Monetary Policy Surprises and Inflation Expectation Dispersion

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Aim of the paper

Motivation. Anchoring of inflation expectations has played a key role in reducing the persistence of inflation and its sensitivity to fluctuations in activity and other factors (Bernanke, 2007; Mishkin, 2007).

- Real shocks have a less persistent effect on inflation dynamics and the exchange rate pass-through is lower when expectations are better-anchored (Fuhrer, 2010; Bems et al. 2018; Carriére-Swallow et al., 2020).
- Anchoring affects the transmission of monetary policy, with an expansionary stance potentially boosting activity and lowering inflation when expectations are poorly coordinated (Hoffman and Hürtgen, 2016).
- Disagreement among inflation forecasters may also lead to an inefficient dispersion in actual prices, even if inflation is stable at low levels.

Objective. While several studies explored the drivers of inflation forecast disagreement (Mankiw et al., 2003; Dovern et al., 2012), there is still limited understanding on how monetary policy actions affect inflation expectation dispersion. This paper aims at filling this void.

Contribution. This paper:

1. Estimates empirically the causal effect of monetary policy surprises in the United States on the dispersion of inflation expectations among individual forecasters.
2. Rationalizes the empirical results with a partial equilibrium rational expectations model with sticky information, in the spirit of Mankiw and Reis (2002).

An Analyst-Level Dataset

Data. Daily inflation and federal funds rate forecasts of 496 analysts from major financial institutions worldwide for the US between Nov 18, 2002 and Dec 18, 2018 from Bloomberg.

Timeline of forecasts. Key feature of our dataset, which we use to identify the impact of monetary policy surprises on inflation expectation dispersion.

1. Each analyst can submit a forecast for the federal funds rate, $p^e_{t-1+\gamma|t-1}$, for period $t-1+\gamma$ at any time during $[t-1, t-1+\gamma)$.
2. Then, the analyst observes the federal funds rate decision $p^r_{t-1+\gamma|t-1+\gamma}$, which takes place and is announced in correspondence of the policy meeting at $t-1+\gamma$.
3. Subsequently, the same analyst prepares the inflation forecast $\pi^e_{t+h|t}$ during $(t-1+\gamma, t]$---that is, after the federal funds rate announcement---for horizon $t+h$ with $h=\{-\epsilon, 3, 6, 9, 12\}$ ($-\epsilon$ is a backcast).
4. Finally, actual inflation for period $t+h$, $\pi^r_{t+h|t+h+\theta}$, is released at $t+h+\theta$.

Monetary policy surprises. Absolute value of the deviation of the individuals' expected federal funds rate from the actual rate announced at the time of the central bank meeting

$$s^{ie}_{i,t-1+\gamma|t-1} = \left| p^e_{i,t-1+\gamma|t-1} - p^r_{t-1+\gamma|t-1+\gamma} \right| \tag{1}$$

pre-meeting window (time between the moment in which the analyst submits her *latest* forecast, $t-1$, and the federal funds rate announcement day, $t-1+\gamma$) ⩽45 days, then narrowed down.

Dispersion of inflation expectations. Absolute value of the deviation of the individual's inflation forecast from the average forecast across all other analysts

$$d^{\pi^e}_{i,t+h|t} = \left| \pi^e_{i,t+h|t} - \frac{1}{N-1}\left(\sum_{i=1}^{N} \pi^e_{i,t+h|t} - \pi^e_{i,t+h|t} \right) \right| \tag{2}$$

post-meeting window (time between the federal funds rate announcement, $t-1+\gamma$, and the moment in which analyst i submits the inflation forecast, t) ⩽30 days.

Empirical Analysis

Specification. To assess the impact of analysts' surprises about policy rate decisions, $s^{ie}_{i,t-1+\gamma|t-1}$, on inflation expectation dispersion, $d^{\pi^e}_{i,t+h|t}$, we estimate:

$$d^{\pi^e}_{i,t+h|t} = \beta s^{ie}_{i,t-1+\gamma|t-1} + \phi_i + \mu_{i,t+h} \tag{3}$$

where ϕ_i denotes the analyst fixed effects, which capture any systematic bias in each analyst's forecasts; and $\mu_{i,t+h}$ is an i.i.d. error term. Note: the surprise variable is lagged by one period so that, even in the case in which inflation expectation dispersion is calculated at $h=-\epsilon$, the surprise always precedes the inflation forecast.

- Horizon $h=-\epsilon$ allows isolating the effect of ``revealed information'' through the Fed actions as analysts may think that the central bank had some information that they could not take into account or had not given the right weight (``Fed informational effects'').

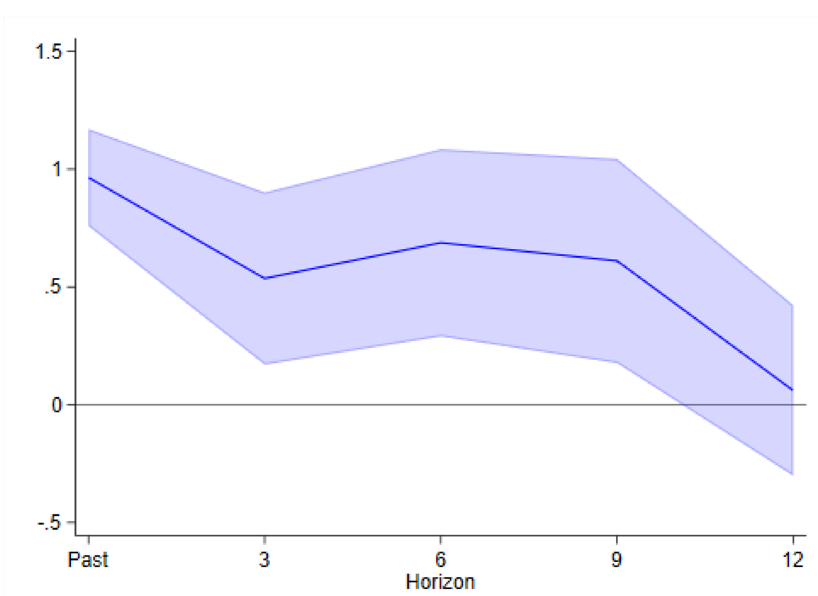
Identification. Based on the tight window around the Fed meetings:

1. A narrow post-meeting → reduces the probability that other confounding factors bias the estimates of the impact of monetary surprises on the dispersion of inflation expectations. On average, analysts submit their inflation forecasts 16 days after the Fed announcement.
2. A narrow pre-meeting window → analysts could become aware of new information after they submit the forecast for the federal funds rate; if analysts do not re-submit their interest rate forecasts and the new information is correlated with the surprise variable, the estimates would be biased. On average, analysts submit their policy rate forecasts 9 days before the Fed announcement.

A Novel Fact

Baseline. A 100-basis point surprise in the federal funds rate leads, on average, to an increase of 96 basis points in the dispersion of inflation expectations for the month that just went by (``informational effect''). The effect fades away over farther horizons but remain statistically significant up to nine months ahead, a horizon shorter than the lag with which monetary policy is believed to affect prices (Figure 1).

Figure 1: Effects of Monetary Policy Surprises on the Term Structure of Inflation Expectation Dispersion (pp)



Source: Bloomberg and authors' calculations. Notes: The line denotes the magnitude of the coefficient of surprise in the central bank decision at different horizons, and the shaded area denotes the 90 percent confidence interval constructed with standard errors clustered at the analyst level. The x-axis denotes the forecast horizon in months, where ``past'' corresponds to the month that just went by.

Robustness. Our findings are robust to sequentially reducing the pre- and post-meeting up to 5 and 10 days (on average 2 and 6 days), respectively; to dropping the GFC, the ZLB, or the period featuring the largest surprises associated to the monetary policy normalization; and to using aggregate monetary policy shocks from Nakamura and Steinsson (2018).

Other Results

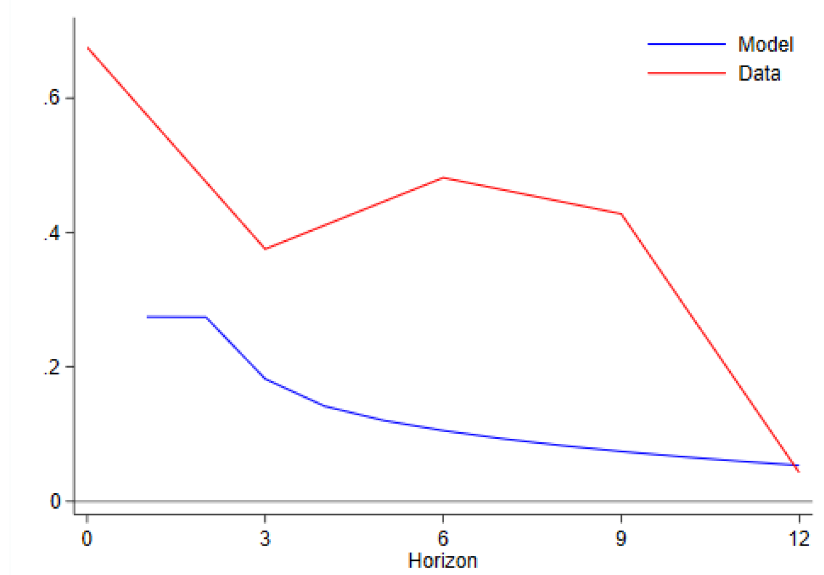
Market surprises. Agents may just imitate other agents (i.e., the ``market'') at the time of the submission of their policy rate forecast. This may occur, for example, if the costs associated to preparing the forecast are high or if the analyst is not confident enough in her model to predict the federal funds rate. → Both individual and market surprises (proxied by the average of individual surprises or NK shocks) lead to increases in inflation expectation dispersion for the past horizon and the very short future horizons. That is, individual surprises unequivocally lead to a larger disagreement about inflation projections above and beyond the surprises of the market.

Deviations from inflation target. We substitute the measure of dispersion in inflation forecasts across analysts with the distance between each analyst's forecast and the inflation target of the central bank, which is another way of proxing the extent of anchoring of inflation expectations. → Surprises in monetary policy decisions lead to an increase in the dispersion of inflation expectations.

Rationalizing the Results

Information rigidity. We contend that information rigidity is essential to explain the empirical patterns. We show that the predictions of a model with full information are not consistent quantitatively nor qualitatively with the observed dispersion of inflation expectations in response to monetary policy surprises. Instead, introducing sticky information is key to generate results that are qualitatively in line with our empirical findings. When we extend the model to allow the degree of information rigidity to depend on the realization of firm-specific shocks (rather than on aggregate shocks), the theoretical results are *qualitatively consistent and quantitatively close* to the empirical ones (Figure 2).

Figure 2: Average Response of Inflation Expectation Dispersion to an Interest Rate Shock, Firm State-Contingent Information Stickiness (pp)



Source: Authors' calculations. Notes: The blue line denotes the response of inflation expectation dispersion to a 77 basis point interest rate shock based on model simulations and the red line denotes the empirical response rescaled to a shock of the same size.

Takeaways

- Evidence of causal effects of monetary policy surprises on inflation dispersion in the United States using i) daily data of federal funds rate forecasts and inflation expectations at the analyst level from major financial institutions and ii) an identification strategy that hinges on a tight window around the Fed meetings.
- A sticky information model that allows the degree of information rigidity to depend on the realization of firm-specific shocks generates results that are qualitatively consistent and quantitatively close to the empirical ones.
- Inflation expectation dispersion, can lead to price dispersion and inflation persistence. From a policy perspective, efforts should be directed at further refining the communication strategy of monetary policy so that information is more aligned across agents.