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The term structure of inflation forecasts disagreement and monetary policy transmission

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Abstract

The term structure of inflation forecasts disagreement in the US can be summarized by two components: disagreement about the trend inflation, and disagreement about the cyclical inflation. While the former has identical impacts on forecasts disagreement across forecasting horizons, the latter has more muted impacts on forecasts disagreement at longer forecasting horizons. Only the cyclical inflation disagreement has a significant impact on monetary policy efficacy. High disagreement about the cyclical inflation undermines the transmission of monetary policy to both real economy and financial markets. Active communication from the Federal Reserve with the general public is a useful tool to reduce inflation disagreement, especially disagreement about the cyclical inflation.

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1 Introduction

Inflation expectations play a crucial role in determining the actual price level. They influence consumption and borrowing decisions of households, as well as investment and pricing strategies of firms. The general consensus is that well-anchored inflation expectations stabilize macroeconomic outcomes. Given the importance, central banks closely monitor survey-based inflation expectations, either from households, firms or professional forecasters, to assess how well inflation expectations are anchored. However, even under the scenario in which consensus inflation forecasts perfectly align with inflation targets, individuals can still form heterogeneous beliefs on future inflation rates, raising concerns of inflation expectations de-anchoring.

Most existing literature focuses on inflation forecasts disagreement over a particular forecasting horizon. The first contribution of our paper is that we take one step further and exploit information in the term structure of inflation forecasts disagreement. Specifically, we propose a parsimonious term structure model of inflation forecasts disagreement, which allows us to decompose inflation forecasts disagreement into two disagreement factors. One is the disagreement around trend inflation, and the other is the disagreement around cyclical inflation. Our model implies that the trend inflation disagreement has identical impacts on inflation forecasts disagreement across different forecasting horizons, while the impact of the cyclical inflation disagreement diminishes as forecasting horizon increases. In other words, the trend and cyclical inflation disagreement can be thought of as level and slope factors of the term structure of inflation forecasts disagreement, respectively.

We estimate our model based on the Survey of Professional Forecasts on GDP price deflator from 1968Q4 to 2022Q4 in the US. We construct the term structure of inflation forecasts disagreement by calculating trimmed cross-sectional variance of forecasts for current quarter and next four quarters. We then estimate the unobserved trend and cyclical inflation disagreement using Kalman filter. Despite its simplicity, our model does a good job in fitting the inflation forecasts disagreement data. Our estimates suggest that trend inflation disagreement declined significantly in the 1980s, consistent with the narrative of better anchored long-run inflation expectations following the Volcker shock. In more recent times, both trend and cyclical inflation disagreement rose rapidly in 2021 when the US economy recovered from the COVID-19 pandemic, signalling de-anchoring risk of inflation expectations. That said, both series started to decline near the end of our sample (2022Q4).

The second contribution of our paper is highlighting the importance to disentangle the trend and cyclical inflation disagreement because they have different impacts on monetary policy efficacy. We examine their respective roles in the transmission of monetary policy to realized inflation following Falck et al. (2021), and to asset prices following Bauer et al. (2022). Our results suggest that the cyclical inflation disagreement tends to weaken monetary policy efficacy. For one, when the cyclical inflation disagreement is high, monetary policy tightening tends to raise price levels instead of lowering them. For another, the cyclical inflation disagreement attenuates asset prices' response to monetary policy shocks. In contrast, the trend inflation disagreement does not seem to play a significant role in the transmission of monetary policy shocks to either realized inflation nor asset prices. Such differences have important implications to guide theoretical models that aim to explain how inflation disagreement affects monetary policy transmission.

The third contribution of our paper is linking inflation disagreement to monetary policy framework. Given the importance of the cyclical inflation disagreement in monetary policy transmission, we investigate the drivers of the disagreement. After controlling for variables established in literature, we find an important role of the Federal Reserve's communication to the public. Our results suggest that active communication from the central bank helps reduce the cyclical inflation disagreement, which would in turn improve effectiveness of monetary policy.

Our paper contributes to several strands of literature. First, it is related to papers examining the term structure of forecasts disagreement. Lahiri and Sheng (2008) and Patton and Timmermann (2010) use disagreement of US macro variables at various forecasting horizons from Consensus Economics to disentangle relative importance of heterogeneity in private information versus heterogeneity in prior beliefs. Andrade et al. (2016) document that the term structure of forecasts disagreement from the Blue Chip Financial Forecasts survey is downward sloping for inflation and growth in the US with the former having a flatter slope, and upward sloping for the federal funds rate. In addition, they propose a generalized model of imperfect information to explain these facts. Similar to our model, their model assumes that the economy is driven by two unobserved components: a transitory one which captures short-lived economic fluctuations and a permanent one which captures structural changes to the economy. Binder et al. (2022) simultaneously examine the term structures of both disagreement and uncertainty constructed from the ECB's Survey of Professional Forecasters.

Our paper also complements papers looking into the impact of disagreement and uncertainty on monetary policy transmission. Falck et al. (2021) find that monetary policy tightening leads to rising price levels when one-quarter ahead survey-based inflation forecasts disagreement is high. Bauer et al. (2022) construct a market-based monetary policy uncertainty measure, and note that responses of asset prices to monetary policy surprises would decrease as policy uncertainty increases. Our paper also adds to papers exploring determinants of inflation disagreement. Mankiw and Reis (2002) propose that disagreement is driven by infrequent information updates by agents. Woodford (2001), Sims (2003) and Maćkowiak and Wiederholt (2009) suggest that disagreement can arise from rational inattention. While agents have access to all available information, they only attend to certain news. Diverging views about the underlying inflation process can also drive inflation forecasts disagreement, e.g. Andrade et al. (2019) and Banerjee and Mehrotra (2021).

The rest of the paper is constructed as follows. Section 2 presents our term structure model and estimation of the trend and cyclical inflation disagreement. Section 3 and Section 4 examine how the two types disagreement affect the transmission of monetary policy to price levels and asset prices, respectively. Section 5 looks into the determinants of inflation forecasts disagreement, and Section 6 concludes the paper.

2 Decomposing inflation forecasts disagreement

In this section, we propose a parsimonious framework for inflation forecasts disagreement. Our theoretical framework suggests that inflation forecasts disagreement for a given forecast horizon is determined by two factors — disagreement about the trend inflation and disagreement about the cyclical inflation. Similar to Patton and Timmermann (2010), we measure disagreement empirically using the cross-sectional variance of individual inflation forecasts. Guided by the theoretical framework, we estimate the two unobserved disagreement factors with the Kalman filter.

2.1 Model

We start with a simple model for inflation dynamics. We assume that inflation π_t consists of a persistent trend component τ_t and a transitory cyclical component g_t. While the trend inflation follows a random walk, the cyclical inflation follows an AR(1) process. Formally, the data generating process of inflation follows:

$$\pi_t = \tau_t + g_t,$$
$$where \;\; \tau_t = \tau_{t-1} + \varepsilon_{\tau,t}, \;\; g_t = \rho g_{t-1} + \varepsilon_{g,t}.$$

The disturbances $\varepsilon_{\tau,t}$ and $\varepsilon_{g,t}$ are independent, normally and identically distributed. This specification for inflation dynamics is widely used in literature, see Faust and Wright (2013) for example.

We assume that the data generating process for inflation discussed above is common knowledge to all forecasters.[1] But forecasters disagree on the current economic conditions and their beliefs about long-run equilibrium when forming respective inflation forecasts. For forecaster i, her inflation forecast for π_{t+h} at time t is

$$\pi^i_{t+h|t} \quad = \quad \tau^i_t + \rho^h g^i_t. \tag{1}$$

Let V^τ_t (V^g_t) denote the cross-sectional variance of forecasters' beliefs on τ^i_t (g^i_t). With the assumption of independence between τ^i_t and g^i_t, the disagreement of inflation forecasts for π_{t+h} at time t can be written as:

$$V[\pi_{t+h|t}] = V^\tau_t + \rho^{2h} V^g_t. \tag{2}$$

Equation(2) implies that disagreement about inflation forecasts can be decomposed to disagreement about the trend inflation and disagreement about the cyclical inflation. The impact of disagreement about the trend inflation persists over forecasting horizons and is identical for inflation forecasts disagreement across all forecasting horizons. In contrast, the impact of disagreement about the cyclical inflation diminishes over forecasting horizons and is more muted on inflation forecasts disagreement at longer forecasting horizons. In other words, the trend inflation disagreement can be thought as a *level* factor in the term structure of forecasts disagreement and the cyclical disagreement is a *slope* factor.

[1] One implication of this assumption is that the auto-regressive coefficient ρ for cyclical inflation is the same for all forecasters. To test this hypothesis, we can estimate ρ for each forecaster with individual forecaster's historical projections, and test the hypothesis $\rho_i = \rho_j$ where i and j are different forecasters. However, it is hard to implement the analysis in practice as there are only 12 forecasters that have consistently participated in more than 18 survey waves.

2.2 Inflation forecasts data

Our inflation forecasts data are from the Survey of Professional Forecasters (SPF). In the first month of each quarter, panelists receive the survey questionnaires, which are sent out after the Bureau of Economic Analysis (BEA) releases the advance report of the national income and product accounts. The survey's questionnaires report recent historical values of the data from the BEA's advance report and the most recent reports of other government statistical agencies. In submitting their projections, panelists' information set includes the data reported in the advance report. The deadlines for responses are the second to the third week of the middle month of each quarter.

For inflation forecasts, we use panelists' projections on price index for GNP/GDP.[2] Such forecasts are available for current quarter and next four quarters from 1968Q4 to 2022Q4.[3] While forecasts for CPI and PCE are also available from the SPF, these series become available much later – 1983Q3 for CPI forecasts and 2007Q1 for core CPI, PCE and core PCE.

We compute the inflation disagreement as follows. First, we calculate individual forecasters' annualized quarter-over-quarter inflation expectations for current quarter and next four quarters. Then we compute the cross-sectional variance of individual inflation forecasts to measure inflation forecasts disagreement $V_t(\pi_{t+h})$. One concern of using variance as a disagreement measure is that it might be more sensitive to outliers than other disagreement proxies, interquartile dispersion for example. To address this concern, we remove individual projections in the top and bottom 10% percentile and use the trimmed data to compute the cross-sectional variance.

Panels A and B in Table 1 show key statistics of inflation forecasts consensus and disagreement across different forecast horizons. Overall, forecasters' consensus as well as

[2] More specifically, panelists make forecasts of the seasonally adjusted index level for GNP deflator prior to 1992, GDP deflator in 1992-1995, and the chain-weighted price index for GDP from 1996 to 2022.

[3] Forecasts for four quarter ahead only became consistently available from 1974Q4.

their disagreement on future inflation both decrease with forecast horizon. Similar to what Andrade et al. (2016) document, forecasters disagree more on short-term inflation rates than on the long-term inflation rates. This is consistent with what our model would imply — short-term inflation disagreements reflect both the cyclical and trend-inflation disagreement, while long-term inflation disagreements are less affected by the cyclical inflation disagreement.

Panel D of Table 1 reports the number of individual forecasts for each forecast horizon over different survey waves. Most of the forecasters submit their projected price index for all surveyed forecast horizons. But there are still rare occasions that forecasters' projections are not complete. For instance, individual forecasts for the four-quarter ahead price index are missing in the Q1–Q3 1969, Q1 1970 and Q3 1970 survey waves. For this reason, forecasts in the same survey wave but of different horizons might not come from the same group of people. But as long as individual forecasts are independent of each other and the sample size is large enough, the cross-sectional sample mean and variance of individual forecasts are unbiased estimates of forecasters' inflation expectation and their disagreement. The median number of individual forecasts across different survey waves is 35 or 36, depending on the forecast horizon.[4]

Figure (1) shows the time series of the inflation forecasts disagreement for current quarter and next four quarters. We can see that disagreement across different forecasting horizons show strong co-movement, consistent with the factor structure that we assume for the data. For example, they generally declined after mid-1980s, and all surged to high levels during the GFC and after the COVID-19 outbreak. At the same time, the disagreement on current-quarter inflation seems to be more volatile and also exhibits less time-series trend than the disagreement on the one-year ahead inflation, suggesting more than one common factor.

[4] There are only nine individual forecasts for a given forecasting horizon in the Q2 1990 survey wave.

2.3 Estimation

We use Kalman filter to estimate unobserved factors V_t^τ and V_t^g. Kalman filter is a common technique to estimate unobserved factors in a dynamic factor model. A dynamic factor model consists of two sets of equations. The first set is measurement equations, where a few latent dynamic factors drive the co-movement of a higher dimensional vector of observed variables. These variables are also affected by a vector of idiosyncratic disturbances arising either from measurement errors or from features that are specific to individual series. The second set is transition equations that describe dynamics of the latent factors.

In our case, the measurement equations can be simply obtained by adding idiosyncratic disturbances to Equation (2),

$$V^o[\pi_{t+h|t}] = V_t^\tau + \rho^{2h} V_t^g + \eta_t^{V,h}. \tag{3}$$

The "o" superscript stands for observed data. The measurement errors are i.i.d normal and are assumed to have the same variance cross different forecasting horizons for simplicity, i.e. $\eta^{V,h} \sim i.i.N.(0, \omega_V^2)$. For the set of transition equations, we make the approximation that $\begin{bmatrix} V_t^\tau \\ V_t^g \end{bmatrix}$ follows a VAR(1) process as follows [5]

$$\begin{bmatrix} V_{t+1}^\tau \\ V_{t+1}^g \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & \rho^2 \end{bmatrix} \begin{bmatrix} V_{t+1}^\tau \\ V_{t+1}^g \end{bmatrix} + \Sigma_V \varepsilon_{t+1}, \tag{4}$$

[5] One issue with the VAR(1) specification is that non-negativity of the disagreement factors cannot be guaranteed in theory. However, we do not see it as a major issue in practice as estimated disagreement factors are largely positive.

where $\Sigma_V = \begin{bmatrix} \sigma^{\tau}_{\mathrm{V}} & 0 \\ 0 & \sigma^{g}_{\mathrm{V}} \end{bmatrix}$ and $\varepsilon_{t+1} \sim \text{i.i.N.}(0, \mathrm{I})$.

For sharper identification, we also decompose inflation forecasts consensus (defined as the simple average of forecasts) into consensus about the trend inflation E^{τ}_t and about the cyclical inflation E^{g}_t. We supplement Equation (3) and (4) by the measurement and transition equations for E^{τ}_t and E^{g}_t:

$$E^{o}[\pi_{t+h|t}] = E^{\tau}_t + \rho^h E^{g}_t + \eta^{E,h}_t, \tag{5}$$

and

$$\begin{bmatrix} E^{\tau}_{t+1} \\ E^{g}_{t+1} \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & \rho \end{bmatrix} \begin{bmatrix} E^{\tau}_{t+1} \\ E^{g}_{t+1} \end{bmatrix} + \Sigma_E \varepsilon_{t+1}, \tag{6}$$

where $\eta^{V,h} \sim i.i.N.(0, \omega^2_E)$ and $\Sigma_E = \begin{bmatrix} \sigma^{\tau}_{\mathrm{E}} & 0 \\ 0 & \sigma^{g}_{\mathrm{E}} \end{bmatrix}$ and $\varepsilon_{t+1} \sim \text{i.i.N.}(0, \mathrm{I})$. We estimate Equation (3) – (6) jointly using inflation forecasts for current quarter and next four quarters from 1968Q4 to 2022Q4. Figure (A.1) and Figure (A.2) show the model fit of inflation forecasts consensus and disagreement respectively. It is remarkable that our simple model fits the term structure of inflation forecasts consensus and of inflation forecasts disagreement well. Average R^2 is more than 99% for inflation forecasts consensus, and is around 85% for inflation forecasts disagreement.

2.4 Estimates of trend and cyclical disagreement

Estimated disagreements about the trend and cyclical inflation are shown in the left column of Figure (2). The trend inflation disagreement is more persistent and more volatile than the cyclical inflation disagreement. In particular, the standard deviation of the trend inflation disagreement is 0.48, while the one of the cyclical inflation disagreement is 0.14 (see Panel C in Table (1)). Our estimates suggest that survey participants' disagreement about the trend inflation forecasts declined substantially during the 1980s. The decline indicates that the aggressive monetary tightening in the late 1970s and early 1980s ("Volcker shock") to tame double-digits inflation helped anchor long-term inflation expectations with reduced uncertainty around it. Afterwards, the trend disagreement is largely stable, but experienced brief spikes during the global financial crisis and at the pandemic's outbreak. More recently, the trend disagreement increased sharply in 2021 when the US economy recovered from the pandemic, coinciding with a possible shift of US economy to a high-inflation regime after many decades of low and stable inflation. Estimated disagreement about the cyclical inflation, on the other hand, does not show a clear level shift over the sample period. And survey participants' seems to disagree more on cyclical inflation in early 70s, during recessions and after 2021. Both the trend and cyclical inflation disagreement started to decline at the end of 2022.

As a byproduct, we also estimate the trend and cyclical inflation expectations, shown in the right column of Figure (2). After a continued increase in 1970s, the trend expectation largely declined in 1980s and 1990s before stabilising around the Fed's inflation target of 2% in the past two decades. More recently, signs of continued increase of the trend expectation started to emerge from 2021. The cyclical inflation expectation fluctuated around zero after mid 80s. When the US economy is in recessions, survey participants generally revise down their cyclical inflation expectations. But when the economy is hit by supply shocks, survey participants adjust their cyclical inflation expectations upwards. Examples include the oil price spike in 1990 and 2007–2008, the surging commodity price after the Russia's invasion of Ukraine, as well as the supply chain disruptions after the pandemic's outbreak.

3 Inflation disagreement and monetary policy transmission to real economy

Well-anchored long-run inflation expectations typically echo a credible monetary policy. In this regard, the first moment, i.e. consensus, of inflation forecasts from various surveys attract a lot of attention in the monetary economic literature.

In contrast, few papers look at the second moment, i.e. disagreement, about inflation expectations. Falck et al. (2021) is one exception. They find that inflation disagreement affects the efficacy of monetary policy. When inflation disagreement is high, a tightening monetary policy shock increases the price level, contradicting what conventional macro models would predict. They attribute this result to the signaling effect of monetary policy decisions, which reveal central bank's information about aggregate supply and demand conditions. Specifically, firms interpret an unexpected increase in policy rates a signal of increasing demand in the future. They respond to this signal by raising prices. When disagreement is high, the signaling effect dominates the conventional monetary policy channel and inflation increases following a positive monetary policy shock.

Like in most literature, the measure in Falck et al. (2021) for inflation disagreement only captures the "total" disagreement on next-quarter inflation expectations. However, different sources of inflation disagreement, the trend versus cyclical inflation disagreement, may affect monetary policy transmission differently.

Evaluating the two sources of disagreement separately is important for central bankers as they would like to know when their monetary policy tightening is likely to lose power of curbing inflation: whether it is during regimes with high trend inflation disagreement or with high cyclical inflation disagreement. The exercise is also useful to guide theoretical models aiming to explain the dependence of monetary policy transmission on inflation forecasts disagreement. For example, if empirical analysis shows that only the cyclical inflation disagreement matters for the transmission, models replying on the trend inflation disagreement to explain the dependence would not be accurate.

3.1 Impacts of inflation disagreement at different horizons

We start our analysis with an exercise that examines how the transmission of the monetary policy shock to realized inflation depends on "total" inflation disagreement at different forecasting horizons, specifically one-quarter and four-quarters ahead. Recall that the trend and cyclical inflation disagreements load differently on total inflation disagreement at different horizons. If one-quarter and four-quarter ahead inflation disagreements are found to affect the transmission of monetary policy shocks differently, it is a hint that the trend and cyclical inflation disagreements do not play identical roles in monetary policy transmission and highlight the importance of differentiating the two kinds of disagreement.

We use a state-dependent local projection model to analyse the efficacy of monetary policy under different inflation disagreement regimes. The methodology of local projection is standard in the macroeconomic literature to trace the impulse response of various shocks. Compared to a standard VAR, the local projection approach is more suitable to examine state-dependent impacts of shocks, see Ramey and Zubairy (2018) for example.

Our specification largely follows that of Falck et al. (2021).[6] In their paper, inflation disagreement is constructed from one-quarter ahead forecasts. We extend this setup by also including the four-quarter ahead inflation disagreement. Specifically, we run the following regression:

[6] There are two differences between our specification and theirs. First, the regime-indicating variable in our paper is binary while the one in Falck et al. (2021) is continuous. We use the dummy variable instead of the probability of regimes to identify states for a easier interpretation of the coefficients. Second, to better match the theoretical framework, we use the trimmed cross-sectional variance instead of standard deviation to measure disagreement.

$$100(p_{t+h} - p_{t-1}) = \alpha_{1,h} + \beta_{1,h}\text{MPS}_t + \boldsymbol{\gamma_{1,h} X_{t-1}} + D_{t-1}(\alpha_{2,h} + \beta_{2,h}\text{MPS}_t + \boldsymbol{\gamma_{2,h} X_{t-1}}) + \tau_h t + \varepsilon_{t+h}. \quad (7)$$

p_t is the log price index (GDP deflator) in quarter t so that the dependent variable measures realized inflation from quarter $t-1$ to $t+h$ expressed in percent. MPS_t is the monetary policy shock (in percent) in quarter t, which we use the series of Romer and Romer (2004) extended by Wieland and Yang (2020). $\mathbf{X_{t-1}}$ is a matrix that contains the list of control variables, including the lagged values of inflation and fed funds rates. D_{t-1} is a dummy variable indicating whether quarter $t-1$ is a high-disagreement regime. It equals zero if the smoothed inflation disagreement, z_{t-1}, exceeds the median of its distribution, and zero otherwise.[7] The coefficients of our interests are $\beta_{1,h}$ and $\beta_{2,h}$. The former captures the impulse response of price level to a 100 bps monetary policy shock when the economy in quarter $t-1$ is in a low-disagreement regime (i.e. $D_{t-1} = 0$); and the latter indicates the change in impulse response when the economy transits from a low-disagreement regime to a high-disagreement regime. Accordingly, $\beta_{1,h} + \beta_{2,h}$ represents the impact of monetary policy when the economy is in a high-disagreement regime.

We first run regression (7) with the dummy variable defined based on the one-quarter ahead inflation disagreement. Figure (3) shows the estimated values of $\beta_{1,h}$, $\beta_{2,h}$ and $\beta_{1,h} + \beta_{2,h}$. Our estimated $\beta_{1,h}$ are in general negative. The result suggests that when the economy is in a low-disagreement regime, price level starts to drop three quarters after a tightening shock, though the impact is insignificant initially. Quantitatively, a 100

[7] The regime-indicating variable, z_{t-1}, is the seven-period moving average of scaled inflation disagreement. Scaled inflation disagreement is the trimmed cross-sectional variance of inflation forecasts, divided by the average level of inflation forecasts. The scaling aims to tease out the positive effect of the level of inflation on the level of disagreement, a well-established relationship in the literature (Mankiw et al. (2004) for example). The smoothing mutes the big spikes in disagreement in the late 1970s and 1980s, but preserves the general pattern of the disagreement.

basis point monetary policy shock reduces the price level by around 0.4% in two years. However, our estimated $\beta_{2,h}$ is positive and its magnitude is larger than $\beta_{1,h}$ for horizons less than twelve quarters. Putting together, in a high-disagreement region, following a 100 basis point monetary policy shock, the price level elevates immediately and increases by 1.2% in seven quarter. After that the price level starts to drop, and only reverts to the pre-shock level after twelve quarters.

We then run the regression using the four-quarter ahead inflation disagreement and report our estimation results in Figure (4). Similar to Figure (3), when the economy is in a low-disagreement regime, monetary policy tightening lowers inflation. However, when the economy transits to a high-disagreement regime, such impact remains intact as $\beta_{2,h}$ is close to zero, and accordingly $\beta_{1,h} + \beta_{2,h}$ does not exhibit statistically different dynamics than $\beta_{1,h}$.

The results above show that the finding of Falck et al. (2021) — the transmission of monetary policy when inflation disagreement is high — depends on the horizon at which inflation forecasts are made. Disagreement about the short-term inflation seems to attenuate monetary policy efficacy while disagreement about the long-term inflation does not. Such differences imply that the trend and cyclical inflation disagreements may have different implications on monetary policy transmission and highlight the importance to differentiate the two sources of inflation disagreement.

3.2 Impacts of the trend and cyclical inflation disagreement

We then formally test whether the trend and cyclical disagreements have different impacts on monetary policy transmission. To this end, we adapt equation (7) into the following regression

$$
\begin{aligned}
100(p_{t+h} - p_{t-1}) = & \alpha_{1,h} + \beta_{1,h}\text{MPS}_t + \boldsymbol{\gamma_{1,h} X_{t-1}} + D^{\tau}_{t-1}(\alpha_{2,h} + \beta_{2,h}\text{MPS}_t + \boldsymbol{\gamma_{2,h} X_{t-1}}) + \\
& + D^{g}_{t-1}(\alpha_{3,h} + \beta_{3,h}\text{MPS}_t + \boldsymbol{\gamma_{3,h} X_{t-1}}) \\
& + D^{\tau}_{t-1} D^{g}_{t-1}(\alpha_{4,h} + \beta_{4,h}\text{MPS}_t + \boldsymbol{\gamma_{4,h} X_{t-1}}) + \tau_h t + \varepsilon_t. \qquad (8)
\end{aligned}
$$

D^{τ}_{t-1} and D^{g}_{t-1} are two dummy variables that indicate whether the period $t-1$ is a high-trend or high-cyclical disagreement regime. In this specification, $\beta_{1,h}$ captures the realized price change h quarters following a 100 bps monetary policy shock when both trend and cyclical disagreements are low, $\beta_{2,h}$ (and $\beta_{3,h}$) is the additional change in inflation when the policy shock arrives in a high-trend-disagreement but low-cyclical-disagreement (and high-cyclical-disagreement but low-trend-disagreement) period, $\beta_{4,h}$ captures the further price change when the policy shock arrives in a regime that both trend and cyclical disagreement are higher than their medians. Accordingly, $\beta_{1,h} + \beta_{2,h}$, $\beta_{1,h} + \beta_{3,h}$ and $\beta_{1,h} + \beta_{2,h} + \beta_{3,h} + \beta_{4,h}$ respectively represent the impulse response of realized price to a 100 bps monetary policy shock in high-trend-low-cyclical disagreement, low-trend-high-cyclical disagreement and high-trend-high-cyclical disagreement regimes.

Figure (5) reports our estimation results. The plot of $\beta_{1,h}$ suggests the conventional impact of monetary policy tightening on lowering inflation when both trend and cyclical inflation disagreements are low. The quantitative impact is similar to Figures (3) and (4). $\beta_{2,h}$ is close to zero, implying there is no material change in the transmission of monetary policy on inflation if the monetary policy shock arrives following a high-trend-disagreement & low-cyclical disagreement regime. Indeed, $\beta_{1,h}$ and $\beta_{1,h} + \beta_{2,h}$ follow similar paths. In contrast, $\beta_{3,h}$ is positive, suggesting attenuation or reversion of the impact of monetary policy on inflation following a high-cyclical-disagreement & low-trend disagreement regime. In such regime, realized inflation increased by 3.5% two years after a 100 bps monetary policy shock suggested by the plot of $\beta_{1,h} + \beta_{3,h}$. These results are consistent with that in the baseline results as is shown in Figures (3) and (4). Since what matters for monetary policy transmission is cyclical inflation disagreement rather than trend inflation disagreement, only inflation disagreement at short forecasting horizons (such as one-quarter ahead) but not that at long forecasting horizons (such as four-quarters ahead) would affect monetary policy transmission as the latter is dominated by trend inflation disagreement.

We further illustrate the importance of cyclical inflation disagreement in monetary transmission by examining the impulse response of inflation expectation and inflation forecast errors to monetary policy shocks. The results are in Figure (A.3). The broad message is similar as before — the cyclical inflation disagreement matters more than the trend inflation disagreement when it comes to monetary policy transmission to inflation.

Our empirical finding is consistent with the model proposed by Falck et al. (2021) to explain why inflation can rise after monetary policy tightening when inflation forecasts disagreement is high. The signaling channel of monetary policy is key. Firms can use monetary policies as a signal to infer aggregate demand and supply in the economy. When firms observe precise signals about state of the economy, their inflation disagreement is low; and they consider an interest rate hike as a contractionary monetary policy shock. However, when firms observe nosisy signals about state of the economy, their inflation disagreement is high; and they partly interpret an interest rate increase as a positive demand shock and raises the price of their products accordingly. Considering what matters for firms' assessment of economic cyclical outlook is the cyclical inflation instead of the trend inflation, it is not surprising that empirically only the cyclical inflation disagreement affects monetary policy transmission.

4 Inflation disagreement and monetary policy transmission to asset prices

Having showed the source of inflation disagreement affects the transmission of monetary policy to the economy, we investigate whether it also affects the transmission to the financial market. To this end, we follow Bauer et al. (2022) and use event-study regressions.

We start by replicating the key regression in Bauer et al. (2022) that estimates the impact of uncertainty about future policy on the response of asset prices to market-based measure of monetary policy surprises on FOMC announcement days. For asset prices, we consider 5- and 10-year nominal government yields, 10-year real government bond yields, S&P500 index, CBOE volatility index (VIX) and a US Dollar index based on a foreign exchange portfolio that goes short G9 currencies with equal weights and long the US Dollar.

The response of these asset prices is calculated as daily yield change or daily index percentage change. For market-based monetary policy surprises (MPS), we use the shock constructed in Bauer et al. (2022) following Nakamura and Steinsson (2018). Essentially, the MPS is the first principal component of daily rate changes based on Federal funds and Eurodollar futures contracts expiring up to a year following the FOMC meeting. The MPS is normalized to have a one-to-one on the four-quarter ahead futures rate. Uncertainty about future policy rates is the conditional volatility of the future short-term interest rate based on prices of Eurodollar futures and options. Monetary policy uncertainty is the daily change in uncertainty about future policy rates around FOMC meetings.

We then replace uncertainty about future policy rates with our estimates of trend and cyclical inflation disagreement. Our hypothesis is that cyclical inflation forecasts disagreement would dampen the response asset prices to monetary policy shocks. This is because it could contribute to uncertainty of future policy rates which would attenuate the transmission of monetary policy shocks to asset prices.[8].

Our regression results are showed in Table (2). Panel A reports estimation results from the baseline model. They are the same as in Bauer et al. (2022). In response to a monetary policy tightening shock, Treasury yields go up, S&P500 sells off, VIX increases and the US Dollar appreciates. When uncertainty about future policy rates is high, such responses are weakened.

Panel B and Panel C report regression results when we replace uncertainty about future policy rates with disagreement about the trend inflation and the cyclical inflation respectively. Coefficients of our interest are the ones in front of the interaction term, $MPS_t \times \hat{V}_{t-1}^{\tau(g)}$, which captures the impact of inflation disagreement on monetary policy shock transmission to asset prices. Consistent with our prior and similar to uncertainty about future policy rate, cyclical inflation disagreement generally weakens the response of financial assets to monetary policy shocks. And the impacts are not only statistically significant but also economically meaningful. Take the response of 10-year nominal yield as an example. When cyclical inflation disagreement is at its mean, a 100 basis points monetary policy shock would lead to a 45 basis points increase in 10-year nominal yield. When such disagreement increases by one standard deviation , the impact would be attenuated to only 7 basis points. Real yield is an exception whose response to monetary policy shocks, does not depend on cyclical inflation disagreement in a statistically significant way. This result largely reflects that the payoff of TIPS is protected from future inflation dynamics. The trend inflation disagreement, on the other hand, does not seem to affect monetary policy transmission to financial assets.

[8] Granted, uncertainty and disagreement are different concepts (Zarnowitz and Lambros (1987)). And, as Bomberger (1996) and Giordani and Söderlind (2003) pointed out, disagreement remains a theoretically unfounded measure of uncertainty. Nonetheless, disagreement contains useful information about uncertainty (see Krüger and Nolte (2016) for example)

The result above shows that the cyclical inflation disagreement would weaken the pass-through from monetary policy shocks to asset prices. This is could be one reason that that uncertainty about future policy rates would attenuate the responses of asset prices to monetary policy shocks. That said, uncertainty about future growth outlook and monetary policy reaction function also play a role, reflected by higher R^2s of regressions with uncertainty of future policy rates than that of regressions with cyclical inflation disagreement.

5 Drivers of disagreement

Given the importance of inflation forecast disagreement in monetary policy transmission, we examine potential drivers of inflation disagreement in this session. Different from existing literature which focus on total inflation disagreement, our analysis examines drivers of the cyclical and trend inflation disagreement separately. Moreover, we investigate how monetary policies can affect inflation disagreements.

Inflation forecast disagreement can rise from different sources. For one, it can reflect sticky information proposed by Mankiw and Reis (2002). The model assumes that in each period of time, only a fraction of the population updates itself on the current state of the economy and revises forecasts. The slow diffusion of information about macroeconomic conditions could reflect costs of acquiring information. In this model, agents do not disagree about forecasting methods; all the differences result from differences across vintages of forecasts. And time-variation in disagreement is related to the frequency that agents update their forecasts. Intuitively, the agents would update their forecasts more often when there are larger changes in macroeconomic conditions or during economic downturns. The disagreement can also result from heterogeneous information. Such heterogeneity could be agents' rational inattention (see Woodford (2001), Sims (2003) and

Maćkowiak et al. (2023)). While agents have access to all available information, they can choose which exact pieces of information to attend to. Or the heterogeneity can arise from different information set faced by agents. For example, if price changes of different goods/services do not always track each other and agents face different consumption baskets, it is very likely for agents to form different inflation expectations based on their own consumption experiences. Obviously, when relatively price changes are more dispersed, inflation disagreement tends to be higher.

Empirically, both variables related to sticky information and variables related to heterogeneous information are found to be significant in explaining inflation forecast disagreement. The seminal paper by Mankiw et al. (2004) shows that the dispersion of inflation expectations rises with its absolute change and the dispersion in rates of inflation across commodity groups. While they do not find a robust relationship between inflation disagreement and real output gap, Dovern et al. (2012) find a strong negative relationship between inflation disagreement and real output gap among G7 countries; and Banerjee and Mehrotra (2021) find a similar relationship for a panel of 42 advanced and emerging market economies. Similarly, Patton and Timmermann (2010) find that disagreement moves counter-cyclically with heterogeneity in opinions being strongest during recessions. In addition, inflation forecasts disagreement is found to be related to realized inflation rate (Mankiw et al. (2004) and Ball (1992) for examples).

We start our analysis by regressing inflation disagreement on the variables discussed above and its own lags to account for persistence in disagreement. We then investigate how conduct of monetary policy would affect inflation disagreement. Specifically, we consider the role of the following two variables in driving inflation disagreement. One variable is the average deviation between actual policy rates and policy rates implied by a Taylor-type rule in the past four quarters.[9] The other variable is the log change

[9] We follow Hofmann and Bogdanova (2012) in terms of the Taylor-rule specification and use the shadow rate constructed in Wu and Xia (2016) to measure monetary policy stance during the Zero Lower Bound

in the number of Fed governors' public speeches in the past quarter. The first variable is a proxy to quantify whether the Fed is persistently behind the curve (corresponding to a negative gap between the policy rate and the rate prescribed by the Taylor rule). And the second variable is a proxy for active central bank communication. Our prior is that the first variable should have a negative relationship with inflation disagreement measures. If the Fed is persistently behind the curve, inflation disagreement should rise as agents are likely to question the central bank's ability to control inflation. The relationship between the second variable and inflation disagreement measures should also be negative. For one, if the Fed is actively communicating with the public regarding its monetary policy practice, agents may have a better understanding of the conduct of monetary policy, which would reduce disagreements. For another, active communication from the Fed may raise agents' attention to inflation, which leads to more often updating of their forecasts and less disagreement. Our disagreement measure includes not only next-quarter total disagreement but also trend and cyclical disagreement. To facilitate the economic interpretation, we standardize disagreement measures. Our sample starts from 1994Q2 due to data availability of the number of Fed Governors' speeches.

The results without monetary policy variables are reported in in Column (1), (3) and (5) in Table (3). Consistent with existing literature, we find that next-quarter total disagreement is positively correlated with realized inflation and dispersion of prices changes across finely disaggregated sectors, and is negatively related to output gap. Absolute change in inflation and recession dummy do not seem to play significant roles in our sample. The estimates for the trend and cyclical inflation disagreements are largely qualitatively similar to that for the total disagreement. However, while absolute change in realized inflation and recession dummy remain insignificant for the trend inflation disagreement; they turn out to be important for the cyclical inflation disagreement. More-

period.

over, quantitatively, output gap has a smaller impact on the trend inflation disagreement than on the cyclical inflation disagreement.

The results with monetary policy variables are reported in in Column (2), (4) and (6) in Table (3). As expected, the coefficients in front of two monetary policy variables are negative across all the disagreement measures. However, the Taylor rule deviation only matters for trend inflation disagreement in a statistically significant fashion. The result highlights the risk of the Fed losing credibility in anchoring long-term inflation if the central banks is persistently behind the curve. Active Fed communication is significant for both the trend and cyclical inflation disagreement, suggesting that the central bank should actively communicate with the public to reduce forecasts disagreement and improve efficacy of monetary policy transmission. Note that the impact of the Fed's communication is much larger for the cyclical inflation disagreement. The difference, again, seems to suggest that the cyclical inflation disagreement is more closely related to sticky information.

6 Conclusion

While the cross-sectional variation in inflation forecasts is gaining more traction, most research focus on inflation forecasts disagreement for a particular forecasting horizon. Our paper takes one step further by exploiting rich information in the term structure of inflation forecasts disagreement.

Specifically, we estimate disagreement around trend inflation and disagreement around cyclical inflation from inflation forecasts disagreement across different forecasting horizons. The identification comes from the implication of our proposed term structure model of inflation forecasts disagreement that disagreement about trend inflation can be thought as a level factor in the term structure and disagreement about cyclical inflation is a slope factor.

It is important to disentangle the two types of disagreement as we find that they have different impacts on the transmission of monetary policy with the cyclical disagreement playing an important role in monetary policy efficacy. When the cyclical inflation disagreement is high, monetary policy tightening would lead to an increase instead of a decrease in price levels. In contrast, the when trend inflation disagreement is high, monetary tightening still works in a conventional way by reducing inflation pressure. Similarly, for responses of asset prices to monetary policy shocks, the cyclical inflation disagreement would weaken the pass-through while the trend inflation disagreement does not have a significant impact.

We then investigate drivers of the trend and cyclical inflation disagreement. In addition to determinants established in literature, such as realized inflation and output gap, monetary policy variables also matter. Specifically, if a central bank is persistently behind the curve with a negative gap between its policy rate and the rate prescribed by a Taylor-type rule, the trend inflation disagreement tends to increase. But more communication to the public helps bring down both trend and cyclical inflation disagreement. Our results highlight the risk for central banks being behind the curve and the benefit of engaging in active communication with the public.

References

Philippe Andrade, Richard K Crump, Stefano Eusepi, and Emanuel Moench. Fundamental disagreement. *Journal of Monetary Economics*, 83:106–128, 2016.

Philippe Andrade, Gaetano Gaballo, Eric Mengus, and Benoit Mojon. Forward guidance and heterogeneous beliefs. *American Economic Journal: Macroeconomics*, 11(3):1–29, 2019.

Laurence Ball. Why does high inflation raise inflation uncertainty? *Journal of Monetary Economics*, 29(3):371–388, 1992.

Ryan Banerjee and Aaron Mehrotra. Disagreeing during deflation. *Journal of Money, Credit and Banking*, 53(7):1867–1885, 2021.

Michael D. Bauer, Aeimit Lakdawala, and Philippe Mueller. Market-based monetary policy uncertainty. *The Economic Journal*, 132(644):1290–1308, 2022.

Carola Binder, Tucker S McElroy, and Xuguang S Sheng. The term structure of uncertainty: New evidence from survey expectations. *Journal of Money, Credit and Banking*, 54(1):39–71, 2022.

William A Bomberger. Disagreement as a measure of uncertainty. *Journal of Money, Credit and Banking*, 28(3):381–392, 1996.

Jonas Dovern, Ulrich Fritsche, and Jiri Slacalek. Disagreement among forecasters in g7 countries. *The Review of Economics and Statistics*, 94(4):1081–1096, 2012.

E. Falck, M. Hoffmann, and P. Hürtgen. Disagreement about inflation expectations and monetary policy transmission. *Journal of Monetary Economics*, 118:15–31, 2021.

Jon Faust and Jonathan H Wright. Forecasting inflation. In *Handbook of Economic Forecasting*, volume 2, pages 2–56. 2013.

Paolo Giordani and Paul Söderlind. Inflation forecast uncertainty. *European Economic Review*, 47(6):1037–1059, 2003.

Boris Hofmann and Bilyana Bogdanova. Taylor rules and monetary policy: a global'great deviation'? *BIS quarterly review September*, 2012.

Fabian Krüger and Ingmar Nolte. Disagreement versus uncertainty: Evidence from distribution forecasts. *Journal of Banking & Finance*, 72:S172–S186, 2016.

Kajal Lahiri and Xuguang Sheng. Evolution of forecast disagreement in a bayesian learning model. *Journal of Econometrics*, 144(2):325–340, 2008.

Bartosz Maćkowiak and Mirko Wiederholt. Optimal sticky prices under rational inattention. *American Economic Review*, 99(3):769–803, 2009.

Bartosz Maćkowiak, Filip Matějka, and Mirko Wiederholt. Rational inattention: A review. *Journal of Economic Literature*, 61(1):226–273, 2023.

N Gregory Mankiw and Ricardo Reis. Sticky information versus sticky prices: a proposal to replace the new keynesian phillips curve. *The Quarterly Journal of Economics*, 117 (4):1295–1328, 2002.

N. Gregory Mankiw, Ricardo Reis, and Justin Wolfers. Disagreement about inflation expectations. In *NBER Macroeconomics Annual 2003*, volume 18, pages 209–270. 2004.

Emi Nakamura and Jón Steinsson. High-Frequency Identification of Monetary Non-Neutrality: The Information Effect*. *The Quarterly Journal of Economics*, 133(3): 1283–1330, 01 2018. ISSN 0033-5533.

Andrew J Patton and Allan Timmermann. Why do forecasters disagree? lessons from the term structure of cross-sectional dispersion. *Journal of Monetary Economics*, 57 (7):803–820, 2010.

Valerie A Ramey and Sarah Zubairy. Government spending multipliers in good times and in bad: evidence from us historical data. *Journal of Political Economy*, 126(2): 850–901, 2018.

Christina D Romer and David H Romer. A new measure of monetary shocks: Derivation and implications. *American Economic Review*, 94(4):1055–1084, 2004.

Christopher A Sims. Implications of rational inattention. *Journal of monetary Economics*, 50(3):665–690, 2003.

Johannes F Wieland and Mu-Jeung Yang. Financial dampening. *Journal of Money, Credit and Banking*, 52(1):79–113, 2020.

Michael Woodford. Imperfect common knowledge and the effects of monetary policy, 2001.

Jing Cynthia Wu and Fan Dora Xia. Measuring the macroeconomic impact of monetary policy at the zero lower bound. *Journal of Money, Credit and Banking*, 48(2-3):253–291, 2016.

Victor Zarnowitz and Louis A Lambros. Consensus and uncertainty in economic prediction. *Journal of Political economy*, 95(3):591–621, 1987.

Table 1: Summary statistics of inflation forecasts.
This table reports the summary statistics of inflation forecasts and their trend and cyclical components. Panel A summarizes the consensus of forecasts (defined as simple average of individual inflation forecasts) for the annualized quarter-to-quarter inflation rate. Panel B reports the disagreement of forecasts (defined as cross-sectional variance of individual inflation forecasts). For a given quarter, both the average and variance of individual forecasts are calculated excluding the top and bottom 10% of the distribution. Panel C shows the trend and cyclical inflation expectation and disagreement estimated from Section 2.3. Table D summarizes the distribution of the number of individual forecasts. Reported statistics include mean, standard deviation, minimum, median, maximum, and the total number of observations. The sample period spans from Q4 1968 to Q4 2022.

	mean	sd	min	p50	max	count
Panel A: inflation consensus						
$E_t(\pi_t)$	3.496	2.278	-0.140	2.681	10.680	217
$E_t(\pi_{t+1})$	3.412	1.990	0.749	2.681	9.581	217
$E_t(\pi_{t+2})$	3.405	1.898	1.270	2.772	9.332	217
$E_t(\pi_{t+3})$	3.382	1.808	1.267	2.741	9.270	217
$E_t(\pi_{t+4})$	3.376	1.766	1.412	2.687	8.967	212
Panel B: inflation disagreement						
$V_t(\pi_t)$	0.666	0.679	0.085	0.387	3.659	217
$V_t(\pi_{t+1})$	0.493	0.518	0.040	0.291	2.685	217
$V_t(\pi_{t+2})$	0.477	0.526	0.000	0.315	3.437	217
$V_t(\pi_{t+3})$	0.472	0.510	0.030	0.290	3.795	217
$V_t(\pi_{t+4})$	0.486	0.524	0.043	0.291	3.031	212
Panel C: inflation components						
$E_t(\pi_t^\tau)$	3.364	1.763	1.482	2.683	8.658	217
$E_t(\pi_t^g)$	0.128	1.006	-1.841	-0.121	6.651	217
$V_t(\pi_t^\tau)$	0.482	0.446	0.054	0.309	2.389	217
$V_t(\pi_t^g)$	0.139	0.380	-0.626	0.046	2.246	217
Panel D: number of forecasts						
$NumF_t(\pi_t)$	38	11	9	36	83	217
$NumF_t(\pi_{t+1})$	38	11	9	36	83	217
$NumF_t(\pi_{t+2})$	38	11	9	36	83	217
$NumF_t(\pi_{t+3})$	38	11	9	36	83	217
$NumF_t(\pi_{t+4})$	36	12	0	35	83	217

Table 2: Transmission of monetary policy shocks to financial markets. Dependent variables are the daily change on FOMC announcement days in the 5-year nominal yield, the 10-year nominal yield, the 10-year real yield, the S&P500 index, the VIX index, and returns on a foreign currency portfolio short G9 currencies and long the dollar index. Independent variables are the Nakamura and Steinsson (2018) monetary policy shock, (MPS_t), (normalized) disagreement on trend inflation from the previous quarter ($\tilde{V}^{\tau}_{t-1}$), (normalized) disagreement on cyclical inflation from the previous quarter ($\tilde{V}^{g}_{t-1}$), as well as the level of implied short-rate uncertainty prior to FOMC announcements (SRU_{t-1}) and its log change after announcements (MPU_t), as defined in Bauer et al. (2022). Sample period is from January 1994 to September 2020.

			Panel A			
	Δy^{5y}_t	Δy^{10y}_t	$\Delta TIPS^{10y}_t$	$\Delta SP500_t$	ΔVIX_t	$\Delta ln(DollarIndex)_t$
MPS_t	1.258***	0.736***	1.324***	-0.112***	16.899***	0.123***
	(0.162)	(0.179)	(0.243)	(0.034)	(4.938)	(0.016)
MPU_t	0.711***	0.747***	0.797***	-0.101***	24.644***	0.052***
	(0.142)	(0.157)	(0.188)	(0.030)	(4.327)	(0.014)
$MPS_t \times SRU_{t-1}$	-0.664***	-0.377**	-1.069***	0.087***	-15.600***	-0.095***
	(0.139)	(0.154)	(0.250)	(0.030)	(4.239)	(0.014)
Constant	0.002	0.004	-0.002	0.000	-0.094	-0.000
	(0.004)	(0.004)	(0.005)	(0.001)	(0.115)	(0.000)
R^2	0.56	0.36	0.34	0.13	0.20	0.30
Observations	197	197	157	197	197	195
			Panel B			
	Δy^{5y}_t	Δy^{10y}_t	$\Delta TIPS^{10y}_t$	$\Delta SP500_t$	ΔVIX_t	$\Delta ln(DollarIndex)_t$
MPS_t	0.677***	0.596***	0.221	-0.020	0.658	0.003
	(0.212)	(0.225)	(0.260)	(0.044)	(6.418)	(0.023)
MPU_t	0.619***	0.683***	0.802***	-0.087***	21.654***	0.038**
	(0.150)	(0.160)	(0.205)	(0.031)	(4.546)	(0.016)
$MPS_t \times \tilde{V}^{\tau}_{t-1}$	0.215	0.399	-0.159	-0.005	1.387	-0.021
	(0.299)	(0.317)	(0.370)	(0.062)	(9.044)	(0.032)
$\tilde{V}^{\tau}_{t-1}$	0.033**	0.035**	0.023	-0.001	-0.180	-0.000
	(0.014)	(0.015)	(0.016)	(0.003)	(0.433)	(0.002)
Constant	0.025**	0.029**	0.018	-0.000	-0.197	-0.000
	(0.011)	(0.011)	(0.012)	(0.002)	(0.318)	(0.001)
R^2	0.52	0.36	0.27	0.09	0.15	0.14
Observations	197	197	157	197	197	195
			Panel C			
	Δy^{5y}_t	Δy^{10y}_t	$\Delta TIPS^{10y}_t$	$\Delta SP500_t$	ΔVIX_t	$\Delta ln(DollarIndex)_t$
MPS_t	0.451***	0.258***	0.332***	0.001	-2.862	0.010
	(0.065)	(0.069)	(0.100)	(0.013)	(1.922)	(0.007)
MPU_t	0.607***	0.683***	0.724***	-0.088***	22.352***	0.037**
	(0.146)	(0.156)	(0.198)	(0.030)	(4.349)	(0.015)
$MPS_t \times \tilde{V}^{g}_{t-1}$	-0.377**	-0.338*	0.020	0.083**	-12.437**	-0.039**
	(0.169)	(0.181)	(0.247)	(0.035)	(5.049)	(0.018)
$\tilde{V}^{g}_{t-1}$	-0.012	-0.001	-0.002	0.003	-0.496	-0.001
	(0.012)	(0.012)	(0.015)	(0.002)	(0.346)	(0.001)
Constant	-0.001	0.004	0.001	0.001	-0.205	-0.000
	(0.005)	(0.005)	(0.006)	(0.001)	(0.140)	(0.000)
R^2	0.52	0.35	0.26	0.12	0.17	0.16
Observations	197	197	157	197	197	195

Table 3: Drivers of inflation disagreement. Dependent variables are the normalized disagreement about next-quarter inflation (left panel), trend inflation (middle panel), and cyclical inflation (right panel). Explanatory variables are: the one-quarter lagged (normalized) inflation disagreement ($\tilde{V}_{t-1}(\cdot)$), realized yoy inflation (π_t) and its absolute change ($|\Delta\pi_t|$), output gap ($y_t - y_t^*$), NBER recession dummy ($Recession_t$), the dispersion of inflation rate across different commodity groups ($InflationDisp_t$), four-quarter moving average of the difference between the actual policy rate and the rate implied by Taylor rule ($TaylorRuleDev_{t-1,ma}$), and the log change in the number of Fed governors' public speeches in the previous quarter ($\Delta ln(FedSpeech)_{t-1}$). Sample period is from Q4 1996 to Q4 2022.

	$\tilde{V}_t(\pi_{t+1})$		$\tilde{V}_t(\pi_t^\tau)$		$\tilde{V}_t(\pi_t^g)$	
	(1)	(2)	(3)	(4)	(5)	(6)
$\tilde{V}_{t-1}(\pi_t)$	0.36***	0.36***				
	(0.07)	(0.07)				
$\tilde{V}_{t-1}(\pi_t^\tau)$			0.61***	0.62***		
			(0.06)	(0.05)		
$\tilde{V}_{t-1}(\pi_t^g)$					0.30***	0.29***
					(0.07)	(0.07)
π_t	0.19***	0.18***	0.08***	0.07***	0.19***	0.18***
	(0.03)	(0.03)	(0.02)	(0.02)	(0.05)	(0.05)
$\|\Delta\pi_t\|$	-0.18	-0.18	-0.11	-0.11	0.41**	0.42**
	(0.13)	(0.12)	(0.07)	(0.07)	(0.20)	(0.20)
$y_t - y_t^*$	-0.11***	-0.11***	-0.05***	-0.05***	-0.13***	-0.13***
	(0.02)	(0.02)	(0.01)	(0.01)	(0.03)	(0.03)
$Recession_t$	0.08	-0.00	0.06	-0.01	0.36***	0.25
	(0.08)	(0.09)	(0.05)	(0.05)	(0.14)	(0.16)
$InflationDisp_t$	0.21***	0.19***	0.13***	0.12***	0.12*	0.10
	(0.04)	(0.04)	(0.03)	(0.03)	(0.07)	(0.07)
$TaylorRuleDev_{t-1,ma}$		-0.16		-0.13**		-0.19
		(0.10)		(0.06)		(0.17)
$\Delta ln(FedSpeech)_{t-1}$		-0.05		-0.04*		-0.14***
		(0.04)		(0.02)		(0.06)
Constant	-1.67***	-1.59***	-0.99***	-0.92***	-1.25***	-1.17***
	(0.20)	(0.20)	(0.13)	(0.13)	(0.29)	(0.30)
R^2	0.74	0.75	0.81	0.83	0.64	0.66
Observations	105	105	105	105	105	105

Figure 1: Inflation forecasts disagreement over different forecasting horizons. Each line represents the 10% trimmed variance of individual inflation forecasts for a given forecasting horizon. The x-axis indicates the survey wave.

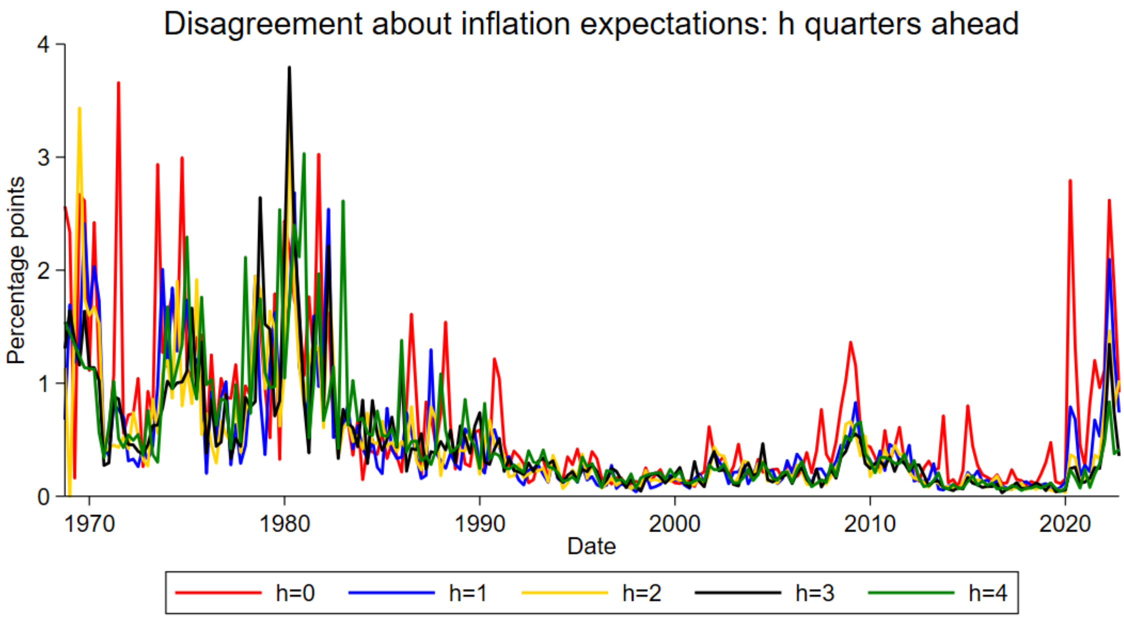


Figure 2: Disagreement and consensus expectation on the trend and cyclical inflation. This graph shows the time series of the trend (blue line) and cyclical (red line) disagreement (left column) and consensus expectation (right column) implied by individual inflation forecasts. The grey shaded areas indicate recession periods as defined by the US National Bureau of Economic Research (NBER).

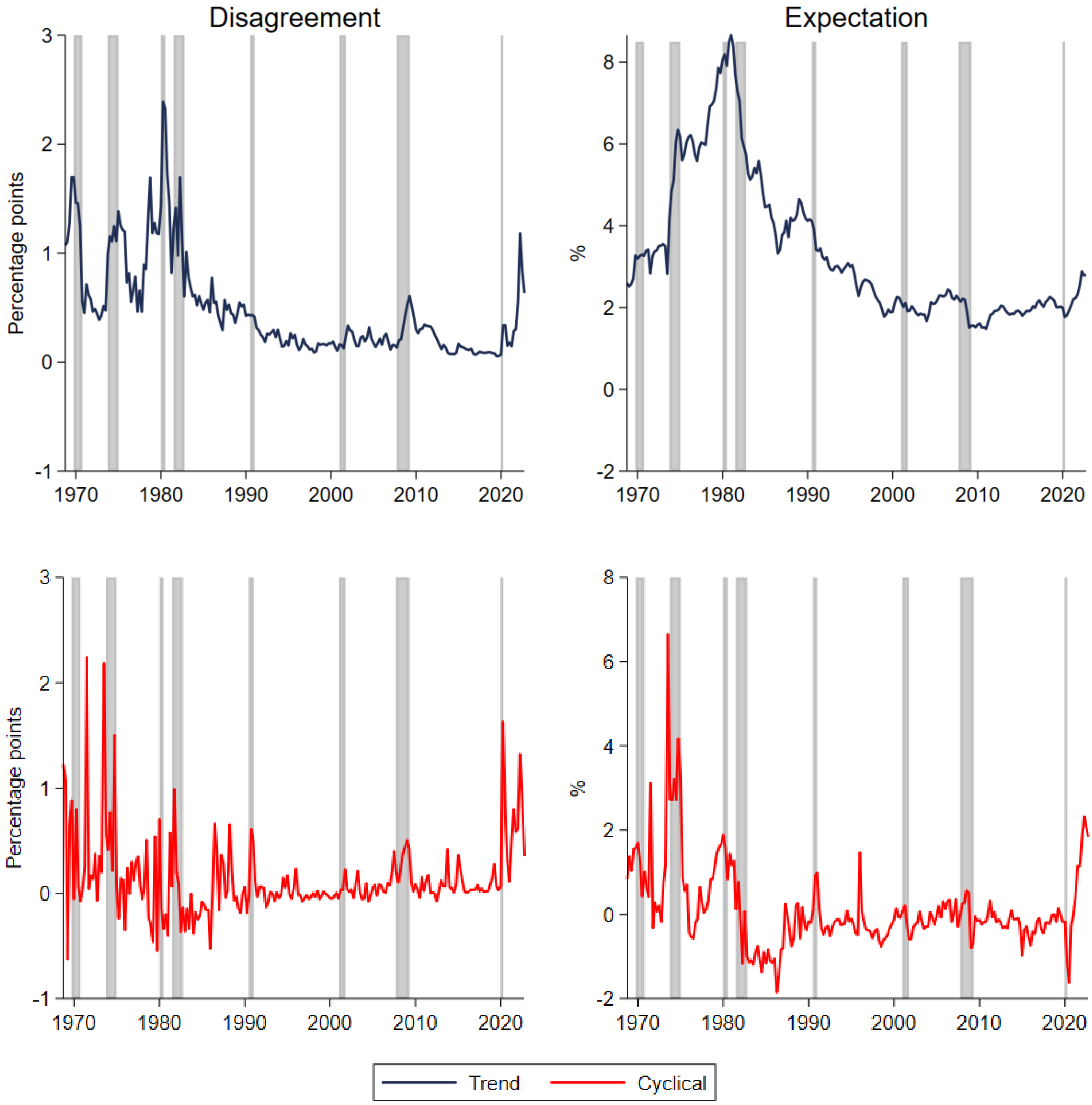


Figure 3: This figure plots the impulse responses of realized inflation to 100 bps monetary policy shock, estimated from a local projection model following Equation (7). The dependent variable is realized inflation. The disagreement dummy equals one if a period is under a high disagreement regime indicated by one-quarter ahead inflation forecasts. Shaded areas indicate 68% (dark grey) or 90% (light grey) confidence intervals of the estimated coefficients.

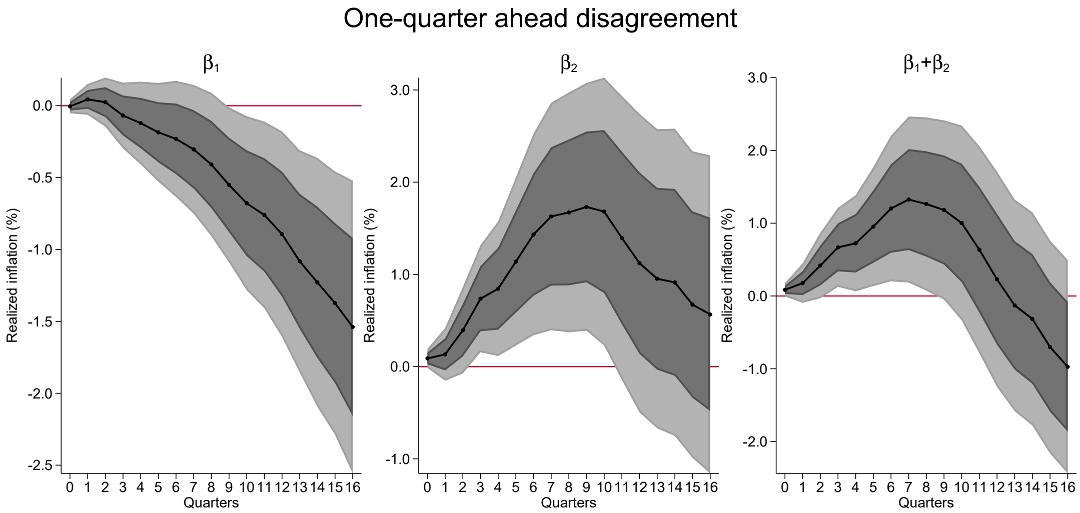


Figure 4: This figure plots the impulse responses of realized inflation (in percent) to 100 bps monetary policy shock, estimated from a local projection model following Equation (7). The dependent variable is realized inflation. The disagreement dummy equals one if a period is under a high disagreement regime indicated by four-quarter ahead inflation forecasts. Shaded areas indicate 68% (dark grey) or 90% (light grey) confidence intervals of the estimated coefficients.

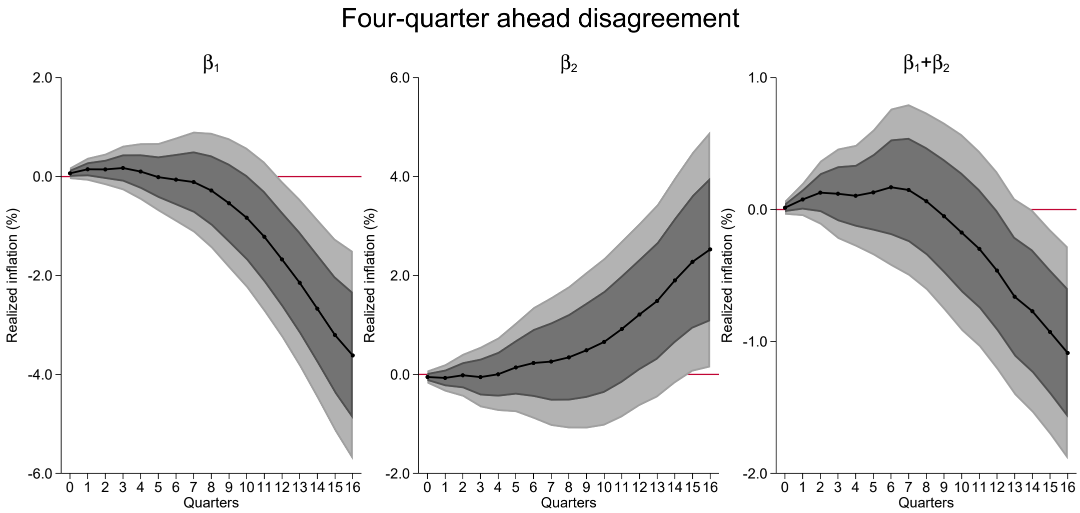
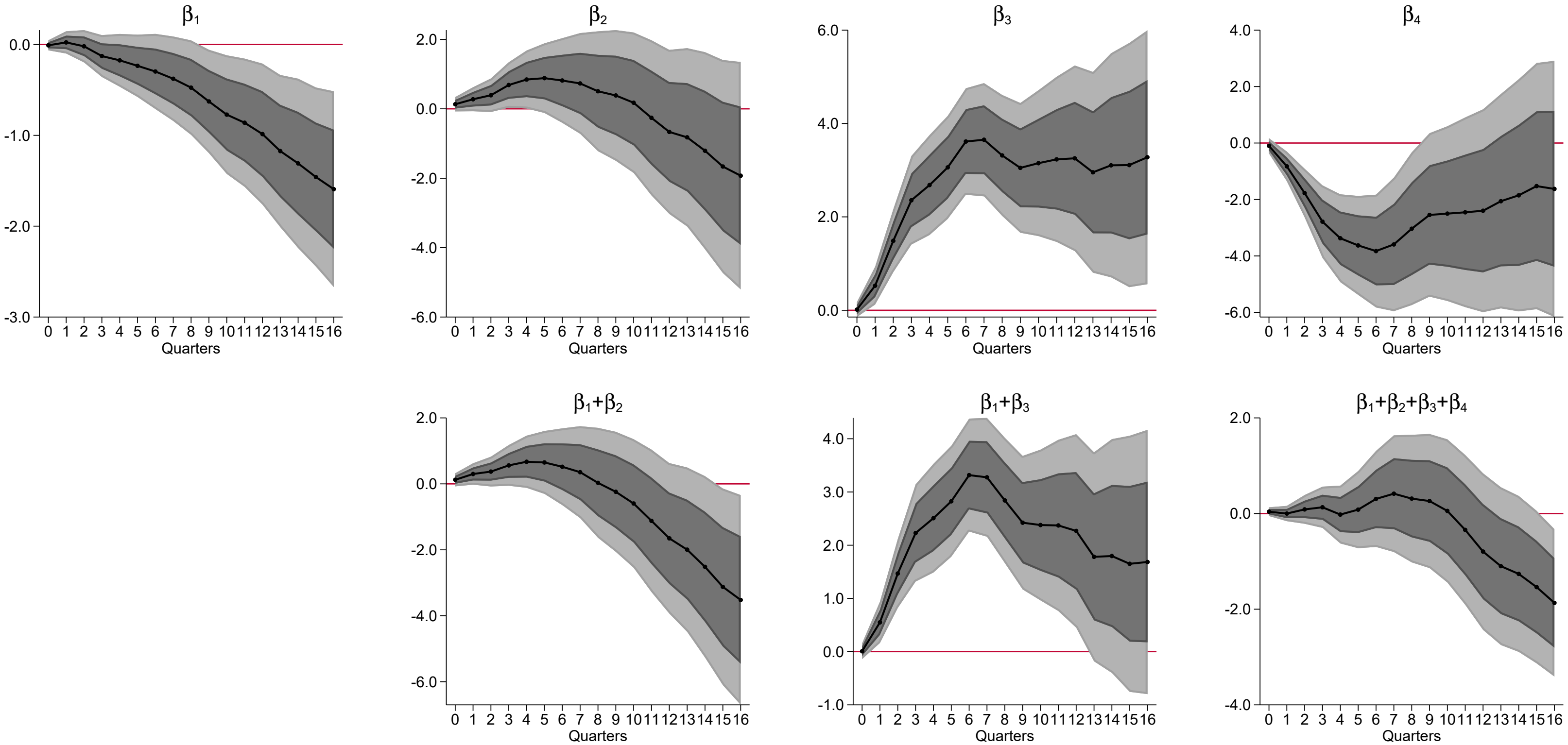


Figure 5: This figure plots the impulse responses of realised inflation to 100 bps monetary policy shock, estimated from a local projection model following Equation (8). Shaded areas indicate 68% (dark grey) or 90% (light grey) confidence intervals of the estimated coefficients.



Appendix

Figure A.1: Observed and fitted inflation forecasts consensus. The figure plots the observed inflation forecasts consensus (black solid lines) and the fitted forecasts consensus (red dashed lines).

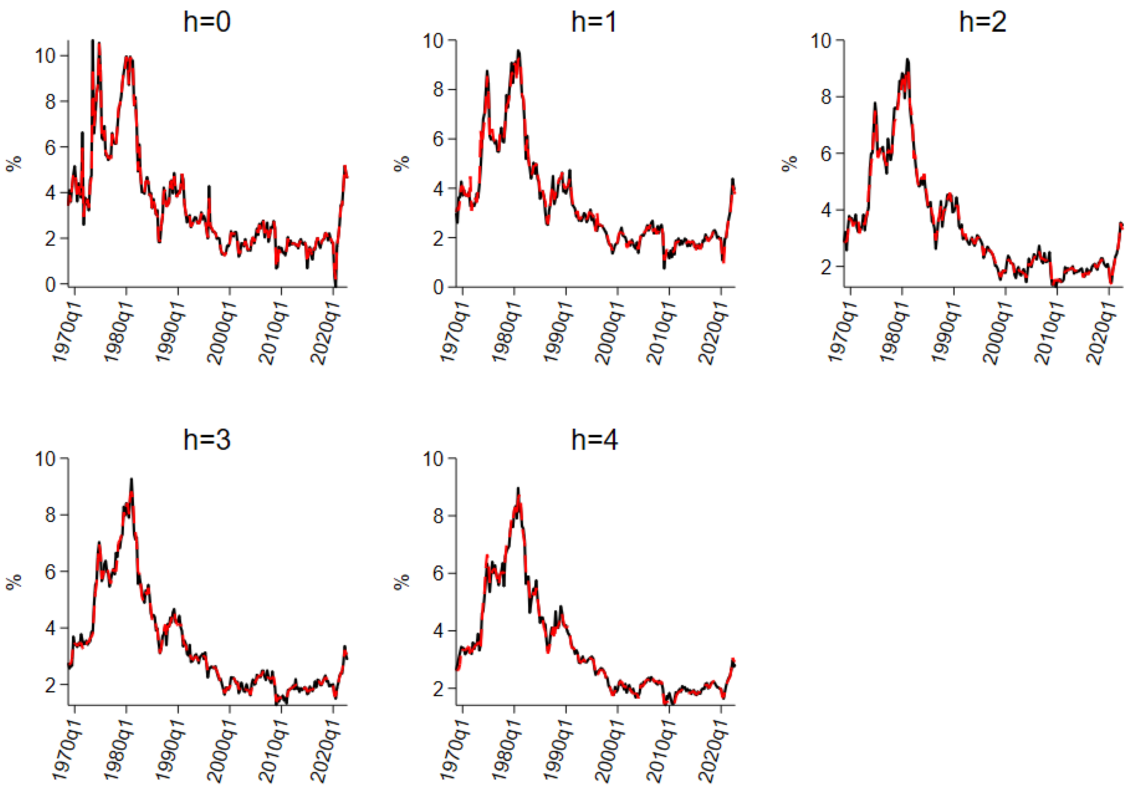


Figure A.2: Observed and fitted inflation forecasts disagreement. The figure plots the observed inflation forecasts disagreement (black solid lines) and the fitted forecasts disagreement (red dashed lines).

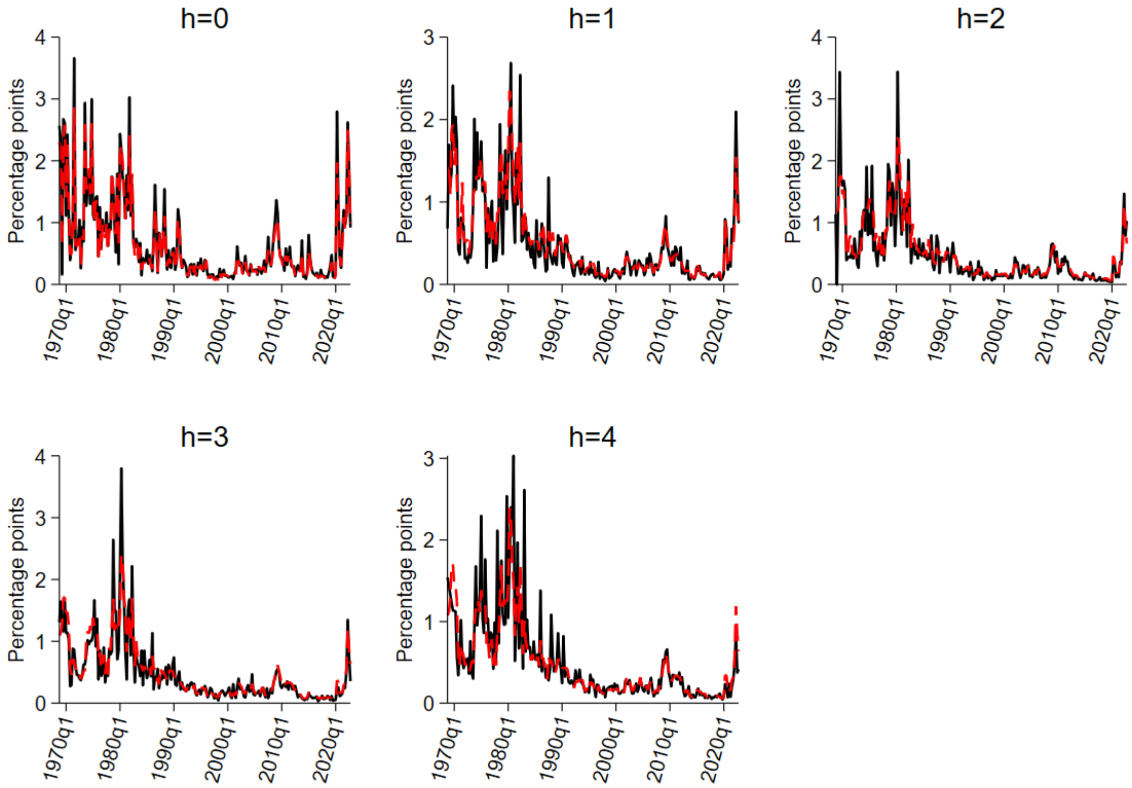
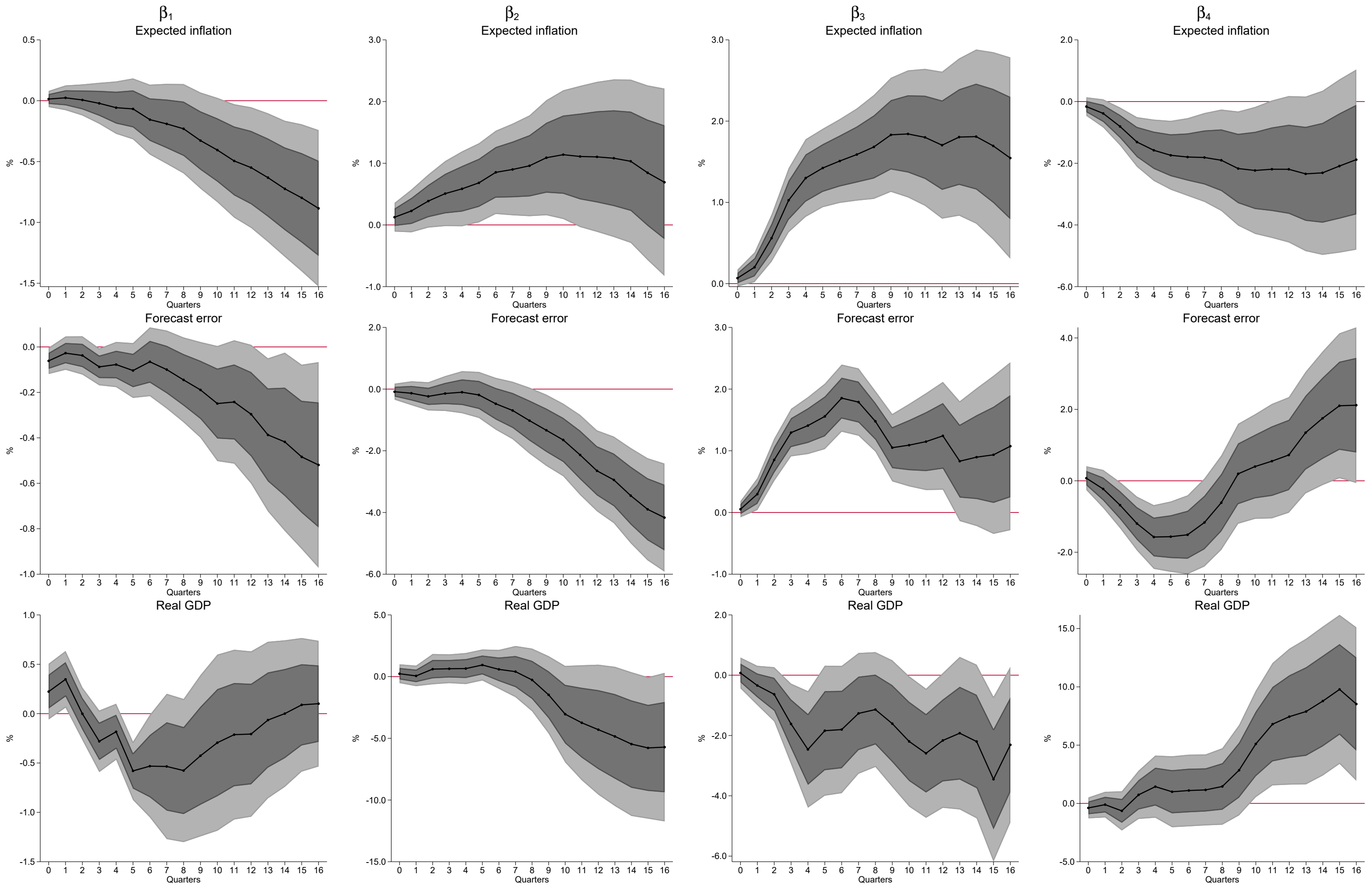


Figure A.3: This figure plots the impulse responses of different macroeconomic variables to 100 bps monetary policy shock, estimated from a local projection model following Equation (8). Shaded areas indicate 68% (dark grey) or 90% (light grey) confidence intervals of the estimated coefficients.



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