Effective dialogue and well anchored inflation expectations: essential tools for navigating challenging times

John C. Williams

Abstract

Recent experience has underscored the essential roles that dialogue among central banks and well anchored inflation expectations can play in helping central banks navigate difficult policy challenges. Sharing perspectives with their counterparts helps central bankers better discern, anticipate and respond to shifting crosscurrents in the global economy, while well anchored inflation expectations help limit the effects of shocks on inflation and the economy. Using measures of the sensitivity, level and uncertainty surrounding longer-term inflation expectations, it is shown that, for the United States, the recent news is mostly encouraging – measures of longer-run inflation expectations have remained remarkably stable in recent years at levels broadly consistent with the FOMC's longer-run goal, notwithstanding the recent upsurge in inflation.

Introduction

It is a pleasure to contribute to this volume in honour of the first two decades of the BIS Representative Office for the Americas, and the vital work that the Office performs on behalf of central banks in the Americas. For readers who may not be familiar, the Americas Office provides a forum for discussion and cooperation among central bankers from the region. This starts from the top, with regular meetings of the Consultative Council for the Americas, or CCA, which comprises the central bank governors of eight of the largest economies in the Americas, along with the BIS General Manager and the BIS Chief Representative for the Americas. The Office also facilitates collaboration among senior central bank staff, through supporting consultative groups and collaborative research efforts that span the full range of functions of those eight central banks. And its dealing room, inaugurated in 2020, has quickly established itself as a valued service provider to central banks throughout the region.

I had the pleasure to serve as chair of the CCA from 2020 through 2022. This was a period of great challenges for the central banks of the region, as economies, financial systems and societies struggled with the multifaceted dislocations triggered by the Covid-19 pandemic, and later the spillovers to global markets from Russia's invasion of Ukraine in early 2022. On the policy side, the period was marked by both great innovation and vigorous efforts to reinforce the fundamentals of our policy frameworks for achieving our core missions as central banks.

Against this backdrop, I would like to offer some reflections on two topics that have been top of mind in recent years: the value of engagement among central banks,

especially in times of heightened uncertainty; and the critical importance of anchoring inflation expectations and how we can assess whether central banks are succeeding, especially now, following the large inflationary shocks across the globe in recent years. I would note that the views I offer are my own, and do not necessarily reflect those of the Federal Open Market Committee (FOMC) or anyone else in the Federal Reserve System.

Dialogue among central banks

Central bankers have long understood the value of engaging with colleagues around the world regarding the challenges we face in our respective countries. We as central bankers have many of the same goals, including price stability, vibrant economies and financial stability. And many of the issues we face are not unique to any one of us, but rather share similarities. Moreover, key challenges are often interconnected and common across regions and the globe.

Effective policy requires timely and appropriate action. But it is also vitally important that we clearly communicate our policy strategies and reasoning for our actions as we carry out our mandates. Clear communication reduces the risk of confusion, volatility and spillovers, and helps others prepare for challenges that may lie ahead. This is as true of our communications with fellow central bankers as with the public.

Indeed, experience provides many examples where clear, forceful and credible communications have succeeded in calming unsettled markets, at times even long before announced actions were implemented. For example, at the onset of the pandemic, the breadth and scale of the policy actions announced by the Federal Reserve, with the support of the Treasury Department, favourably impacted US and global markets almost immediately, even though some of these new measures would clearly take some months to implement.

Of course, effective communication is not the same thing as coordination. Each country faces its own set of circumstances, and each central bank is charged with fulfilling its own domestic mandate. But the policies that we each implement can affect our neighbours, and developments outside our borders can impact our ability to achieve our domestic goals. So, for each of us, understanding the challenges our neighbours are facing, and their strategies for addressing them, can be very helpful in plotting our own courses through sometimes quite difficult waters.

That has been particularly true in recent years, as we confronted a unique set of challenges with both global and local dimensions. When the pandemic hit in 2020, a first order of business for many central banks – including the Federal Reserve – was to put in place highly accommodative policies to address the sudden stops in economic and financial activity caused by the health crisis. Using the various tools available to them, central banks lowered borrowing rates and provided liquidity to ensure orderly market functioning and to support the flow of credit to businesses and consumers.

And then, as our economies gained firmer footings, we moved to dial back these accommodative policies, and then to tighten policy to address stronger-than-expected inflation. But at each step of the way, the challenges we faced had important dimensions that extended outside our borders, reflecting disruptions to production and supply chains and markets at both the local and global levels, later exacerbated

by the disruptions to commodity supplies due to the war in Ukraine. Understanding the perceptions and actions being taken by other central banks mattered more than ever.

In this context, the BIS provides indispensable venues for sharing insights, analyses and concerns. The CCA has presented a particularly apt example in recent years. The novel, complex but in many ways similar challenges faced by all central banks in the Americas gave us much to discuss. And discuss we did, meeting much more frequently at all levels in recent years. Our dialogue had benefits both in the moment, to hear how our policies and other factors were affecting economies in the region, and in building the shared understanding and trust that provides a valued asset for the future. Moreover, facilitated by the BIS Americas Office, we have also jointly met with members of the private sector, including bank CEOs and chief economists covering the region, to benefit from their perspectives on the region's economies and financial systems. It has proven insightful for all of us to hear from leaders beyond our own organisations, and the borders of our countries.

While effective dialogue with peers has proven very helpful to central bankers in charting their respective policy courses, well anchored inflation expectations play a crucial role in helping economies get back on course in the face of unexpected shocks, a topic I turn to now.

Anchoring inflation expectations

The critical importance of anchoring inflation expectations in line with central bank objectives is now enshrined as a bedrock principle of modern central banking. When inflation expectations are well anchored, inflation processes tend to be mean-reverting, as firms, workers, consumers and investors see shocks to prices and overall inflation as likely to be idiosyncratic and temporary, and they behave accordingly. Having well anchored inflation expectations thus makes it easier to maintain inflation close to desired levels. Well anchored expectations also provide more scope for central banks to stabilise output and employment, in a complementary manner to their price stability goals, by stimulating activity when the economy is running at a below-potential pace which would tend to bring inflation below target, and tightening when it is running at an above-potential pace that could lead to above-target inflation.

But anchoring inflation expectations requires sustained and consistent policy action, and keeping expectations well anchored is hardly something that central banks can take for granted. In the decades before the pandemic, central banks in the advanced economies and many emerging market economies made great strides in anchoring inflation expectations, coming out of earlier periods of unacceptably high inflation. This progress invariably required sustained monetary restraint to bring inflation to targeted levels and credibly keep it there. And for many emerging market economies, or EMEs, the process also involved shifts toward greater exchange rate flexibility, and away from using the exchange rate as the primary nominal anchor.

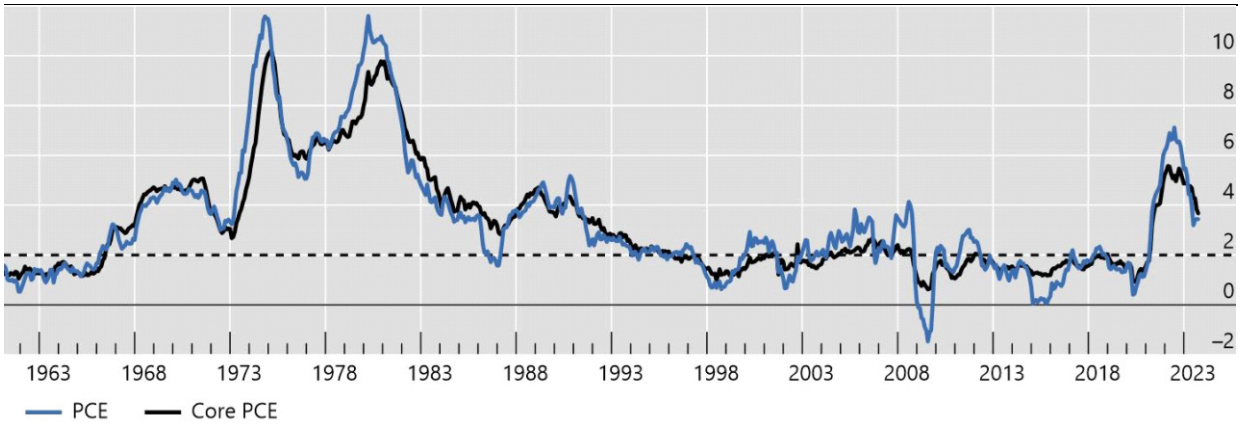
The process of anchoring inflation in line with central bank objectives was aided in many cases by explicit commitments to a longer-run inflation goal. In some cases, such inflation targets were declared early in the disinflation process, well before the targets were achieved. And there is some evidence that declaring a goal early on was

helpful to those economies in the disinflation process, although it did not obviate the need for a period of sustained restraint.

In other cases, a formal target for inflation came later, after substantial progress toward price stability had already been made. In the United States in the 1980s, monetary policy focused on bringing inflation down from unusually elevated levels, but without officially indicating a target level for inflation. By the early 1990s, the United States had largely succeeded, with 12-month core PCE inflation in the subsequent two decades fluctuating in a relatively narrow range, in the vicinity of 2%. In January 2012, the FOMC took an additional step by issuing its Statement on Longer-Run Goals and Monetary Policy Strategy. The statement explicitly set a 2% longer-run inflation goal, as measured by the 12-month change in the PCE price index, and it declared that: "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."[1]

12 – month inflation[1]

In per cent — Graph 1



[1] 12 month changes in the Personal Consumption Expenditures Price Index, and the Personal Consumption Expenditure Price Index, excluding food and energy.

Source: Breau of Economic Analysis; Haver.

The 2% longer-run goal and the importance of well anchored inflation expectations were reaffirmed in the FOMC's updated Goals and Strategy statement released in 2020. The 2020 statement also took note of increased downward risks to inflation associated with the proximity of equilibrium interest rates to the effective lower bound. Indeed, inflation averaged 1.5% in the decade preceding the onset of the pandemic, well below the FOMC's 2% longer-run goal, as can be seen in Graph 1. The updated document stated that "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."[2]

[1] Board of Governors of the Federal Reserve System (2012).

[2] Board of Governors of the Federal Reserve System (2020).

But while persistently low inflation was a top-of-mind risk in the United States for much of the previous decade, the current decade has brought the opposite challenge: the pandemic and other global shocks contributed to inflation that rose to well above the Federal Reserve's 2% target. Between end-2020 and mid-2022, 12-month inflation in the United States accelerated from a pace of 1.4% to a peak of 7.1%, as measured by the personal consumption expenditures (PCE) price index. The 12-month consumer price index (CPI) inflation rate rose even more dramatically, peaking at over 9%. A significant portion of these sharp increases reflected global increases in food and energy prices, aggravated by the effects of the pandemic and the war in Ukraine. But core inflation, which strips out volatile food and energy prices, also rose significantly, peaking at 5.6% for the PCE index.

In response, the Federal Reserve raised its main policy rate significantly and at a pace not seen in decades, moved to reduce its asset holdings, which it had increased considerably between 2020 and early 2022 when the policy rate was constrained by its effective lower bound, and signalled its resolve to maintain a restrictive stance to bring inflation down to target over time. Encouragingly, the inflation trajectory has turned, with headline 12-month PCE inflation having fallen by more than half from its peak to a still elevated 3.4% as of September 2023. The Federal Reserve has continued to signal its strong commitment to return inflation to target.

Given the inflationary upsurge, it is reasonable to ask to what degree inflation expectations have remained well anchored. To answer that question, we need to be clear about what is meant concretely by well anchored expectations, and how would we know if they are well anchored. In a speech delivered last year,[3] I suggested three criteria for well anchored inflation expectations, based on economic theory.[4] These criteria relate to the "sensitivity," "level" and "uncertainty" around long-run inflation. Let me summarise each of the criteria briefly, before reviewing the available evidence for the United States.

- The sensitivity criterion states that although near- and medium-term inflation expectations may respond to economic shocks, expectations of inflation far in the future should not.
- The level criterion applies the more stringent standard that the level of long-run inflation expectations should be consistent with the central bank's long-run inflation target.
- And the third criterion – the uncertainty criterion – requires that uncertainty about future inflation should increase less than linearly with the forecast horizon.

Applying theory to the real world

This current episode represents a unique opportunity to empirically assess the three criteria for well anchored expectations during a period of high and volatile realised inflation.[5] For the United States, there are several relevant surveys and measures of

[3] Williams (2022).

[4] See Orphanides and Williams (2004, 2005, and 2007). There is a large theoretical and empirical literature on the formation of expectations. See, for example, Evans and Honkapohja (2001), Malmendier and Nagel (2016), Coiboin et al (2022), and references therein.

[5] As discussed in Levin and Taylor (2013), data on longer-run inflation expectations were spotty in past periods of high inflation. This situation has improved markedly over the past 20 years, first with the

inflation expectations which can be used for such analysis. Each has its own strengths and limitations. For example, some surveys focus on the views of professional forecasters, others on firms in the financial industry and/or the broader business sector, and still others on the views of representative samples of households. These surveys also differ in scope and methodology, including with respect to the time frames they inquire about, and in the measures of uncertainty they can provide.

In addition to surveys, market-based measures of inflation compensation derived from inflation-indexed securities and inflation swaps provide useful and relevant information. However, the level and dynamics of derived inflation compensation reflect not just levels and shifts in expected inflation, but also various market and liquidity risk premia, which can vary over time.

In the discussion below, I concentrate on four main sources of survey information: the Survey of Professional Forecasters (SPF), run quarterly by the Federal Reserve Bank of Philadelphia since 1990 and earlier by the American Statistical Association and National Bureau of Economic Research; the Federal Reserve Bank of New York's (FRBNY) Surveys of Primary Dealers and Market Participants (Policy Survey), taken ahead of each FOMC meeting, which capture the views of economic and financial professionals; and the University of Michigan Surveys of Consumers (Michigan Survey) and the FRBNY's Survey of Consumer Expectations (SCE), which each seek to measure the views of a representative sample of households. For comparison, I also draw on measures of inflation compensation derived from financial instruments as proxy measures of the level and dynamics of market-implied inflation expectations.

In moving from theory to an empirical assessment of the sensitivity and level of longer-run inflation expectations, one must specify what forecast horizon corresponds to the "long run". Survey don't typically ask about inflation in the "long run," but rather the inflation rate over a specific time period. A reasonable and often used benchmark of longer-run inflation expectations is to look at inflation five or more years in the future. Such a forecast horizon is sufficiently far in the future that current business cycle dynamics and the effects of monetary policy on inflation can be expected to have played out. However, under some circumstances, this may fall short of the "long run" implied by theory. Moreover, not all available surveys for the United States measure expectations at that horizon.

The sensitivity criterion

Turning to the data, over the past year and a half, available measures of longer-run inflation expectations have been fairly insensitive to the rapid rise in inflation. Graph 2 shows the time series of these measures of longer-run inflation expectations. This includes CPI breakeven inflation rates six to 10 years in the future as implied by nominal and inflation-protected US Treasury securities; median expectations from the Survey of Professional Forecasters (SPF) for inflation measured by the PCE price index six to 10 years in the future,[6] median expectations from the Policy Survey for inflation measured by the CPI Index six to 10 years in the future; and the University of Michigan

appearance of inflation-indexed Treasury securities, and more recently with the introduction of the Survey of Consumer Expectations in 2013, and other surveys of businesses and market participants.

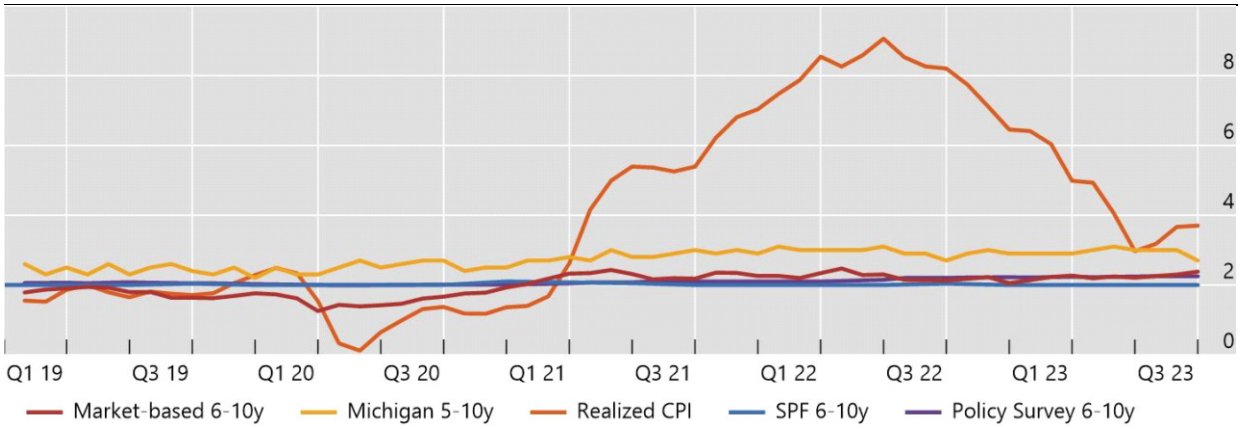
[6] This is constructed by inferring the expectations 6-10 years from matched individual responses for "the next ten years" and "the next five years," then taking the median from the sample. The Blue Chip survey, another surveys of economists and market participants, yields similar results regarding long-term inflation expectations.

survey of inflation expected during the next five to 10 years. Realised trailing 12-month CPI inflation is also shown in the figure for reference.

Longer-run inflation expectations

In per cent

Graph 2



Source: Federal Reserve Board, Federal Reserve Bank of New York, Federal Reserve Bank of Philadelphia, Haver Analytics, University of Michigan.

As seen in Graph 2, longer-run inflation expectations of SPF and Policy Survey respondents have remained remarkably stable over the past two and a half years, although there has been a slight upward drift for expectations as measured by the Policy Survey. The market-based measure and the Michigan survey rose modestly during 2021–22 and as of Q3 2023 are near the top of their historical range. Because the Michigan survey asks about inflation during the next five to 10 years, it is a mixture of short-run and longer-run expectations, which may be related to its modest sensitivity to inflation. Market-based measures include a time-varying risk premium that may explain some of their modest movements over time.[7]

In contrast to longer-run expectations, short-run and, to a lesser extent, medium-run inflation expectations responded to the sharp rise in inflation in 2021–22. The lower portion of Table 1 reports summary statistics for one-year-ahead inflation expectations from the inflations swaps market, the Michigan survey, one- and three-year-ahead expectations from the New York Fed's Survey of Consumer Expectations (SCE), and expectations for average annual CPI inflation for the next five years from the Policy Survey. As can be seen, over the past several years, one-year-ahead inflation expectations have been highly sensitive to incoming inflation during the recent period. This is consistent with past trends as well. The sensitivity of three-year-ahead inflation expectations is far less than that for one-year-ahead expectations. Median and average expectations for the average CPI inflation over the next one to five years from the Policy Survey also rose, but to a lesser degree, peaking at 2.6% late 2022, and declining to 2.4% in September 2023.

[7] Another form of relevant sensitivity analysis is the response of interest rate to economic shocks or news. As discussed in Swanson and Williams (2014), responses of yields to news can be distorted when short-term interest rates are at or near the effective lower abound.

Measures of inflation expectations

In per cent Table 1

	2014-19 mean	2014-19 90% range	2020	2021	2022	2023 Q3
Longer-run expectations						
Market-based 6-10 years	1.9	1.4–2.4	1.6	2.3	2.2	2.3
SPF 6-10 years	2.1	2.0–2.2	2.0	2.0	2.0	2.0
Policy Survey 6-10 years[1]	2.1	2.0-2.1	2.0	2.1	2.2	2.3
Michigan next 5-10 years	2.6	2.3–2.9	2.5	2.9	3.0	2.9
Short- and medium-run expectations:						
Market-based 1 year ahead	1.6	0.5-2.2	1.0	3.2	4.0	2.4
Policy Survey 1-5 years[1]	2.0	1.9-2.1	1.9	2.1	2.4	2.4
SCE 1 year ahead	2.8	2.4–3.2	2.8	4.5	6.0	3.6
SCE 3 years ahead	2.8	2.5–3.2	2.7	3.6	3.4	2.9
Michigan 1 year ahead	2.7	2.4–3.2	2.7	4.2	5.0	3.3

[1] Data from January 2015 onward.

Sources: Federal Reserve Board, Federal Reserve Bank of New York, Federal Reserve Bank of Philadelphia, Haver Analytics, University of Michigan.

The level criterion

Assessing the level criterion presents some comparability issues. Only the SPF includes a longer-run forecast of PCE price inflation that is directly comparable with the Federal Reserve's target. Other measures of longer-run inflation expectations for the United States do not correspond exactly to the PCE price index that the FOMC has stipulated for its long-run goal. This complicates a direct comparison of these measures with the FOMC's stated goal. For example, "breakeven inflation" measures are derived from inflation-indexed Treasury securities that are indexed to the CPI; these measures also include time-varying risk and term premiums in addition to expectations of inflation.[8] The Policy Survey also refers to CPI inflation, as this permits a more direct comparison with market-based measures of inflation compensation. The situation is more complex with surveys of consumers. The SCE refers to the "rate of inflation," and the Michigan survey refers to "prices in general," rather than referring to a specific price index.

To address the lack of direct comparability of different measures of inflation expectations, I compare readings over the past two years with the levels observed during 2014–19, after the FOMC's announcement of a 2% long-run goal and before the onset of the pandemic in 2020 and subsequent rising inflation in the spring of 2021. In addition, for CPI based measures, one can apply a long-term average differential between CPI and PCE based inflation, on the presumption that this differential might be expected to return to its longer-run average.

Over the two decades ending in 2019, 12-month CPI inflation was on average 0.3 percentage points higher than PCE inflation. Of course, the gap between CPI and PCE 12-month inflation at times can be much larger. Indeed, the gap widened in 2021–22

[8] There is a literature that aims to extract inflation expectations from breakeven inflation rates; see Breach et al (2022) and references therein. These measures of inflation expectations tend to be even more stable than breakeven inflation rates, including during the current episode.

to a peak level of almost 2 percentage points, but the differential narrowed again in 2023 and has averaged 0.3 percentage points year-to-date through September. Hence, to the extent that the typical relationship between PCE and CPI inflation is expected to hold in the longer run, one could interpret an expectation of 2.3% longer-run CPI inflation as being broadly consistent with the FOMC's target of 2.0% on average for PCE inflation.

The level of longer-run PCE inflation expectations in the SPF has consistently stayed very close to the FOMC's 2% goal. The other measures have generally stayed within pre-pandemic ranges, with most recent readings only slightly higher than corresponding average levels from 2014–19. The upper portion of Table 1 provides statistics on these comparisons. Interestingly, during the period of sustained low inflation before the pandemic, the market-based and Michigan measures declined, and their current levels are similar to those seen prior to that decline.

In the case of the Policy Survey, longer-run CPI inflation expectations have moderately increased, compared with the pre-pandemic period, but to a level of 2.2 to 2.3% that is arguably more consistent with the FOMC's 2% PCE target than the 2.1% longer-run CPI inflation expected over the period 2015–19.

The uncertainty criterion

Data limitations make assessment of the uncertainty criterion for well anchored inflation expectations – that uncertainty not increase linearly with the forecast horizon – more challenging. In principle, reported prices on inflation options contracts could be used to infer investors' distributions of beliefs about future inflation.[9] However, there have been virtually no trades recorded in the US market for inflation caps and floors since early 2021. Over that time, the "prices" reported for these options were based on models, not transaction prices, and cannot be used to measure investors' inflation uncertainty during the current episode.

Instead, I will turn to the FRBNY's Policy Survey and SCE. Both surveys ask respondents to assign probabilities of inflation falling in several defined ranges over specified time periods. Since early 2015, respondents to both the Survey of Primary Dealers and the Survey of Market Participants have been asked to provide expected probability distributions for average annual inflation over the next five years, and for the five years after that, ie average annual inflation six to 10 years ahead.[10] The SCE asks its panel of consumers to provide expected probability distributions for annual inflation over the next year, for the year starting 2 years ahead (three-year inflation), and since late 2021, for the year starting four years ahead (five-year inflation).

With these data, three measures of uncertainty can be computed. The dispersion of probability-weighted means from individual responses can be used to track *disagreement* across respondents about expected outcomes. Disagreement is a commonly used proxy measure for uncertainty,[11] but some have criticised it as not necessarily being reflective of true uncertainty at the level of individuals and firms. Using the probability distributions reported by respondents to the Policy Survey and SCE, individual uncertainty can be computed from measures of the breadth of their reported probability distributions. These measures can be averaged to track the evolution of *individual uncertainty* over time.

[9] As discussed in Mertens and Williams (2021).

[10] Respondents to the Survey of Primary Dealers have answered these questions over a longer horizon.

[11] Mankiw, Reis, and Wolfers (2003) and Reis (2022).

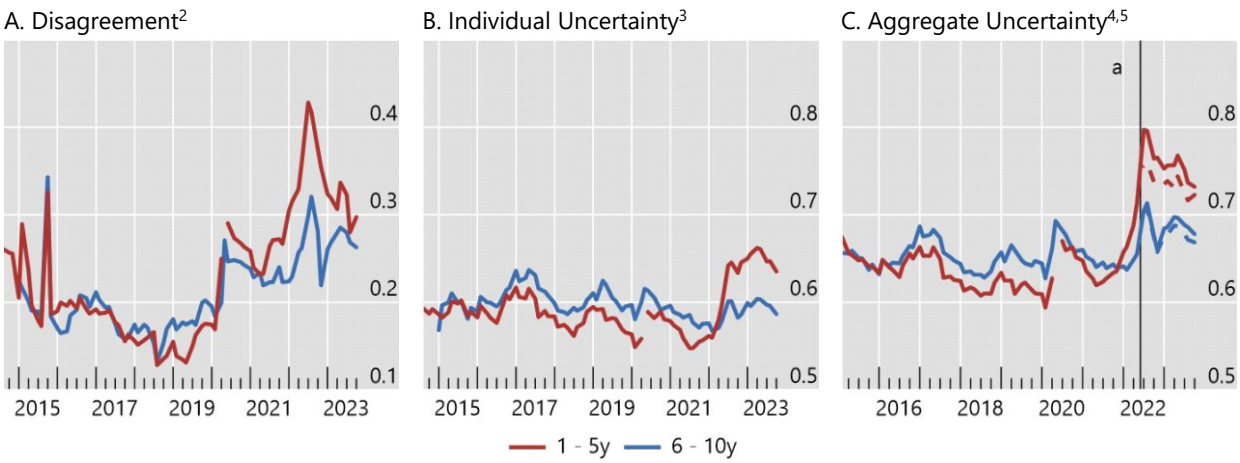
And third, we can similarly construct a measure of *aggregate uncertainty* from an aggregate probability distribution constructed by averaging across the individual probability distributions. The dispersion of this aggregate probability distribution can increase, implying higher aggregate uncertainty, because respondents become more uncertain about their individual forecasts, and/or because disagreement across respondents increases. The available evidence suggests both factors have been at work in recent years in both surveys, especially with respect to nearer-term horizons.

Panels A, B, and C in Graph 3 illustrate the evolution of these measures over time for Policy Survey respondents with respect to expectations for average annual inflation one to five years ahead and six to 10 years ahead. Several features stand out. One is that disagreement among these respondents, shown in Panel A, is quite low in absolute terms and compared with respondents' own average uncertainty (Panel B). However, with the onset of the pandemic and then the 2021–22 inflation upsurge, disagreement rose notably, peaking at nearly twice the pre-pandemic level at the one-to five-year horizon in mid-2022, and has begun to decline somewhat at that horizon as inflation has begun to recede.

Measures of market participants short-to-intermediate and longer-term inflation uncertainty[1]

In per cent

Graph 3



[a] June 2022

[1] The 1-5y inflation question was omitted from the April 2020 survey, creating a series break. [2] Measured as the standard deviation of the distribution of respondent inflation density means. [3] Sample average; individual uncertainty is measured as the standard deviation of a respondent's inflation density forecast. [4] Measured as the standard deviation of the respondents' aggregate inflation density forecast. The aggregate density forecast is constructed from the average across respondents of the individual density forecasts. [5] The questionnaire was modified in June 2022 to increase the number of probability categories. Dashed lines show for illustrative purposes measures using unchanged probability categories from June 2022 onward.

Source: Federal Reserve Bank of New York Surveys of Primary Dealers and Market Participants.

Another notable feature is that while average individual uncertainty ticked up at the one- to five-year horizon, it has remained range bound at the longer six- to 10-year horizon. Reflecting the combination of these two sets of developments, aggregate uncertainty rose substantially following the onset of the pandemic, led by uncertainty at the nearer, one-to five-year, horizon. It is also notable that our estimates of aggregate uncertainty show some sensitivity to the number of probability buckets in the Policy Survey. In April 2022, an additional high and low bucket was added, which resulted in higher estimates of aggregate uncertainty. The

dashed lines show the slightly lower estimates that would have been obtained with the original number of buckets.

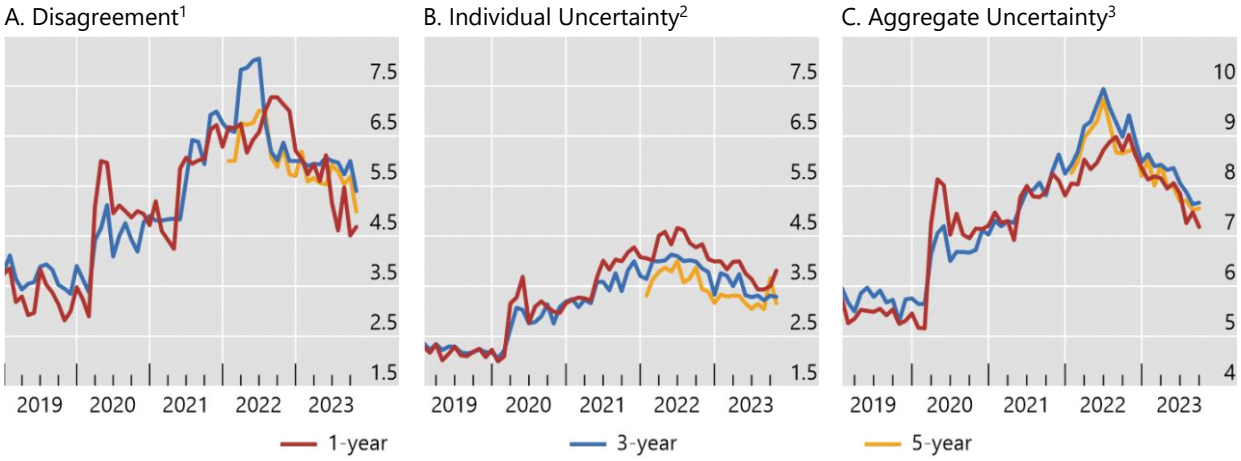
From the perspective of expectational anchoring these results are encouraging, especially the relative stability of the respondents' average uncertainty about six- to 10-year-ahead inflation. And even for the other measures, we do not find that uncertainty increases linearly with the horizon. On the contrary, measures of longer-run uncertainty remained less sensitive to the inflationary shocks of recent years than nearer-term expectations.

As shown in Panel A of Graph 4, disagreement about expected inflation among SCE respondents stepped up notably from 2019 levels following the onset of the pandemic and stayed elevated before rising further in 2021–22, when inflation surged, peaking at roughly twice the pre-pandemic 2019 level. Disagreement about one-year and three-year-ahead inflation showed broadly similar trends, although disagreement peaked somewhat higher for three-year-ahead inflation. Disagreement has largely retraced the rise in 2021–22, but not the initial rise that followed the onset of the pandemic. In recent readings, disagreement is somewhat higher for three-year ahead inflation than at the one-year horizon, somewhat similar to the situation in 2019.

What's behind this upsurge in disagreement? As discussed in research with my colleagues at the New York Fed,[12] there has been a striking increase since 2021 in the share of respondents who expect outright deflation three and five years in the future.[13] At the same time, the share expecting inflation above 4% also grew notably, but part of the increase has since reversed.

Measures of consumers' near-and longer-term inflation uncertainty

In per cent — Graph 4



[1] Measured as the difference between the 75th and 25th percentile of the distribution of respondent inflation density means. [2] Sample median; individual uncertainty is measured as the difference between the 75th and 25th percentile of a respondent's inflation density forecast. [3] Measured as the difference between the 75th and 25th percentile of the respondents' aggregate inflation density forecast. The aggregate density forecast is constructed from the average across respondents of the individual density forecasts.

Source: Federal Reserve Bank of New York Survey of Consumer Expectations.

[12] Armantier et al (May 2022, October 2023).

[13] The University Michigan survey of inflation over the next 5-10 years also showed a rise in deflation expectations in 2022.

As shown in Panel B, individual uncertainty, based on the interquartile range of each respondent's density function, also showed a two-step rise with the onset of the pandemic and then again with the upsurge in realised inflation in 2021–22. But the increase in individual uncertainty was not as pronounced as the rise in disagreement. For individual uncertainty, there is also a clear tiering by time horizon in the increases in uncertainty since early in 2021. Specifically, uncertainty about one-year inflation has been almost always higher than individual respondent uncertainty about three-year ahead inflation. And uncertainty about five-year-ahead inflation has almost always been lower than individual uncertainty about three-year inflation.

Finally, looking at aggregate uncertainty, as measured by the interquartile range from the average density function across respondents, as shown in panel C of Graph 4, several features stand out. One is that while aggregate uncertainty remains well above pre-pandemic levels, the additional upsurge in aggregate uncertainty that began in mid-2021 has largely retraced. Second, for the most part aggregate uncertainty about one-year, three-year, and five-year-ahead inflation has tracked together closely. And third, for a period between mid-2021 and mid-2022, aggregate three-year and five-year inflation uncertainty was higher than for one-year-ahead inflation, but the difference was not linearly proportional to the differences in time horizons.

Interestingly, the Policy Survey and SCE were similar in that disagreement across respondents rose more than individual uncertainty in recent years, and disagreement was the main contributor to changes in aggregate uncertainty. Also in both surveys, individual uncertainty rose more at nearer-term horizons. However, in the SCE, disagreement is a much bigger contributor to the *level* of aggregate uncertainty than for respondents to the Policy Survey.

Summing up

The recent news about the long-run anchoring of inflation expectations in the United States is mostly reassuring: available measures of longer-run inflation expectations in the United States have remained remarkably stable at levels broadly consistent with the FOMC's longer-run goal, notwithstanding the overshoot of the FOMC's inflation objectives over the last two and a half years. That said, both the SCE and the Policy Survey provide evidence of increased uncertainty about longer-run inflation. But this does not appear to be due to unmoored longer-run expectations, given that the measures do not suggest that uncertainty is increasing linearly with the forecast horizon. On the contrary, for many measures, uncertainty about longer-run inflation has increased by about the same degree or less than shorter-horizon measures.

References

Armantier, O, Boumahdi F, Kosar G, Somerville J, Topa G, Van der Klaauw W and Williams JC (2022): "What do consumers think will happen to inflation?", Federal Reserve Bank of New York, Liberty Street Economics, 26 May.

Armantier, O, Boumahdi F, Kosar G, Somerville J, Topa G, Van der Klaauw W and Williams JC (2022): "What are consumers' inflation expectations telling us today?", Federal Reserve Bank of New York, Liberty Street Economics, 14 February.

Armantier, O, Boumahdi F, Kosar G, Somerville J, Topa G, Van der Klaauw W and Williams JC (2022): "The curious case of the rise in deflation expectations", Staff Report, no 1037, October (revised).

Board of Governors of the Federal Reserve System (2012): Statement on Longer-Run Goals and Monetary Policy Strategy, 24 January.

Board of Governors of the Federal Reserve System (2020): Statement on Longer-Run Goals and Monetary Policy Strategy, 27 August.

Breach, T, S D'Amico and A Orphanides (2020): "The term structure and inflation uncertainty", *Journal of Financial Economics*, vol 138, no 2, November, pp 388–414.

Coibion, O, F D'Acunto, Y Gorodnichenko and M Weber (2022): "The subjective inflation expectations of households and firms: measurement, determinants, and implications", *Journal of Economic Perspectives*, vol 36, no 3, Summer, pp 157–84.

Evans, G and S Honkapohja (2001): *Learning and Expectations in Macroeconomics*, Princeton University Press.

Levin, A and JB Taylor (2013): "Falling behind the curve: a positive analysis of stop-start monetary policies and the great inflation", in MD Bordo and A Orphanides (eds), *The Great Inflation: The Rebirth of Modern Central Banking*, University of Chicago Press, pp 217–44.

Malmendier, U and S Nagel (2016): "Learning from inflation experiences", *The Quarterly Journal of Economics*, vol 131, no 1, February, pp 53–87.

Mankiw, G, R Reis and J Wolfers (2004): "Disagreement about inflation expectations", *NBER Macroeconomics Annual 2003*, vol 18, pp 209–70.

Mertens, T and JC Williams (2021): "What to expect from the lower bound on interest rates: evidence from derivatives prices", *American Economic Review*, vol 111, no 8, August, pp 2473–505.

Orphanides, A and JC Williams (2004): "Imperfect knowledge, inflation expectations, and monetary policy", in BS Bernanke and M Woodford (eds), *The Inflation-Targeting Debate*, University of Chicago Press, pp 201–34.

Orphanides, A and Williams JC (2005): "Inflation scares and monetary policy", *Review of Economic Dynamics,* vol 8, April, pp 498–527.

Orphanides, A and Williams JC (2007): "Inflation targeting under imperfect knowledge", in F Mishkin and K Schmidt-Hebbel (eds), *Monetary Policy under Inflation Targeting*, Central Bank of Chile, reprinted in *Federal Reserve Bank of San Francisco, Economic Review*.

Reis, R (2022): "Losing the inflation anchor", *Brookings Papers on Economics Activity*, Fall 2021 issue, pp 307–61.

Swanson, E and Williams JC (2014): "Measuring the effect of the zero lower bound on medium- and longer-term interest rates", *American Economic Review*, vol 104, no 10, October, pp 3154–85.

Williams, JC (2022): "A steady anchor in a stormy sea", remarks at the SNB-FRB-BIS High-Level Conference on Global Risk, Uncertainty, and Volatility, Zurich, Switzerland, November.