR trigger changes in other short- and medium-term interest rates, the foreign exchange value of the U.S. dollar, and other asset prices that influence households' and businesses' spending and investment decisions.

[13] In figure A1 of the appendix, we display the FFR, the Fed's balance sheet assets, and notable changes in forward guidance about the path of the FFR over the sample period.

[14] In figure A2 of the appendix, we list key milestones in the Fed's communications about its long-term goal for inflation.

[15] In figures A3 and A4 of the appendix, we display the share of (low and high) outliers, along with the standard deviation, skewness, and kurtosis, associated with each histogram (of figures 2 and 3, respectively).

[16] The increasing share of large outliers may have been driven by the Fed's large-scale asset purchases at the time, which increased the quantity of bank reserves dramatically. For example, some respondents might have believed in the "quantity theory of money," which states that, all else being equal, rapid growth in the money supply (which includes reserves) leads to rapid inflation.

[17] This terminology is *not* used in the policy framework statement, although it was used in Fed Chair Jerome Powell's Jackson Hole speech given on August 27, 2020—the same day the substantially revised statement became effective.

[18] Two such speeches were by former Chicago Fed President Charles Evans and former Cleveland Fed President Loretta Mester.

[19] Specifically, from September 2020 through November 2021, when inflation had been running below target for some time, the FOMC's post-meeting statements included the following sentence: "The Committee will aim to achieve inflation moderately above 2 percent for some time so that inflation averages 2 percent over time and longer-term inflation expectations remain well anchored at 2 percent." The policy framework statement is silent on what happens when inflation is above 2% for some time.

[20] The tendency for the share of extreme values to increase in times of high inflation is discussed in a technical note published by the University of Michigan on July 12, 2024. Armantier et al. (2023) analyze how the share of respondents in the New York Fed's *Survey of Consumer Expectations* expecting deflation up to three years ahead increased sizably during the recent period of surging inflation.

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