



**Panel session: Do the analytical tools of central banks need to be adjusted, and how?**

## **The role of expectations**

**OCT 4 2024**

**BCC 12TH ANNUAL CONFERENCE**

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# Outline & preview

## Which and whose inflation expectations matter for inflation dynamics?

- ▶ Short-term versus Long-term
- ▶ Professional forecasters, Markets, Households, Firms

## Why expectations are important for central banks policymaking?

- ▶ Drive C, I, pricing, employment decisions through the perceived real rate:  $i_t - E_t \pi_{t+1}$
- ▶ Enhance potency of monetary policy
  - ◆ MP transmission (micro evidence: attentive firms)
  - ◆ Sacrifice ratio (macro modelling and evidence: CB strong framework)

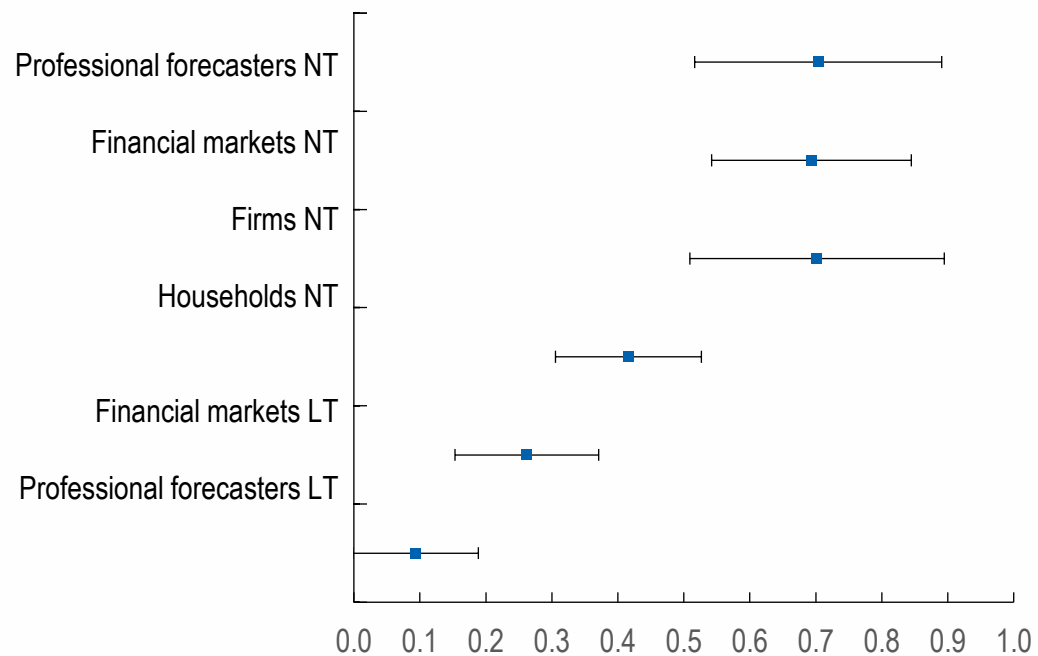
## Can central banks use the expectation channel as policy tool?

- ▶ Measurement
- ▶ Better understating of mechanism through which agents update their beliefs
- ▶ Breaking through the veil of inattention
- ▶ Incorporate agents' heterogeneity in CB models

# Which and whose inflation expectations matter for inflation dynamics?

## Estimated Effects of Alternative Inflation Expectations Measures on Current Inflation

*(Standardized regression coefficients)*



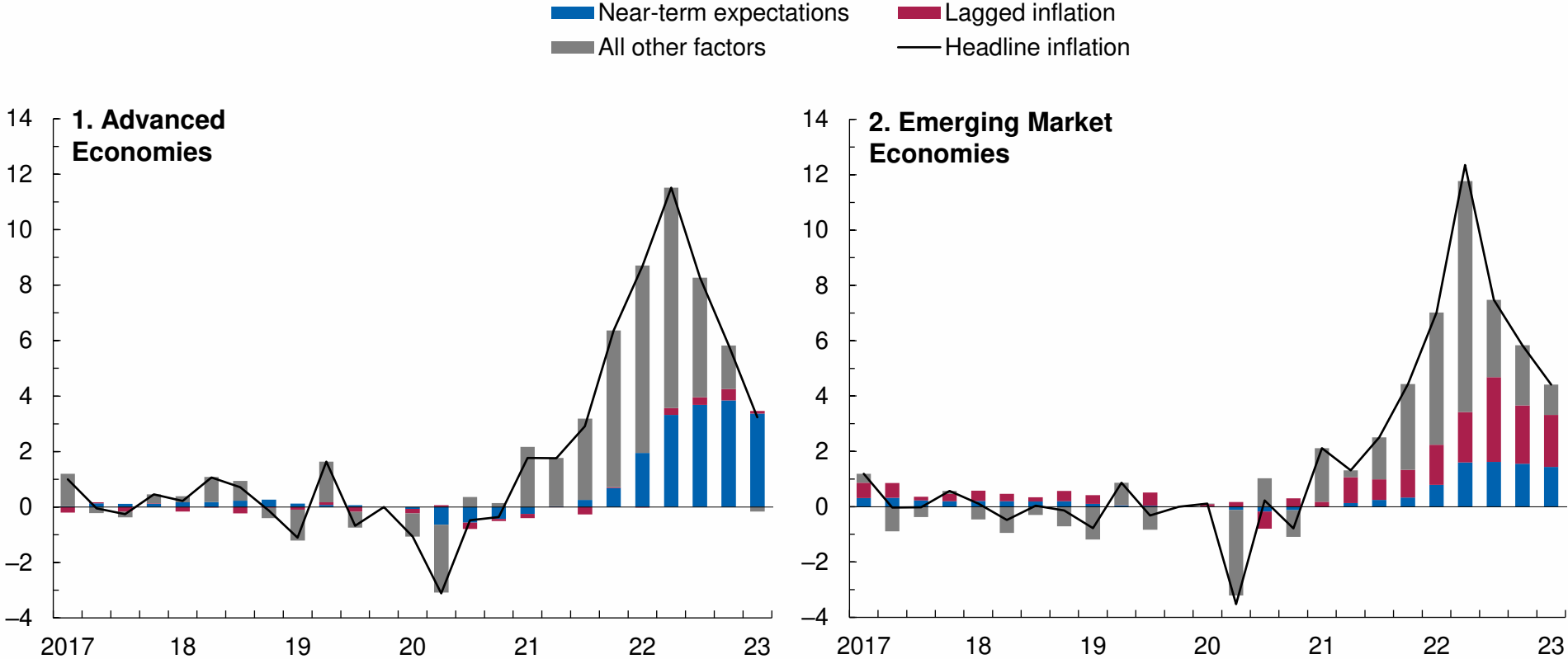
Source: World Economic Outlook Chapter 2 October 2023

Note: The figure shows standardized coefficients from linear regressions estimated by pooled times series for the euro area, United Kingdom, and United States using quarterly data from 1991:Q2 through 2023:Q1. The dependent variable is quarterly headline inflation, seasonally adjusted at an annualized rate. Horizontal lines show 90 percent confidence intervals with heteroskedasticity-robust standard errors. LT = long-term (five-year-ahead; for financial markets is next-5-years) inflation expectations; NT = near-term (next-12-months) inflation expectations.

# Growing importance of near-term inflation expectations, especially in advanced economies.

## Contributors to Recent Inflation Dynamics

(Percentage point deviation from 2019:Q4)



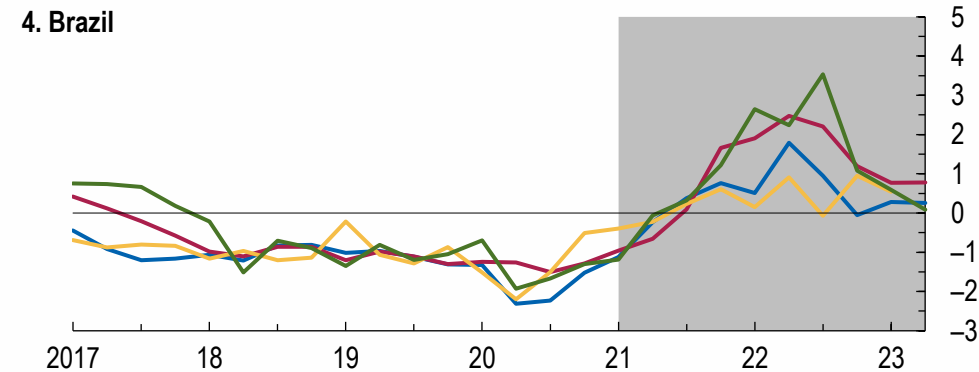
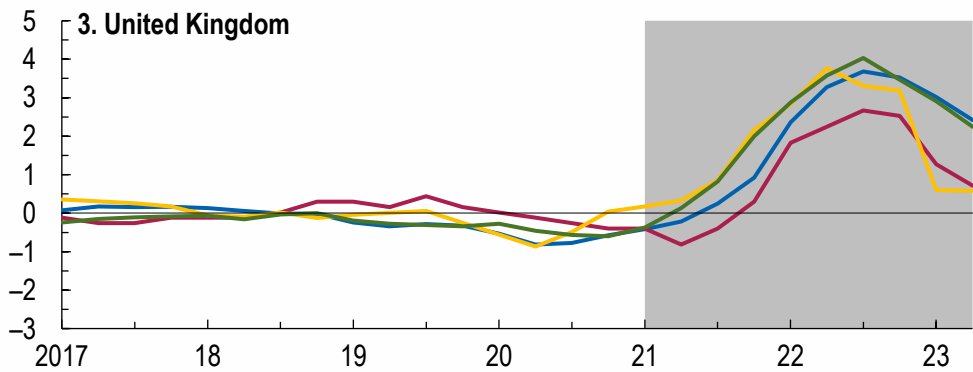
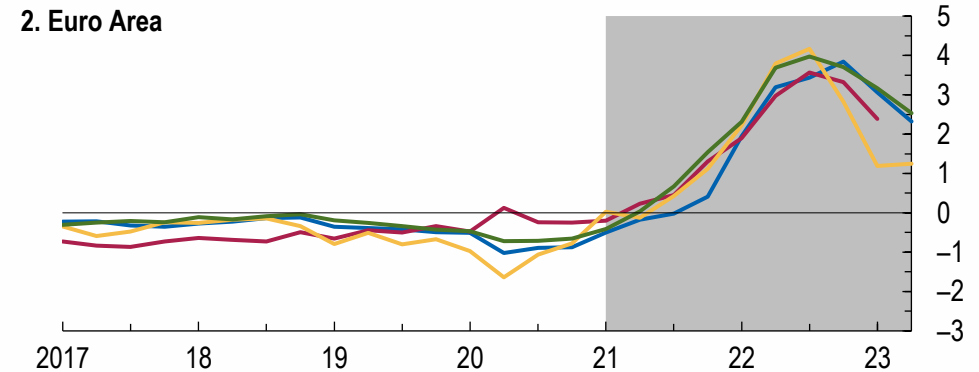
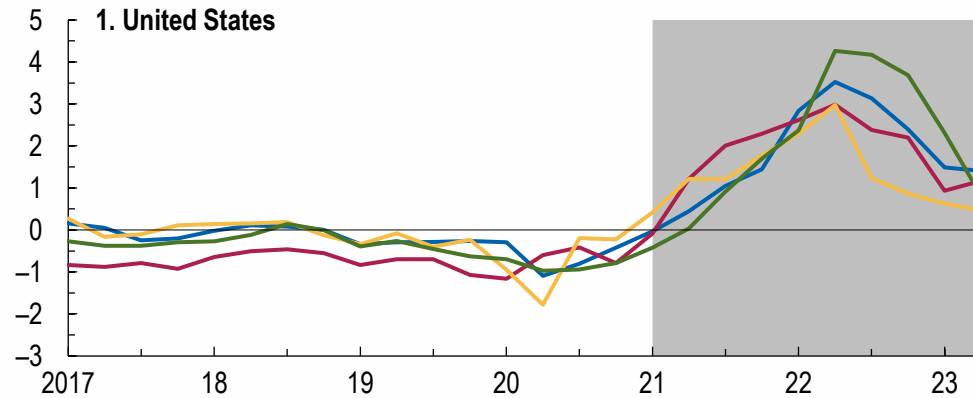
Source: World Economic Outlook Chapter 2 October 2023.  
 Note: Bars in the figure show the contributions to average headline inflation by economy group relative to the contributions observed in 2019:Q4. Contributions are calculated using coefficients estimated by instrumental variables pooled time series with quarterly data over 1991:Q2–2023:Q1. The black lines in each panel show the average seasonally adjusted annualized quarter-on-quarter headline consumer price index inflation observed relative to 2019:Q4. The “All other factors” category includes the contributions from time fixed effects (common global factors), all other explanatory variables, and the regression residual.

# Characteristics of expectations: cross-agents

## Next-12-Months Mean Inflation Expectations by Economic Agent

(Z-score, standard deviations from the mean)

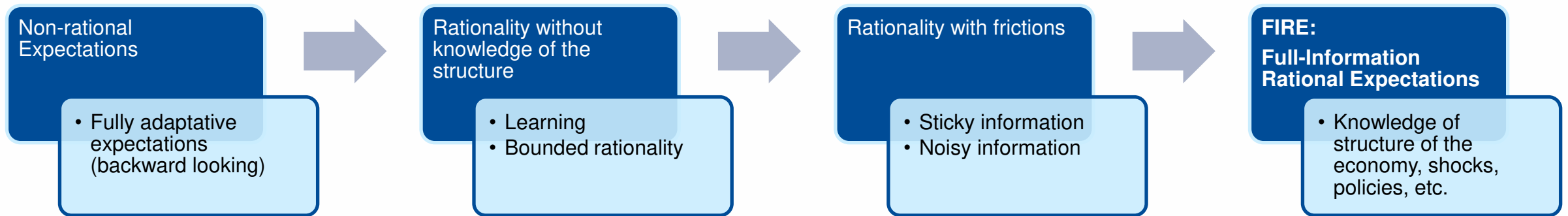
Professional forecasters Households Financial markets Firms



Sources: World Economic Outlook Chapter 2 October 2023.

Note: The figure shows z-scores (variable minus its mean, all divided by its standard deviation) calculated over the period 2004:Q1 to 2023:Q2 at quarterly frequency. Shaded areas in each panel highlight the period from 2021 onward, when realized inflation began notably rising.

# Central Banks' models generally assume Full-Information Rational Expectations

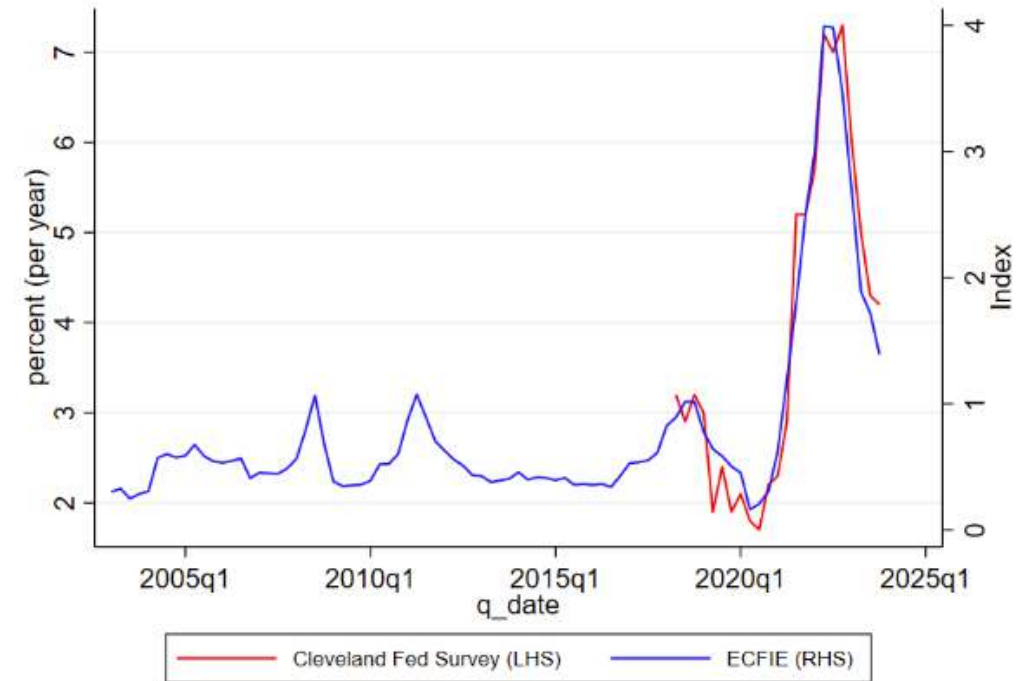


# ECFIE: Earning-Calls based Firm's Inflation Expectations

- New measure of firms' inflation expectations based on text analysis of firms' earnings calls to capture firms' intensity of discussion of near-term inflation expectations.
- Human judgment and ChatGPT to identify two set of key words: **inflation** and **expectations** at the sentence level, Then Bag-of-words" (NL Analytics).

- $$ECFIE\ Index_{t,i} = \frac{\sum Inflation\ Expectation\ Sentences_{t,i}}{Total\ Sentences_{t,i}}$$

## US ECFIE Index and Survey-based Firms' Inflation Expectations



Correlation = 0.9755

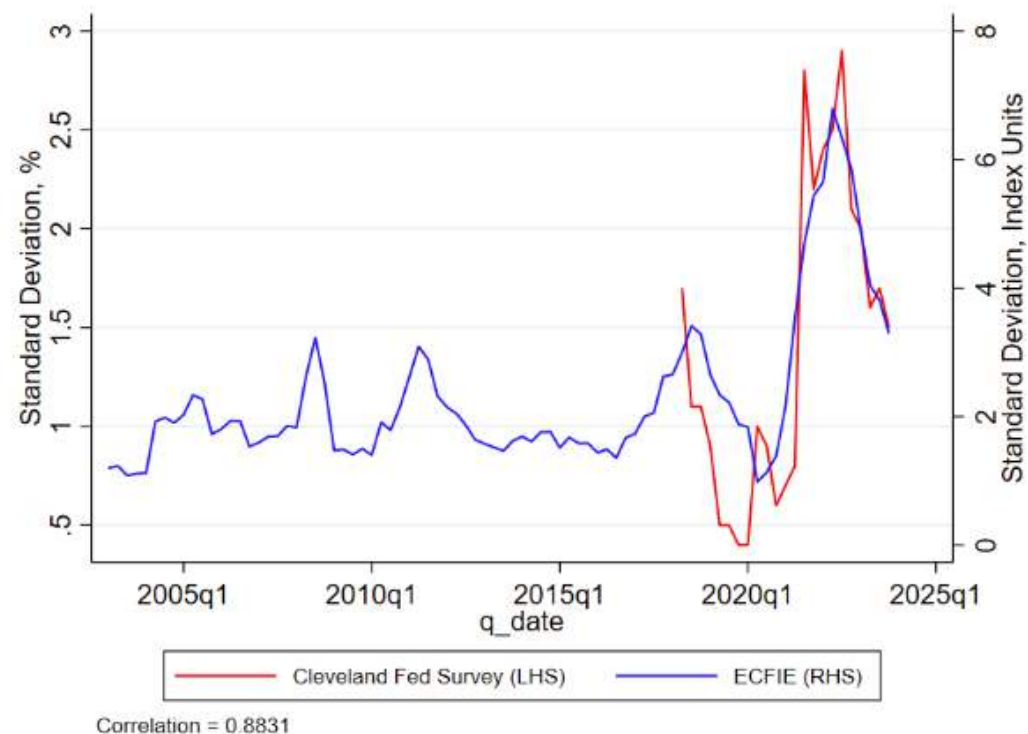
Source: Albrizio et al. 2023.

Note: The figure shows ECFIE Index according to the information content extracted from the earnings call (right scale) and the US firms' survey is conducted by the Cleveland Fed (left scale) for US. The ECFIE is calculated from a text analysis using transcripts of US based companies. ECFIE = earnings call firm inflation expectations



# Evidence from firms' inflation expectations: Deviations from FIRE

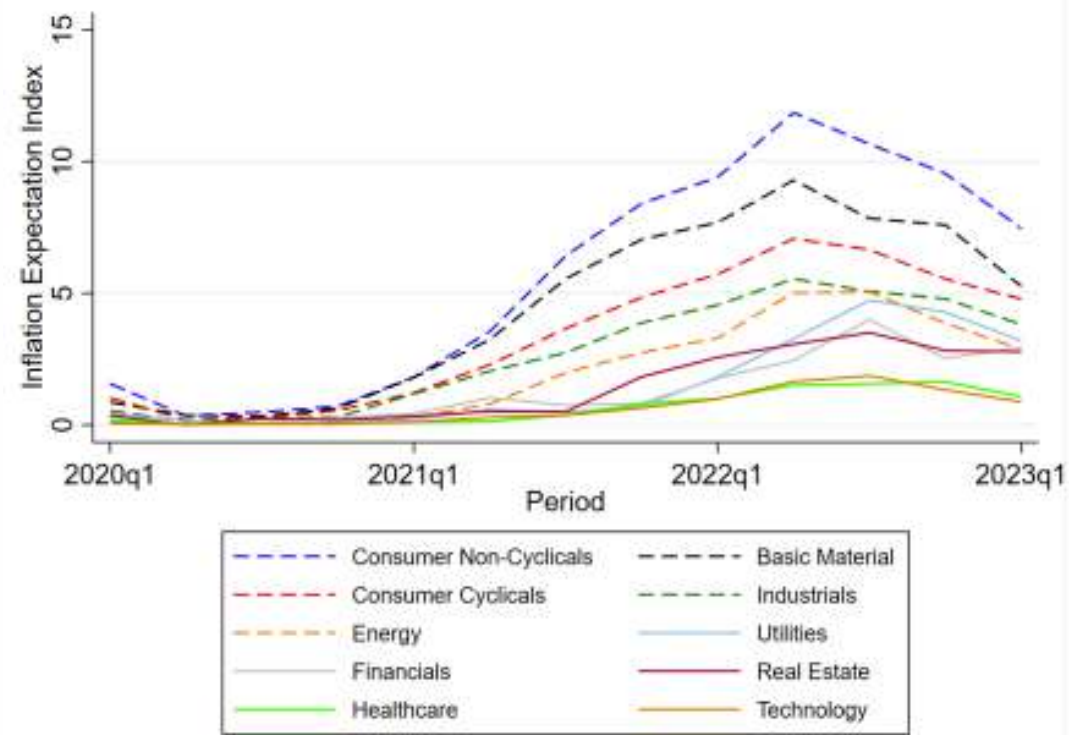
## Disagreement between firms' expectations



Source: Albrizio et al. 2023.

Note: Disagreement is calculated as the standard deviation of the index across firms at each point in time.

## ECFIE Index across sectors

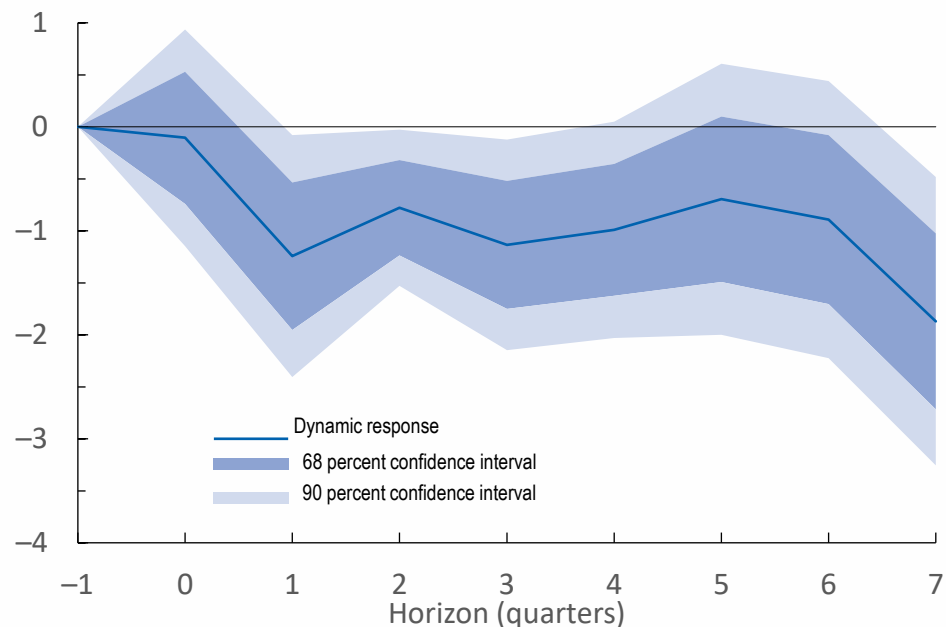


Source: Albrizio et al. 2023.



# Why expectations are important for central banks policymaking?

Role of Attention in Monetary Policy Effectiveness  
(Percent of ECFIE standard deviation)



Sources: Albrizio et al. 2023.

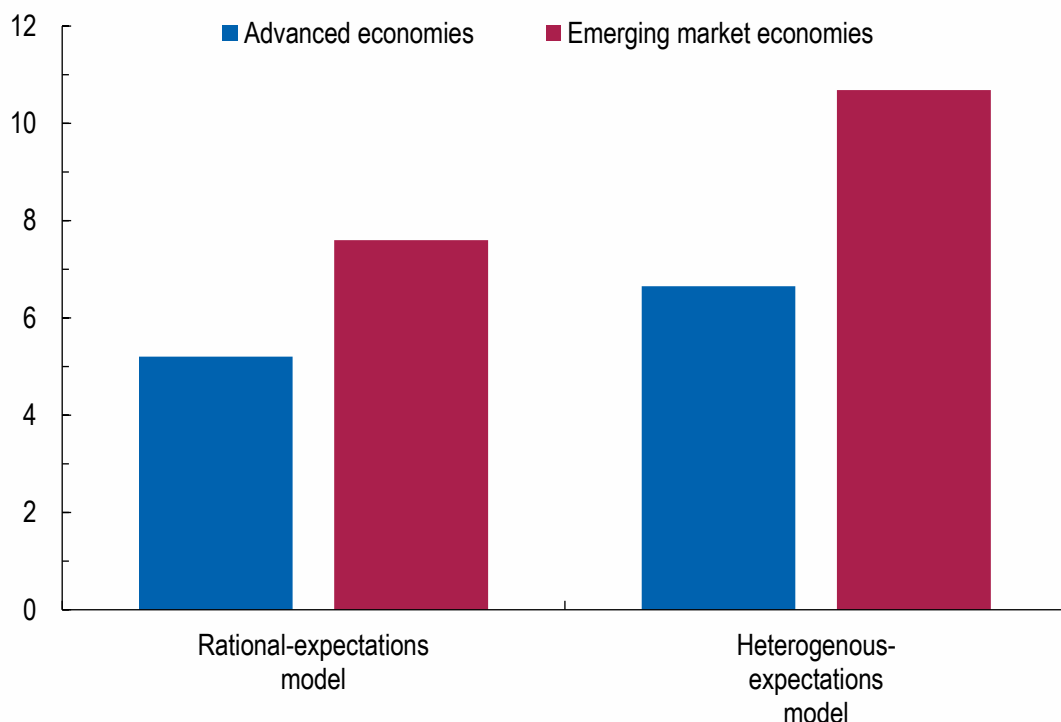
Note: The line in the figure is the estimated cumulative impulse response to a one-standard-deviation contractionary monetary policy shock for a firm that is one standard deviation above the average firm attentiveness in its sector. Shaded areas represent 68 (outer) and 90 percent (inner) confidence intervals. ECFIE = Earnings-Calls-based Firm Inflation Expectations index.

- **Monetary policy effectiveness is boosted when firms pay attention to the Fed**
- Attention to the Central Bank index based on text analysis of firms' earnings call.
- Firms more attentive to the Fed's actions decrease their inflation expectation relative more following a monetary policy shock
- This corresponds to an amplification of about one-fourth by sector.

# Why expectations are important for central banks policymaking?

## Sacrifice Ratios under Alternative Expectations Processes

(Percent of output forgone to lower inflation by 1 percentage point)



Source: World Economic Outlook Chapter 2 October 2023

Note: The sacrifice ratios in the figure are calculated under the assumption that monetary policy is implemented to bring the inflation rate down by 1 percentage point over three years.

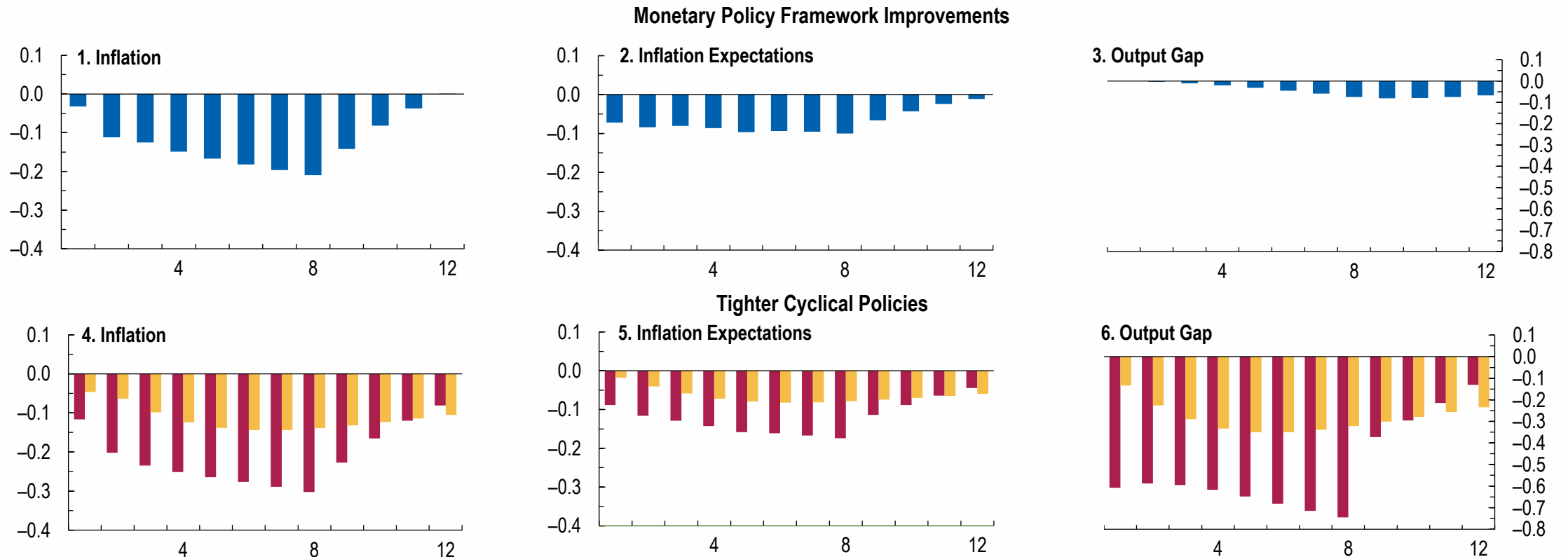
- **The more backward-looking learners in the economy, the higher the sacrifice ratio is.**
- Higher sacrifice ratio is driven by backward-looking learners. These agents do not fully incorporate the anticipated impact of monetary policy going forward.
- The effect is higher in emerging market economies since they typically have a higher share of backward-looking learners.

# Can central banks use the expectation channel as policy tool?

## Policy Interventions to Hasten the Reduction of Inflation and Inflation Expectations

(Percentage point, deviation from baseline)

- Monetary policy framework and communications strategy improvements
- Fiscal consolidation
- Monetary tightening



Source: World Economic Outlook Chapter 2 October 2023

Note: Improvements in communication strategies is calibrated as the difference of the forward-looking share between the representative advanced and emerging market economies. Fiscal consolidation shock is assumed to be a 1% consolidation maintained for 2 years. The monetary policy tightening exercise uses a standard 100bps tightening.

# What CBs should do to leverage inflation expectations as a tool?

- ▶ Measurement - higher frequency data, AI
- ▶ Better understating of mechanism through which agents update their beliefs
- ▶ Breaking through the veil of inattention: Communication (Coibion and others 2020, D'Acunto and others 2020, and Weber and others 2022, among others)
  - simple and repeated messages
  - Investing in financial literacy education
  - Emphasizing the goal and not the instruments ( “whatever it takes”)
  - Target the message to the conjuncture
  - Use sources relevant for the target audience (TV)
  - Overall: explanation, engagement, and education (Haldane, Macaulay, and McMahon (2020))
- ▶ Improve the MP framework to increase credibility
  - Transparency
  - Independency
- ▶ Incorporate agents' heterogeneity in CB models: especially to predict turning point (Reis and others)

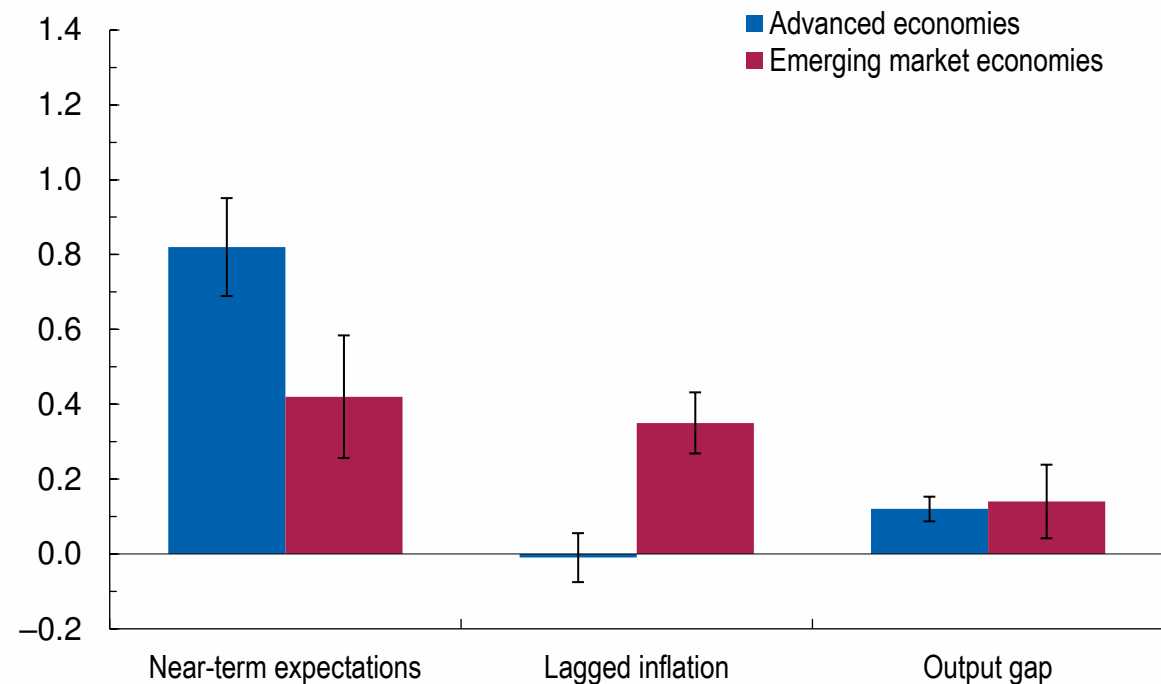


**Thanks for your attention**

# Hybrid Phillips Curve: IV approach

## Hybrid Phillips Curve: Key Instrumental Variables Coefficients

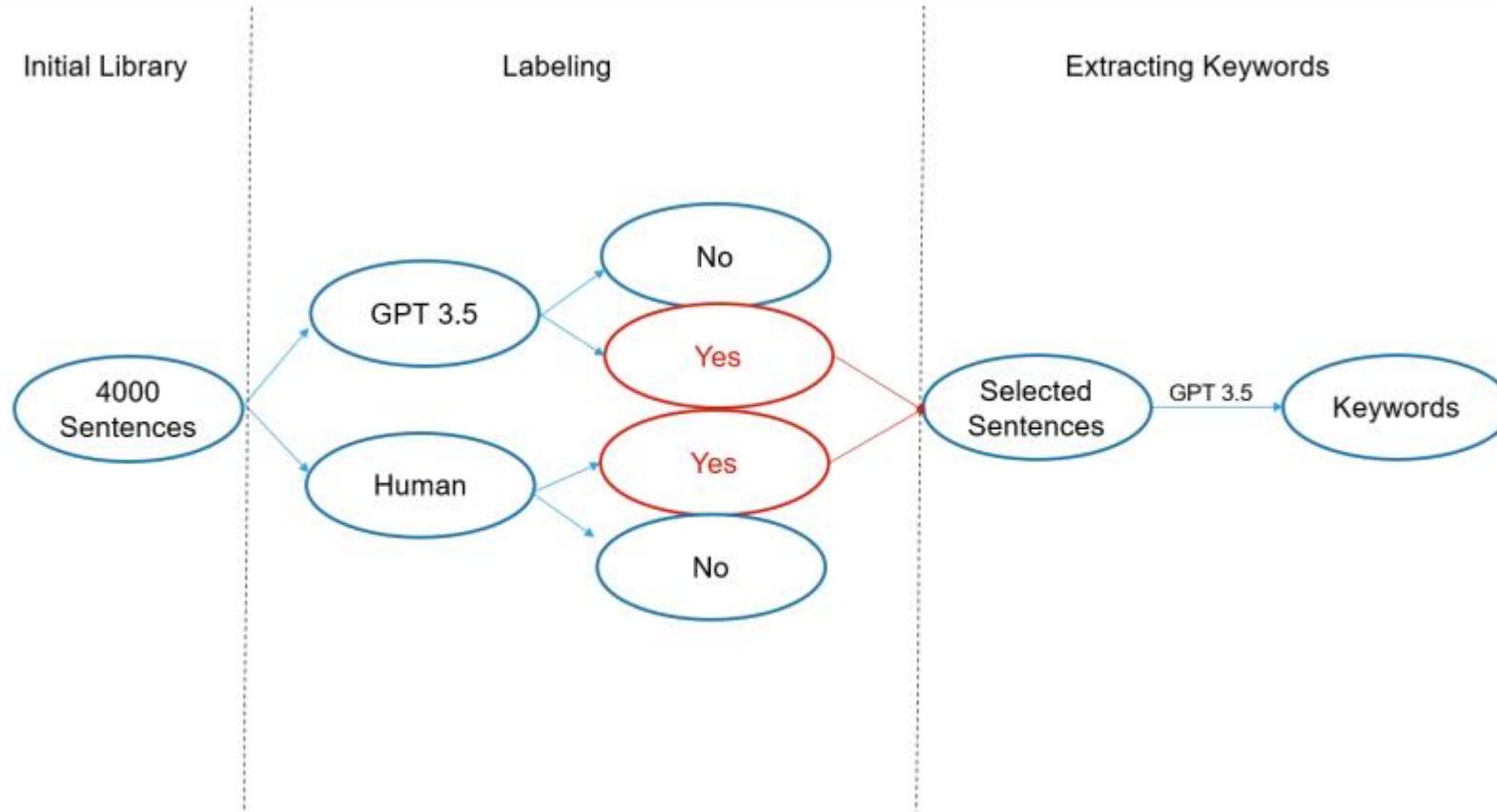
*(Regression coefficients)*



Source: World Economic Outlook Chapter 2 October 2023

Note: The figure shows coefficients from linear regressions estimated by pooled times series using quarterly data from 1991:Q2 through 2023:Q1, over 32 AEs and 21 EMs using Consensus Forecast. The dependent variable is quarterly headline inflation, seasonally adjusted at an annualized rate. Whiskers show the 90 percent confidence intervals with Driscoll-Kraay standard errors.

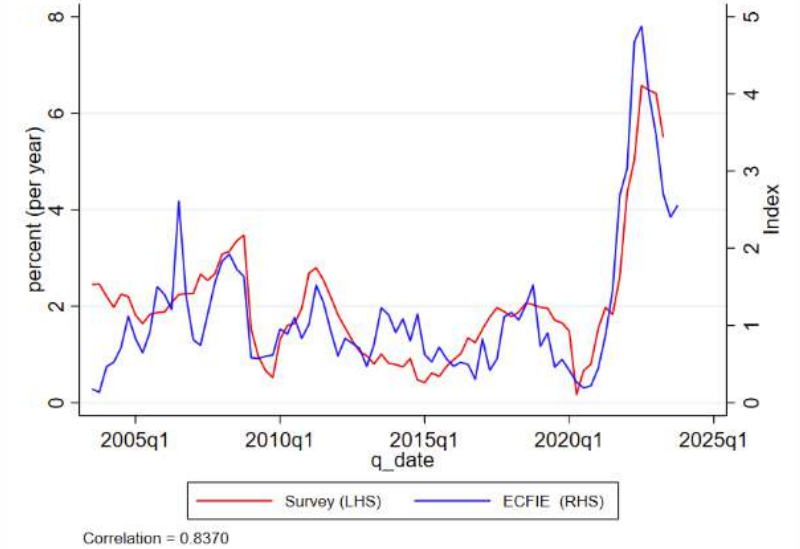
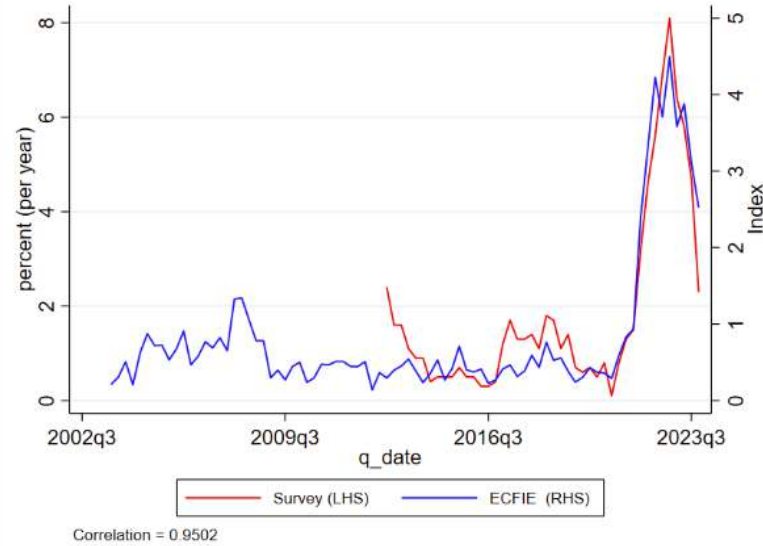
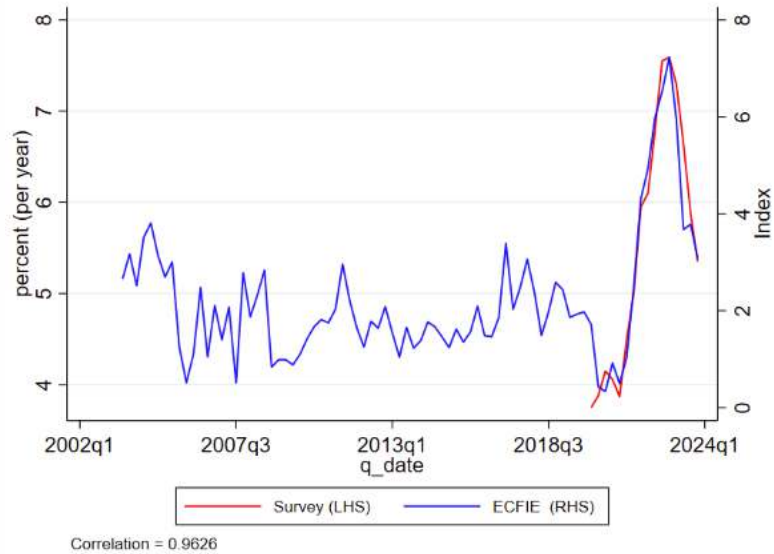
# Process to construct the ECFIE index



*Notes:* This figure show steps to extract the inflation and expectations keywords to construct the ECFIE index.



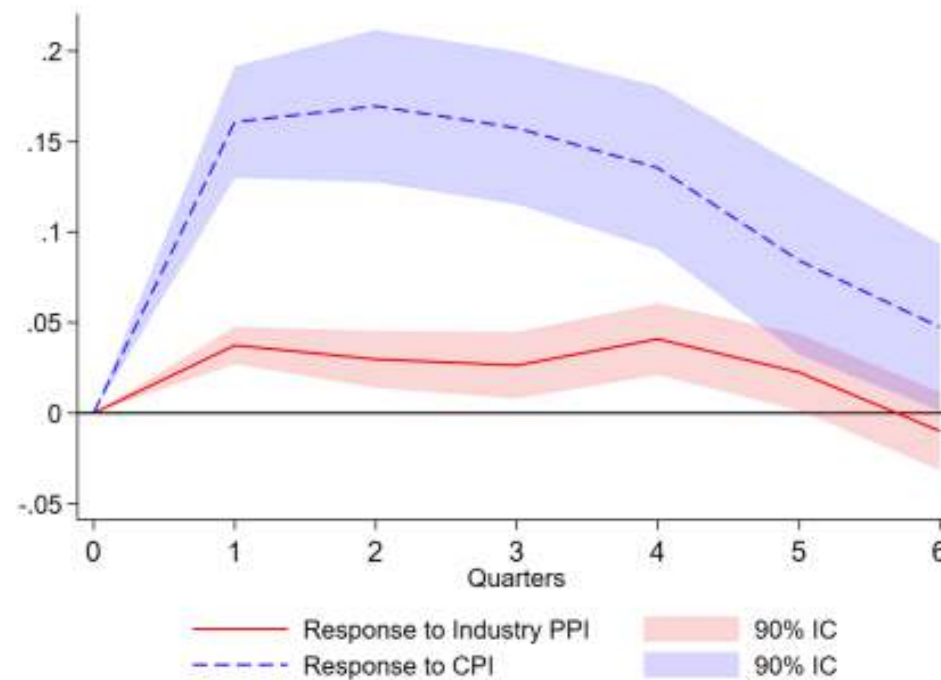
# ECFIE: Mexico, Italy and Sweden



# Deviation from FIRE

Inflation expectations reacts to aggregate as well as industry level price information

*(Regression coefficients)*



Source: Albrizio et al. 2023.

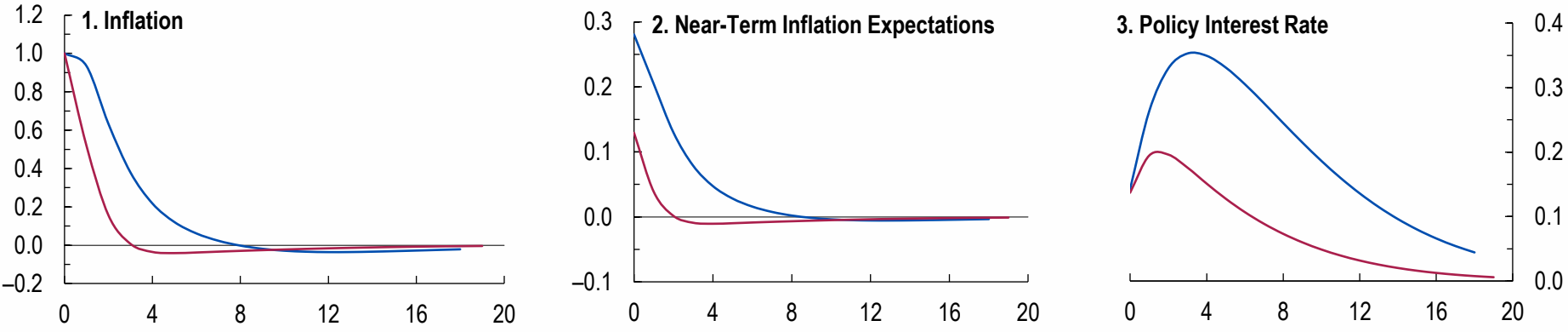
Note: This figure shows the Impulse Response Function (IRF) for US firms' inflation expectations index according to the information content extracted from the earnings call on innovations in aggregate inflation (blue line) vs. changes in industry inflation (red line). The confidence intervals are set at 90%. The horizontal axis shows the impulse-response horizon measured in quarters.

# Cost-push shocks are more persistent and policy less potent with more backward-looking learners in the economy.

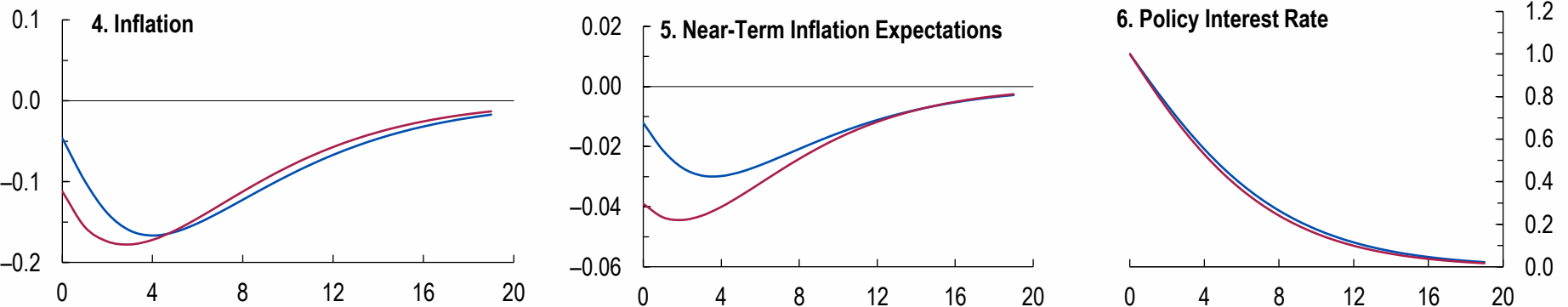
Macroeconomic Responses to Shocks Conditional on Agents' Expectations Formation  
(Percentage points)

— Heterogeneous expectations model    — Rational expectations model

Cost-Push Shock



Monetary Policy Shock



Source: IMF staff calculations.  
 Note: Numbers on the horizontal axes in the panels represent quarters after the shock at time 0. Panels 1–4 show the impulse responses to a cost-push shock that increases inflation by 1 percentage point. Note that the output gap increases after this shock, because potential output falls by more than real GDP. Panels 5–8 show the impulse responses to a temporary monetary policy shock that increases the policy rate by 100 basis points. Note that the monetary policy shock's impact on inflation peaks after five quarters in the heterogeneous-expectations model and after three quarters in the rational-expectations model.