

ECONOMIC COMMENTARY

Inflation: Drivers and Dynamics 2020 CEBRA Annual Meeting Session Summary

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The Cleveland Fed's Center for Inflation Research sponsored a session on inflation dynamics at the 2020 CEBRA annual meeting. The presentations focused on inflation expectations and firms' price-setting behavior. This *Economic Commentary* summarizes the papers presented during the session.

Inflation is a complex process that is constantly evolving alongside the economy. For example, researchers and policymakers continue to view the Phillips curve—which broadly captures the relationship between inflation and economic activity—as a key building block in understanding inflation dynamics. But there is a growing consensus that economic activity has been playing a smaller role in influencing movements in inflation in recent decades, which points to other elements of the Phillips curve—such as inflation expectations—now playing a more important role in explaining inflation dynamics. As a result, researchers are focusing considerable attention on how inflation expectations are formed and how these expectations can change over time.

The Cleveland Fed's [Center for Inflation Research](#) sponsored the *Inflation: Drivers and Dynamics* session at the Central Bank Research Association's (CEBRA) 2020 annual meeting as a forum for researchers to present work at the nexus of monetary policy and inflation dynamics. Inflation expectations played a central role in this year's session. In addition, because inflation is ultimately determined by the actual pricing decisions of the businesses within an economy, the session contained a paper on businesses' price-setting behavior. This *Commentary* summarizes the papers presented at the session, which was held on September 2, 2020.

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Summaries of Presented Papers

Because inflation expectations are determined by people's beliefs, they may differ greatly across individuals and depend importantly on how people perceive the world around them. In "Inflationary and Deflationary Biases in Inflation Expectations," Michael Lamla, Damjan Pfajfar, and Lea Rendell explore how a loss of consumers' confidence in the central bank's ability to achieve its price stability objective will affect their expectations about future inflation. The model in the paper allows for heterogeneous perceptions of the effective lower bound (ELB) on nominal interest rates and the central bank's monetary policy objectives. Under this setting, households will display heterogeneous expectations that can feature inflationary biases as well as deflationary biases. Specifically, one segment of the population can lose confidence in the price stability objective of the central bank and fear that a negative shock might bring the economy to the ELB, which leads to deflationary fears (with inflation substantially below the target) because monetary policy will not be able to offset the shock. Another segment of the population, however, can lose confidence because it perceives the central bank puts too much weight on cyclical fluctuations in the economy and will provide excessive stimulus, which ultimately leads to inflationary fears (with inflation above the target).

The paper tests the implications of the model using individual-level survey data from nine countries. The survey data are unique because they include an assessment by households on the price stability objective of the central bank as well as the households' medium-run inflation expectations. Medium-run expectations are better suited to infer policy-related changes in expectations than are short-run expectations because medium-run expectations match the medium-run horizon that central banks target and they are not influenced by transitory shocks. Econometric analysis shows that both inflationary and deflationary biases exist and are sizable in the survey data: The inflationary bias is approximately 1 percentage point, while the deflationary bias is on average -0.54 percentage point. Consequently, the paper highlights the relevance of heterogeneous inflation expectations, particularly when the economy is close to the ELB, and the consequences of losing confidence in the price stability objective of central banks. These findings highlight the importance for central banks to design clear policy communications especially around the ELB.

At shorter horizons, inflation expectations may be affected by temporary events, but what determines inflation expectations over longer horizons? Carlos Carvalho, Stefano Eusepi, Emanuel Moench, and Bruce Preston explore this question in the paper "Anchored Inflation Expectations." The paper develops a theory of low-frequency movements in inflation expectations to interpret the joint dynamics of inflation and inflation expectations for the United States and other countries over the postwar period. In the model, long-run inflation expectations

are endogenous. They are driven by short-run inflation surprises in a manner that depends on recent forecasting performance and on monetary policy. This feature distinguishes the theory from existing explanations of low-frequency properties of inflation.

The paper features a New Keynesian model with a central bank that has a fixed inflation target. The key additional variable in the model is firms' beliefs about long-run inflation. Price-setters infer the long-run mean inflation rate, which in turn defines long-run expectations, from observed prices. To handle the signal extraction problem, firms use one of two different commonly used models: either a decreasing-gain algorithm or a constant-gain algorithm. The first approach is consistent with estimating a time-invariant inflation mean. Here, the gain is the inverse of the sample size, so that accumulating evidence of a stationary mean leads to declining sensitivity to new information. The second approach implies a constant and relatively high sensitivity to new information, with the geometric discounting of older data permitting a faster tracking of shifts in the inflation target. Firms select from the two approaches based on a weighted average of past observable forecast errors. Consequently, this criterion implies that large and persistent short-term forecast errors lead to an unanchoring of inflation expectations: Agents start to doubt a constant mean of inflation and switch to an estimator that places more weight on recent observations. Because firms set prices optimally based, in part, on their longer-term inflation expectations, a feedback loop then arises between inflation and inflation expectations that can amplify shocks.

The model, estimated using only inflation and short-term forecasts from professional surveys, accurately predicts observed measures of long-term inflation expectations and identifies episodes of unanchored expectations in the United States and a range of OECD countries. Specifically, the model is able to explain the sharp rise and fall of long-term US inflation expectations in the late 1970s and early 1980s and the insensitivity of inflation expectations during the Great Recession.

While the results from the previous two papers highlight the potential for central bank communications to influence longer-term expectations, much communication still focuses on managing the expectations of professional forecasters and financial markets. In "Monetary Policy Communications and Their Effects on Household Inflation Expectations," Olivier Coibion, Yuriy Gorodnichenko, and Michael Weber study the role of monetary policy communication for household inflation expectations.

Based upon the results of a large-scale customized survey fielded on the Nielsen Homescan panel with more than 20,000 respondents, the paper finds that there are many individuals who do not know the inflation objective of the Federal Reserve, with about 40 percent thinking that the Federal Reserve tries to achieve an inflation rate larger than 10 percent. Using a randomized control trial, the

paper shows that if central banks were able to reach the public, communication could be a very powerful tool to manage expectations. In an experiment conducted through the survey, households update their expectations by more than 1 percentage point when they receive simple statistics about current and future inflation. The effect on expectations was roughly the same if instead individuals in the survey were asked to read an actual Federal Open Market Committee (FOMC) statement that contained more detailed information about the conduct of monetary policy. In some cases, central banks may expect that the broad public will learn about monetary policy through the media. Yet when households were asked to read nontechnical news coverage about the most recent FOMC meeting, they revised their inflation expectations by half as much as the revision coming from the households that read the actual statement. The muted reaction to the news coverage could be due to the specific newspaper chosen for the experiment, *USA Today*, which might be perceived as less credible than other newspapers, or it could reflect a general discounting of information from the media, among many other possibilities. However, when the households were asked to rank different national newspapers in terms of credibility for news about the economy, the surveyed households ranked *USA Today* higher than the *New York Times* or the *Wall Street Journal*.

Finally, the paper studies the persistence in the causal effect of these information treatments. It finds that most of the effects dissipate after three months and then entirely disappear after six months. Taken together, the paper finds that monetary communication to households can be a powerful tool of monetary policy to the extent that central banks are able to reach households. But the paper also suggests that communications strategies cannot rely purely on traditional media to reach households. The results suggest that while simple messages are a promising way to communicate, they are also quickly forgotten, meaning that central banks need to engage in repeated communications with households to drive home their message.

Stepping away from inflation expectations, the final presentation focused on price-setting behaviors. Retail prices present economists with a paradox because they are both sticky and jumpy. That is, on the one hand, prices often remain fixed at exactly the same value for extended periods of time, even after economic conditions change. On the other hand, price changes are often large, but frequently also transitory, reversing themselves after a big decrease or increase. Remarkably, stickiness and jumpiness seem linked: Retail prices often jump back and forth between two or more points that may each recur many times at exactly the same nominal value.

In “Control Costs, Rational Inattention, and Retail Price Dynamics,” James Costain and Anton Nakov study the adjustment of regular and sales prices. The paper develops a new theory of retail price dynamics based on the assumption that precise and exact decisions are costly. Building on existing frameworks of information processing, the model allows for limited memory as well as limited information processing in the context of retail price-setting. This framework allows for jumps between multiple sticky price types, such as “regular” and “sales” prices. Besides shedding light on the economic mechanisms underlying the stickiness and jumpiness of nominal prices, as well as on the implications for monetary policy, the framework provides new computational methods for the numerical solution of models of near-rational choice. The results suggest that both limited memory as well as limited information-processing capability may play a role in explaining observed retail price behavior.

This selection of papers emphasizes some recent progress that has been made in understanding the drivers and dynamics of inflation. But many open questions in inflation research still remain. We therefore look forward to the next edition of the conference session.

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