

Cast out the pure? Inflation and relative prices on both sides of the Atlantic*

Emanuele Franceschi Chiara Osbat Miles Parker
EUROPEAN CENTRAL BANK

What is inflation?

- “We may regard price changes, therefore, as partly due to causes arising from the commodities themselves raising some, lowering others, and all different in degree, and, superimposed upon the changes due to these heterogeneous causes, **a further change affecting all in the same ratio arising out of change on the side of money.**”

J. M. Keynes

- The annual change in the harmonised index of consumer prices.

European Central Bank

Research questions

- How to tell apart changes in relative prices from *pure* inflation?
- Do sectoral shocks only affect relative prices or can they feed into pure inflation?
- Was the inflation surge only a matter of relative prices or was it also pure inflation?
- Any difference between the euro area and the United States?

What we do

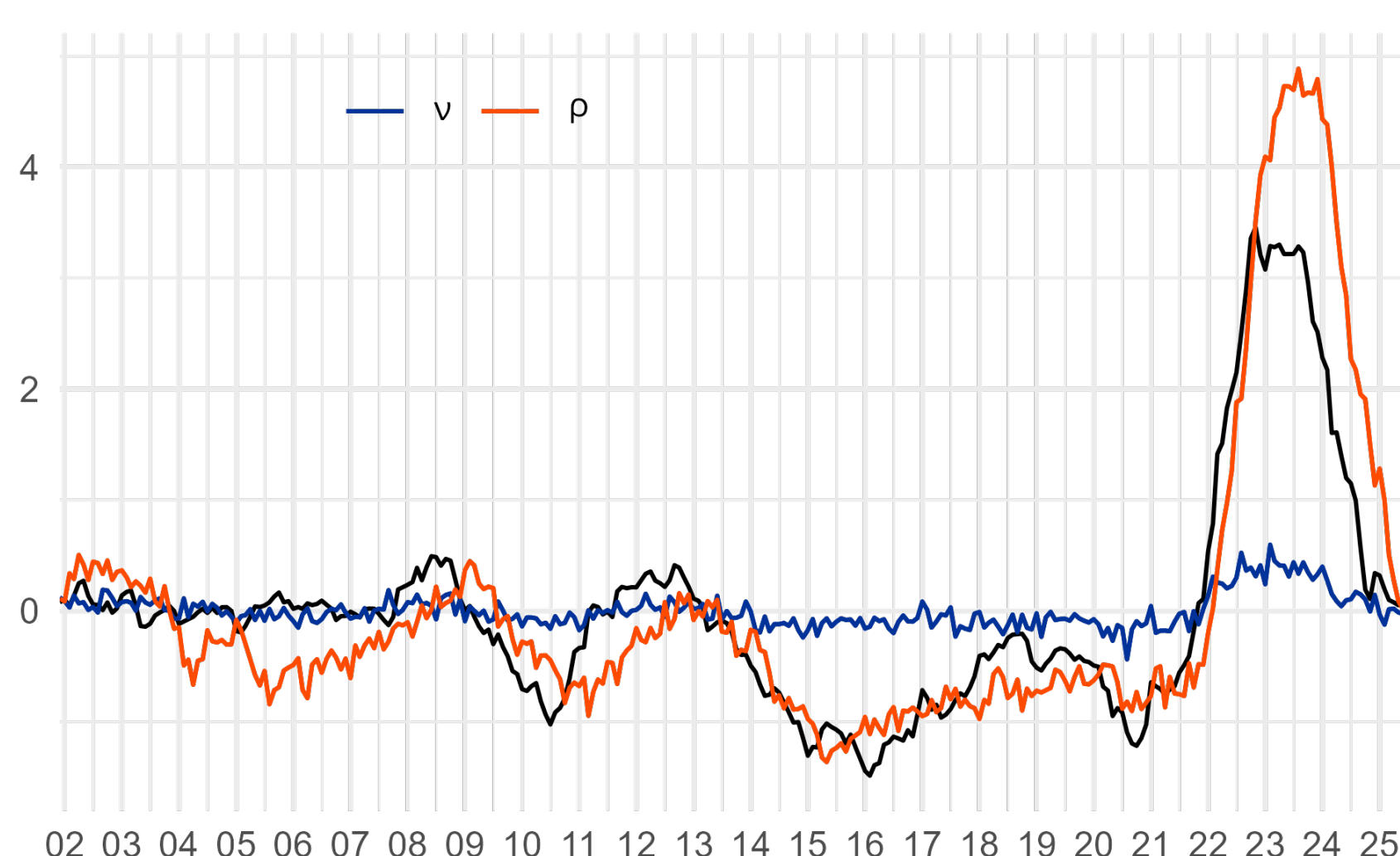
Build on Reis & Watson (2010), who:

- Estimate a dynamic factor model on many inflation sub-categories for the US – end of quarter on end of quarter
- Project factors into **pure inflation**, which loads uniformly, and **aggregate relative prices**.

A more flexible approach:

- Monthly frequency and longer horizon to account for heterogeneous price rigidity
- Bayesian approach: loading restriction on pure inflation is a prior, so data can reject it

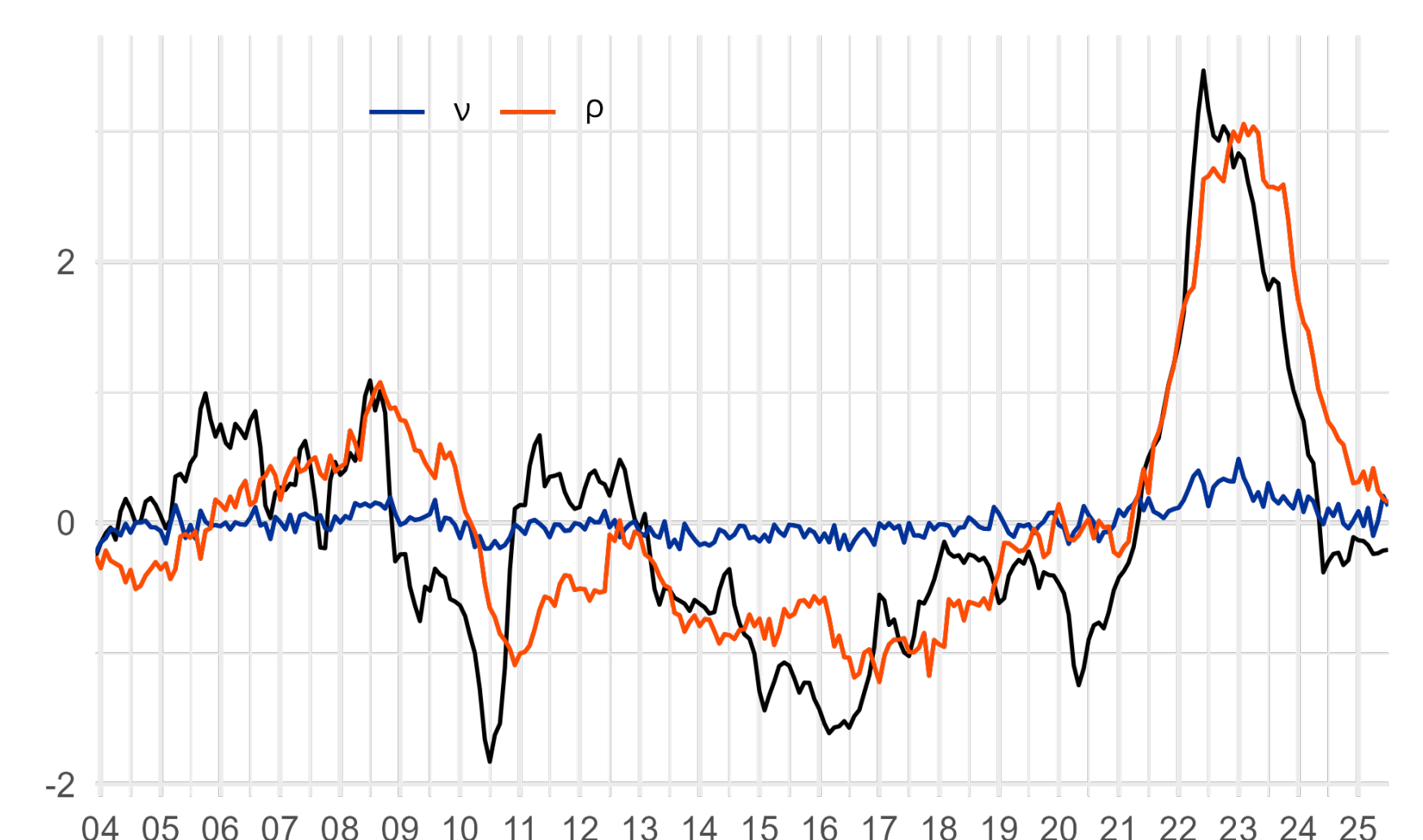
Euro area



Conclusion

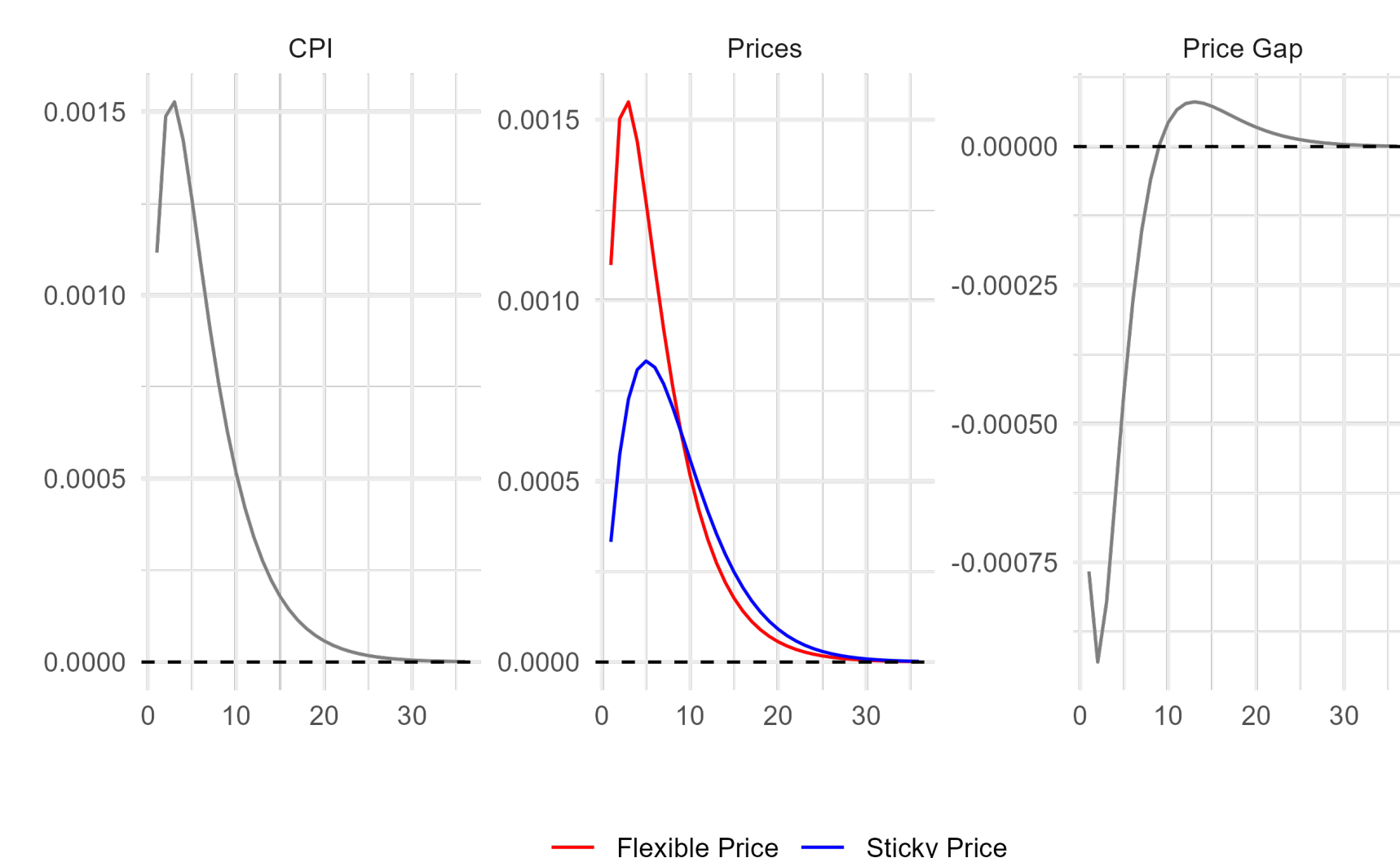
- Aggregate shocks feed somewhat into relative prices**
- Some sector-specific shocks do affect ‘pure’ inflation**
- Relative prices explain bulk of headline inflation movements in past 25 years, especially during pandemic period**
- Nonetheless, also historically large movements in pure inflation**

United States



Response to money shock

- Using a modified version of Ghassibe (2021), we look at impact of a temporary 1% increase in money stock.
- Differences in price stickiness, plus production network effects result in relative price differentials at policy-relevant horizons



An overidentified BDFM

$$\Pi_t = \Lambda F_t + \varepsilon_t \text{ with } \varepsilon_t = \Phi \varepsilon_{t-1} + e_t$$

$$F_t = \Gamma F_{t-1} + \eta_t$$

Factors identification restrictions follow Bai & Wang (2015)

- $\Lambda_{K \times K}$ is lower triangular, $\text{diag}(\Lambda_{K \times K}) > 0$
- $\eta_t \sim iid(0, I)$

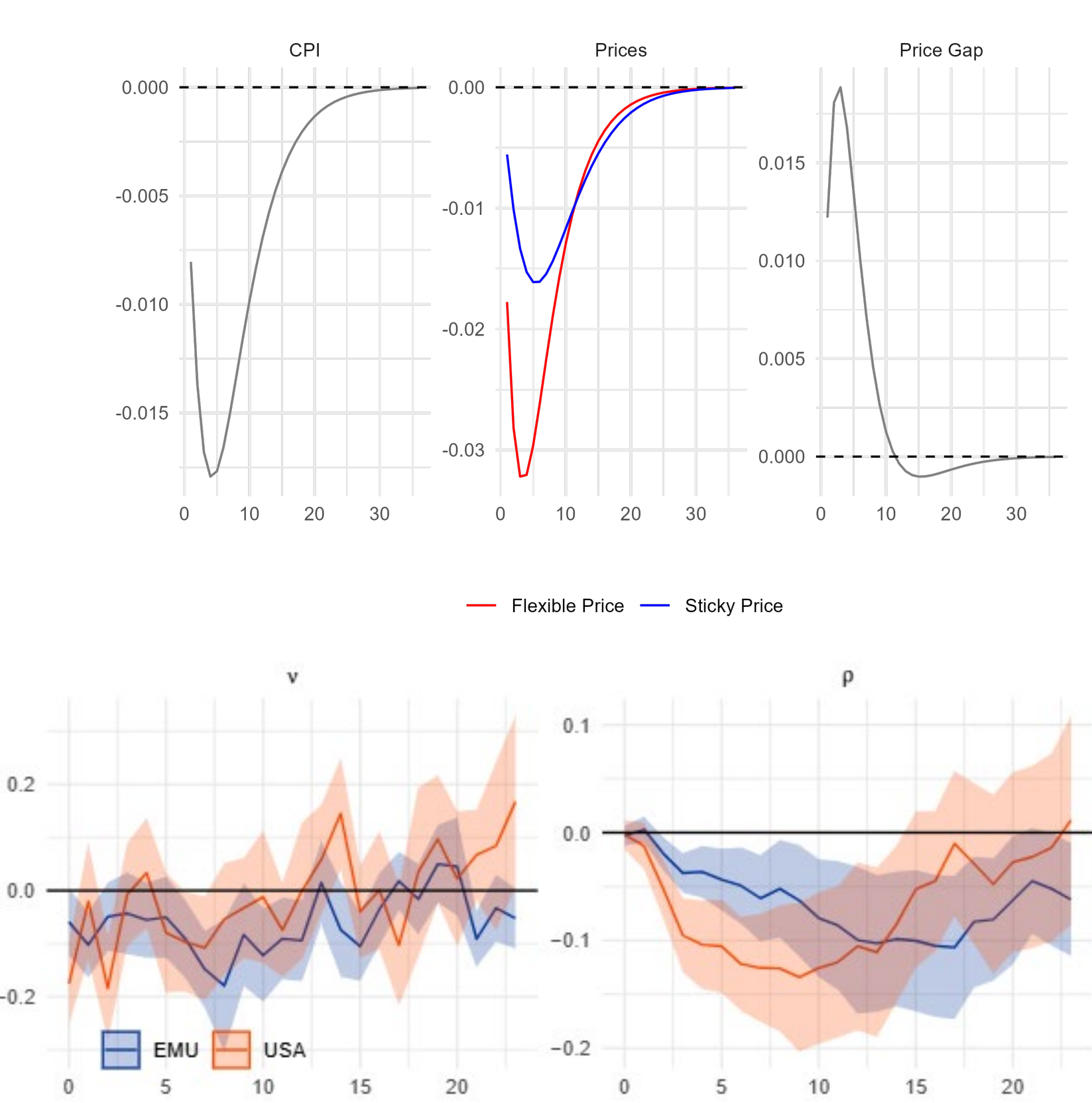
Additional uniformity restriction:

- the first column of Λ is centred around 1 - the “pure” factor
- $\Lambda F_t = 1a_t + \gamma R_t$

So that

$$\begin{aligned} v_t &= a_t - E(a_t | F_{t-1}) \\ \rho_t &= E(F_t | R_{t-1}) \\ \pi_t^{\text{HICP}} &= v_t + \beta \rho_t + u_t \end{aligned}$$

Response oil supply shock



- Ghassibe, Mishel (2021). “Monetary policy and production networks: an empirical investigation”, *Journal of Monetary Economics*, 119, pp. 21–39,
- Reis, Ricardo and Mark W. Watson (2010). “Relative goods’ prices, pure inflation, and the Phillips correlation”, *American Economic Journal: Macroeconomics* 2.3, pp. 128–157

Inflation: Drivers & Dynamics Conference 2025

European Central Bank and Federal Reserve Bank of Cleveland

Contact: Miles.Parker@ecb.europa.eu

* The views expressed here are those of the authors and not necessarily those of the European Central Bank nor its Governing Council.