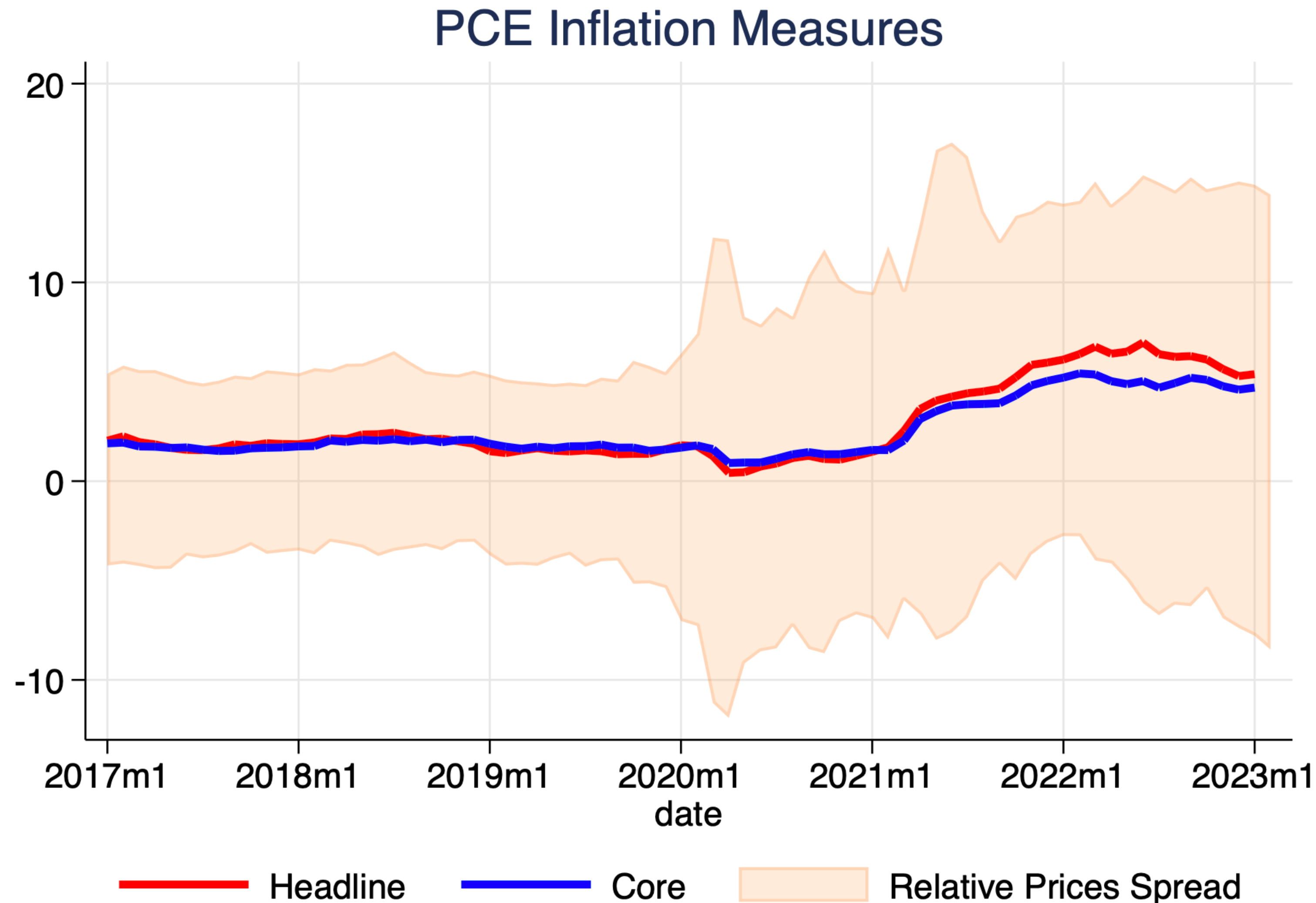


**WHAT IS DRIVING INFLATION?
WILL IT STAY HIGH AND WHAT
CAN POLICY DO ABOUT IT?
(OR: HOW DO YOU ANSWER THESE?)**

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LSE

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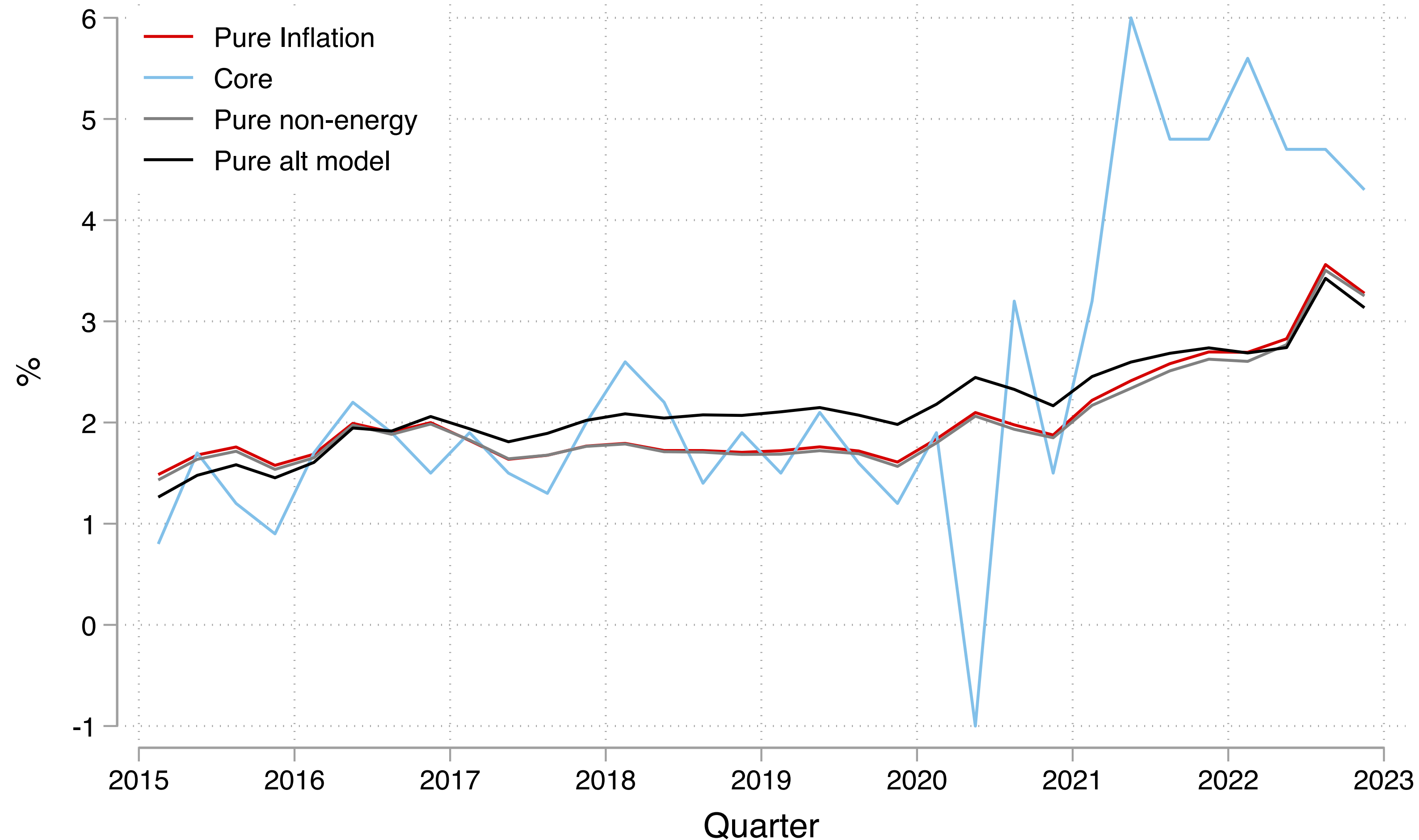
First candidate: it is all relative prices



- Large rise in relative price variability in the data
- Claim: rise in inflation not so much about pure inflation
- Poor man's estimate of pure inflation: core inflation
- **First answer:** pandemic, supply bottlenecks, Ukraine.
- **Second answer:** relative-price dispersion is still high, maybe price controls or subsidies.

First candidate: it is all relative prices

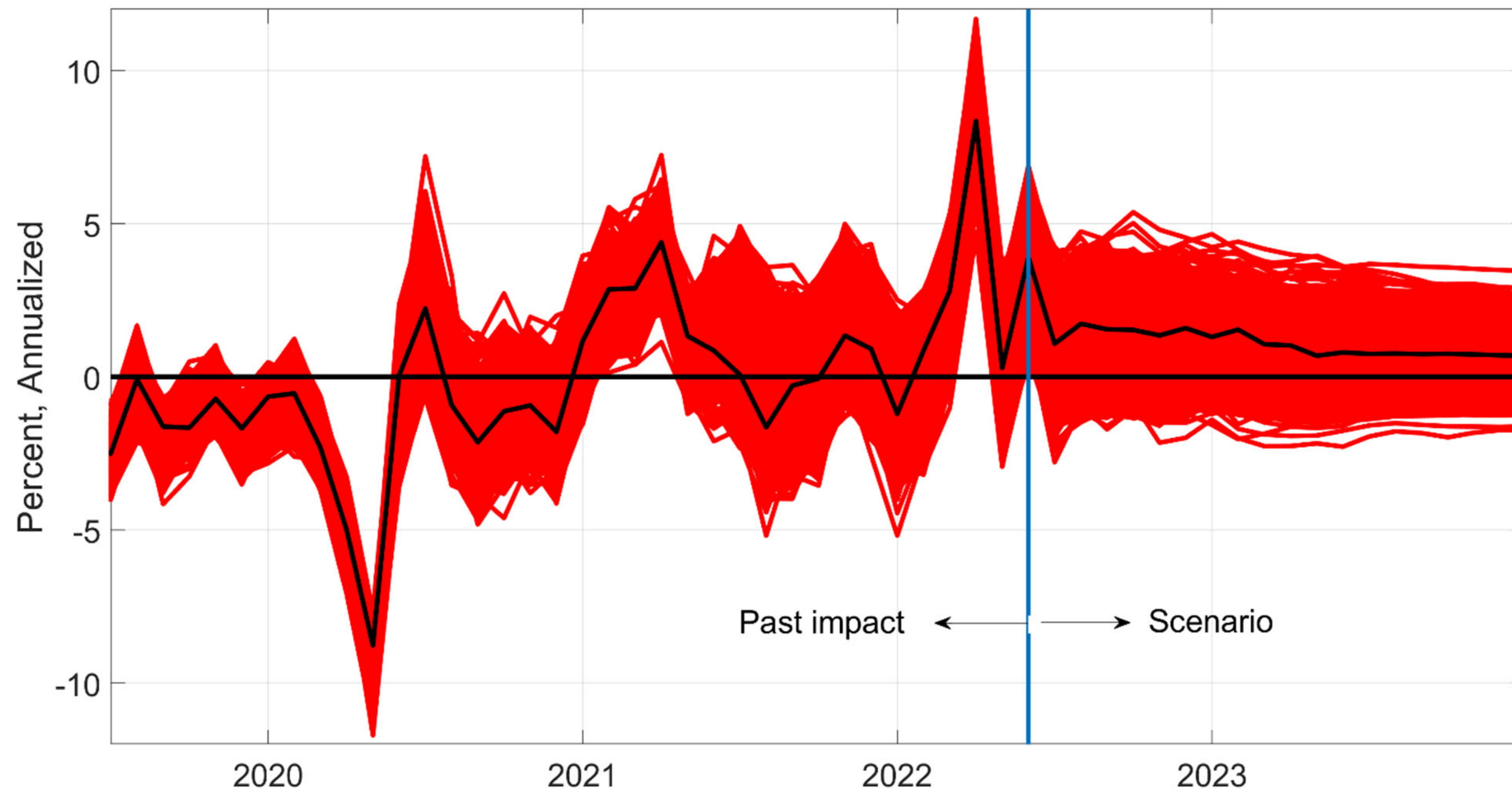
Pure inflation in the US: baseline and alternatives



- But...
- In a model with nominal rigidities, only fully anticipated monetary policy drives pure inflation. Any other shock changes relative prices.
- Reis-Watson dynamic factor model to estimate pure inflation. Found accounts only for 7-23% of the variability of headline inflation.
- True now as well...

First candidate: it is all relative prices

Figure 3: Monthly headline CPI inflation caused by gasoline price shocks, 2019.6-2023.12

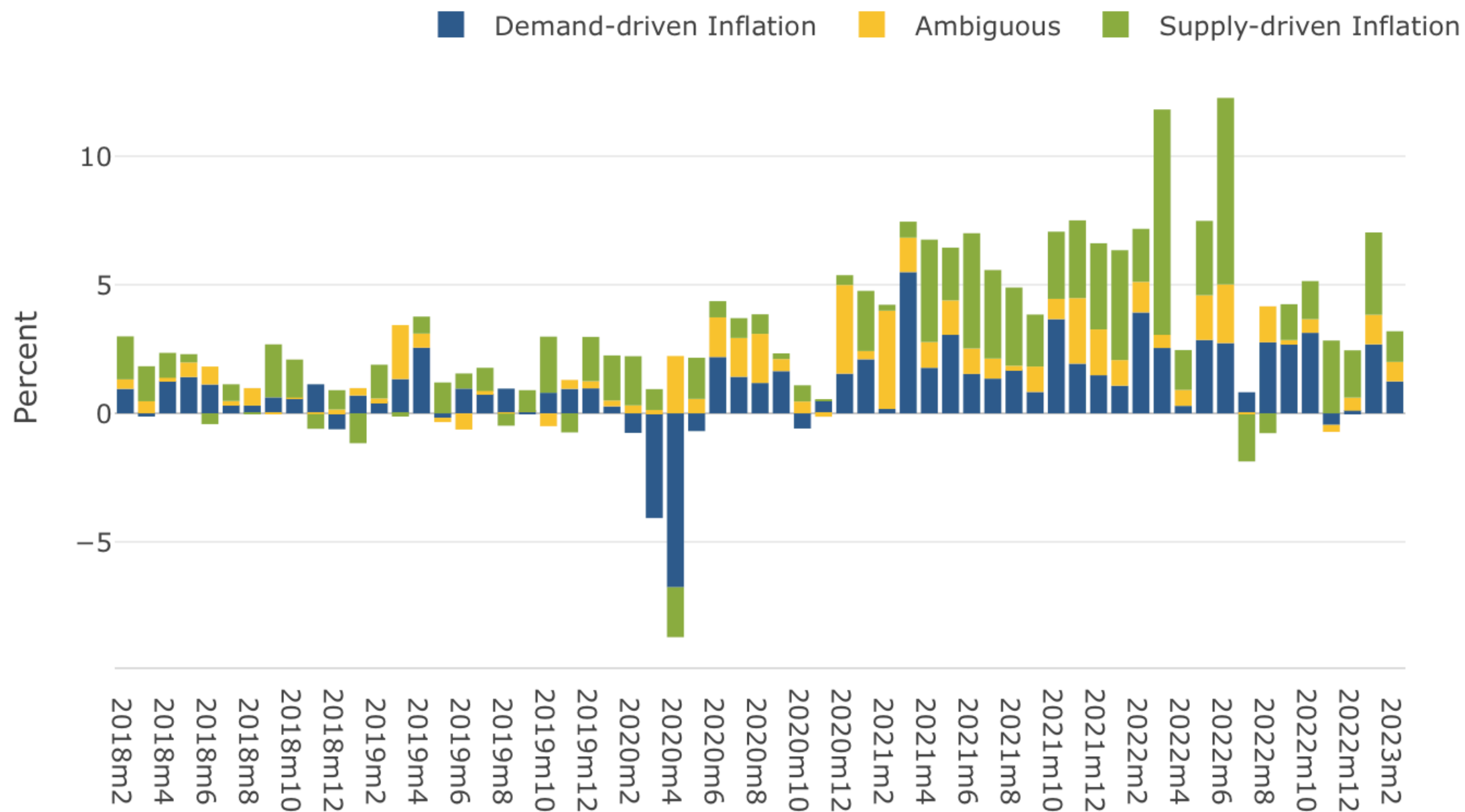


NOTES: Authors' computations based on estimated model (1). The expected path is shown as the black line. The other lines capture the uncertainty about this path based on an approximation to the 68% joint credible set.

- But...
- We are supposed to solve for prices, not to use them as final explanations
- With fast global recovery, oil prices were not just driven by the invasion of the Ukraine
- Kilian and Zhu (2022) isolate supply shock to gas prices.
- Explain short-lived rise in inflation in 2022, little in 2023

Second candidate: it is all supply

Figure 1: Supply- and Demand-Driven Contributions to Annualized Monthly Headline PCE Inflation



- Tricky, in Walrasian general equilibrium what are supply and demand?
- Clever answer: weighted average of sectoral inflation including sectors for which prices rose but quantities fell.
- **First answer:** absolve monetary policy from the inflation hike.
- **Second answer:** do not bring inflation down quickly, recall optimal targeting rules.

Second candidate: it is all supply

$$u(C) - v(L) \quad C = \left(C_a^{1-1/\eta} + C_b^{1-1/\eta} \right)^{\eta/(\eta-1)}$$

$$C_a = \left(\int_0^1 C_a(i)^{1-1/\sigma} di \right)^{\sigma/(\sigma-1)} \quad \text{same for } b$$

$$Y_a(i) = A^{\theta_a} L_a(i)^\alpha \quad \text{same for } b$$

$$p_a = \lambda_a \left(\frac{w_t L_a(i)}{\alpha Y_a(i)} \right) + (1 - \lambda_a) \mathbb{E} \left(\frac{w_t L_a(i)}{\alpha Y_a(i)} \right) \quad \text{same for } b$$

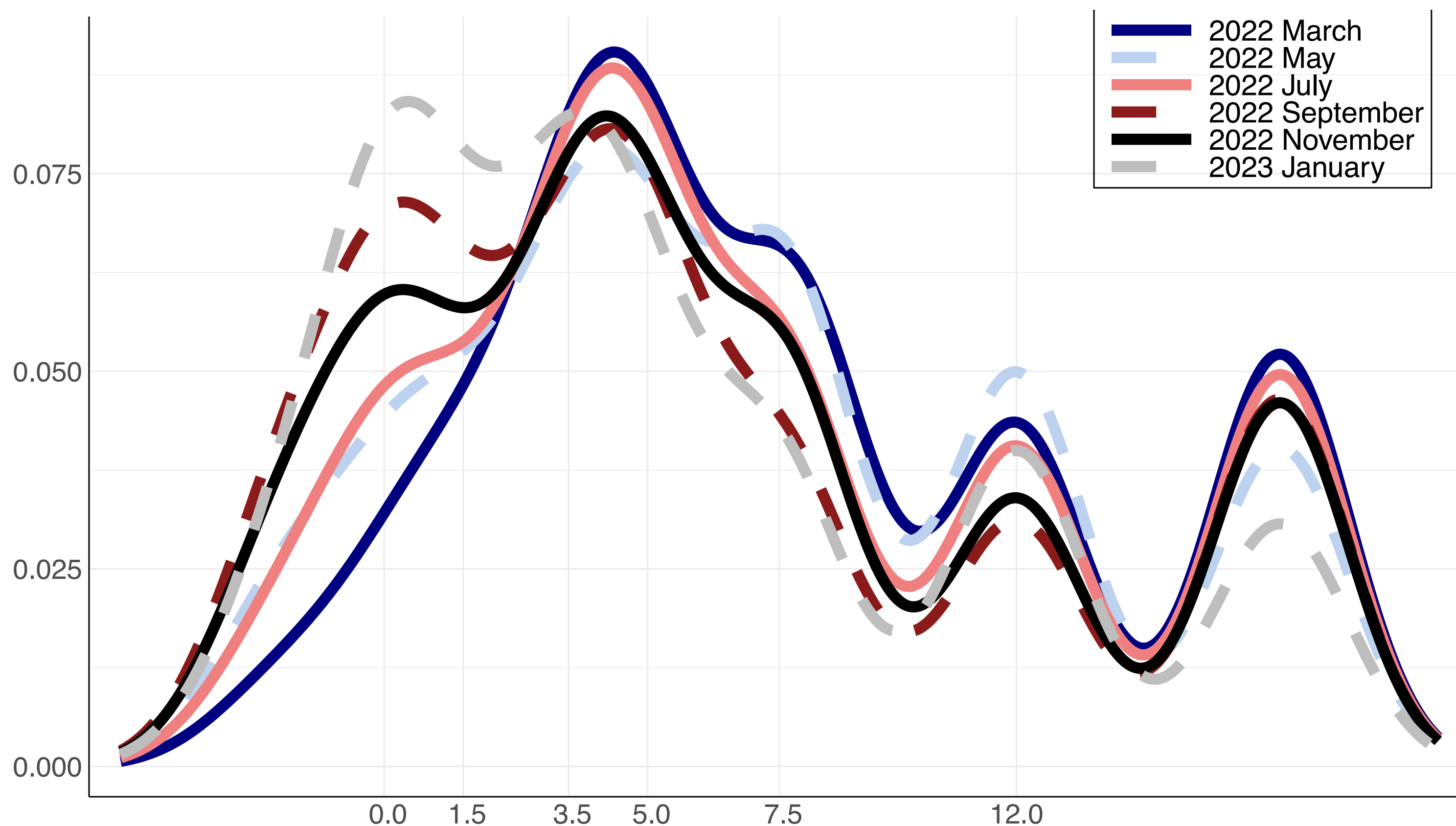
$$L = L_a + L_b \quad Y_a = C_a + G^{\gamma_a} \quad , \quad Y_b = C_b + G^{\gamma_b}$$

- Textbook new Keynesian model, but with two sectors
- Heterogeneity in incidence of:
 - θ - technology shock
 - γ - public purchases shocks
 - λ - nominal rigidities
- Also, monetary policy shock to nominal income (to keep the model static)
- Pencil and paper solution

Second candidate: it is all supply

- Does output in sector b (Y_b) rise following a shocks that raises inflation in this economy?
- If positive monetary policy shocks (aggregate demand)
 - It may not if $\lambda_a \ll \lambda_b$, inelastic labor supply, because Y_a rises more, draws in labor
- If positive government purchases (aggregate demand)?
 - It may not if $\gamma_b \ll \gamma_a$ so purchases fall on other good, again draws in inputs.
- If negative technology shock (aggregate supply)
 - It may not if $\theta_a \ll \theta_b$ because more affected by the shock
- Can get any decomposition of inflation between supply and demand for any of the shocks. Aggregate demand is not the aggregation of demands.

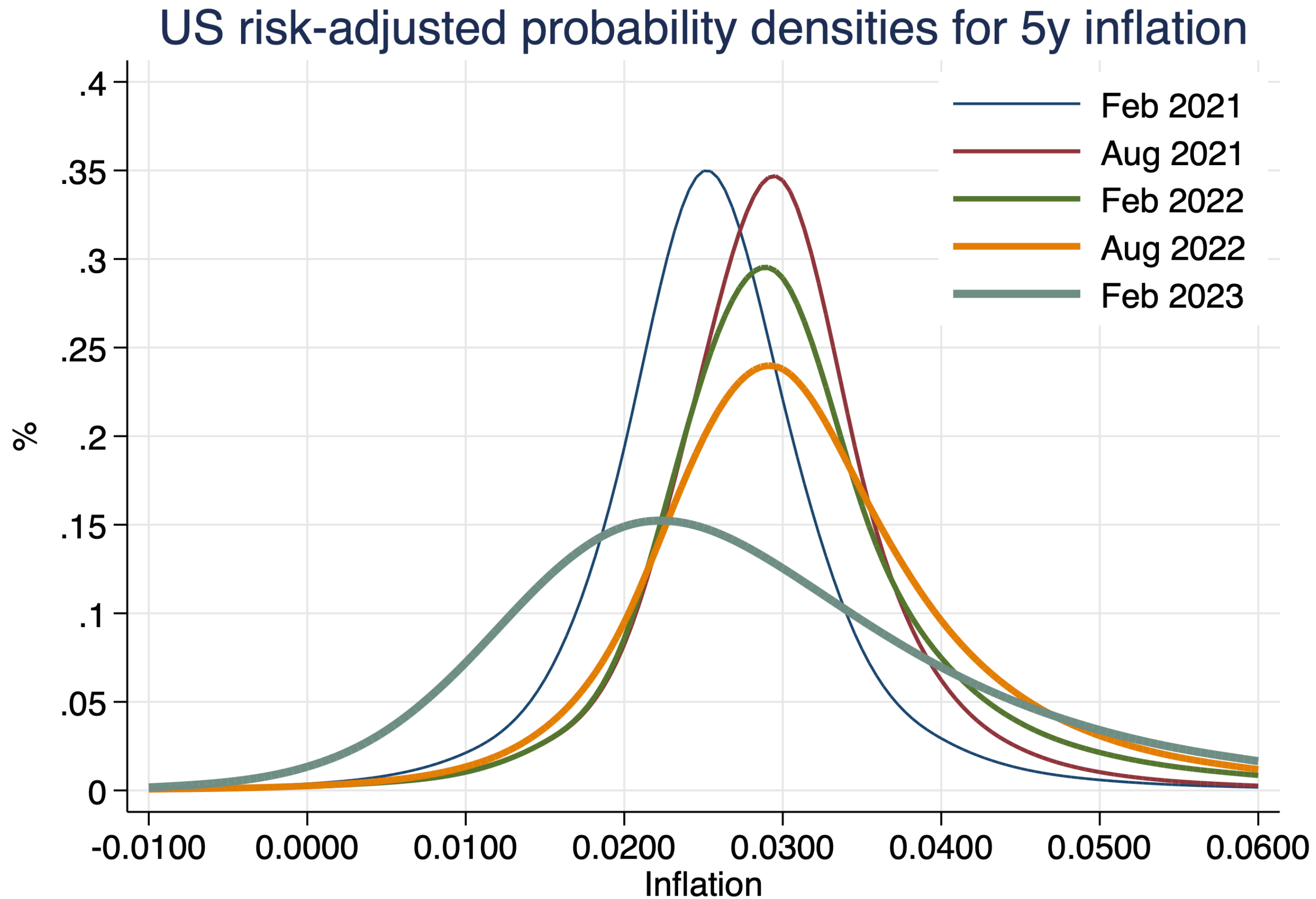
Third candidate: it is expectations



Survey (MSC), 1-year ahead , disagreement

- Phillips curve: how much of the inflation is associated with tightness in activity, drift in expectations, or shifts in curve?
- Useful organizing framework and optimal NK policy makes this the crucial decomposition.
- Look beyond first moments
- **First answer** from short-term expectations: large part of the inflation of 2021:H2 - 2022:H1. Mix of bad policy and bad luck

Third candidate: it is expectations



Markets (options), 5-year ahead , mass in tails

- **Second answer:** remarkable re-anchoring in 2022:H2 - 2023...
- Both in surveys and in market prices, today people and markets are almost as worried about low as high inflation
- Big win from talking tough, acting tough in the last 9 months.
- Optimism about 2023-4
- Policy advice: stay on the announced course, be patient, it is paying off.

Third candidate: it is expectations

- But, expectations are as endogenous as it gets. They are a useful signal but not a driver
- Simplest model of inflation: classical dichotomy and iid real interest rates

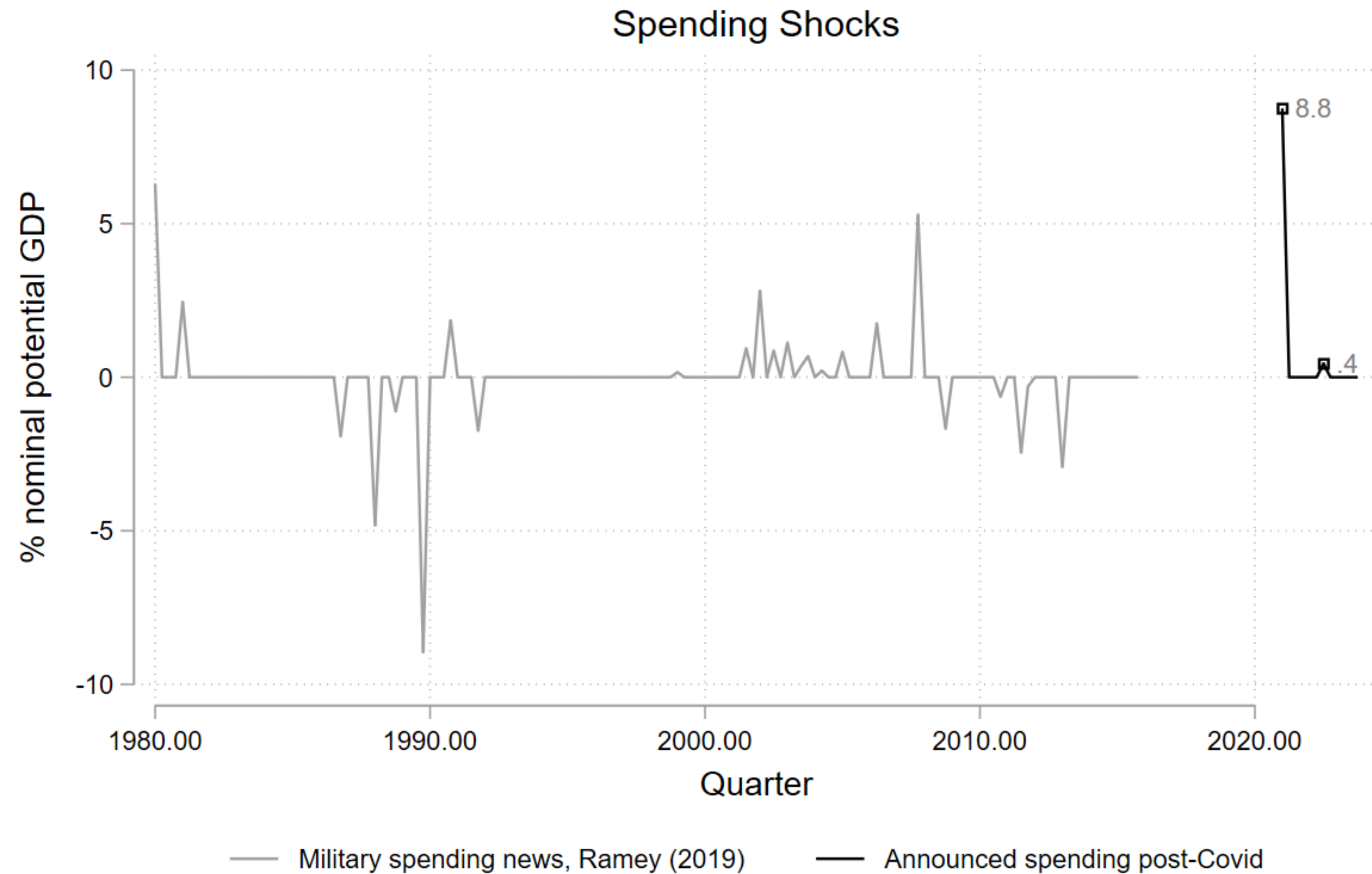
$$i_t = r_t + \pi_{t+1}^e \quad x_t = r_t - \hat{r}_t \quad i_t = \bar{\pi} + \hat{r}_t + \phi(\pi_t - \bar{\pi})$$

- Imagine that a share λ of agents have rational expectations $\mathbb{E}_t(\pi_{t+1})$, while remainder have erratic expectations $\bar{\pi} + \varepsilon_t$. Then inflation is:

$$\pi_t - \bar{\pi} = \frac{x_t + (1 - \lambda)\varepsilon_t}{\phi} + \lim_{T \rightarrow \infty} \phi^{-T} \mathbb{E}_t(\pi_{t+T} - \bar{\pi})$$

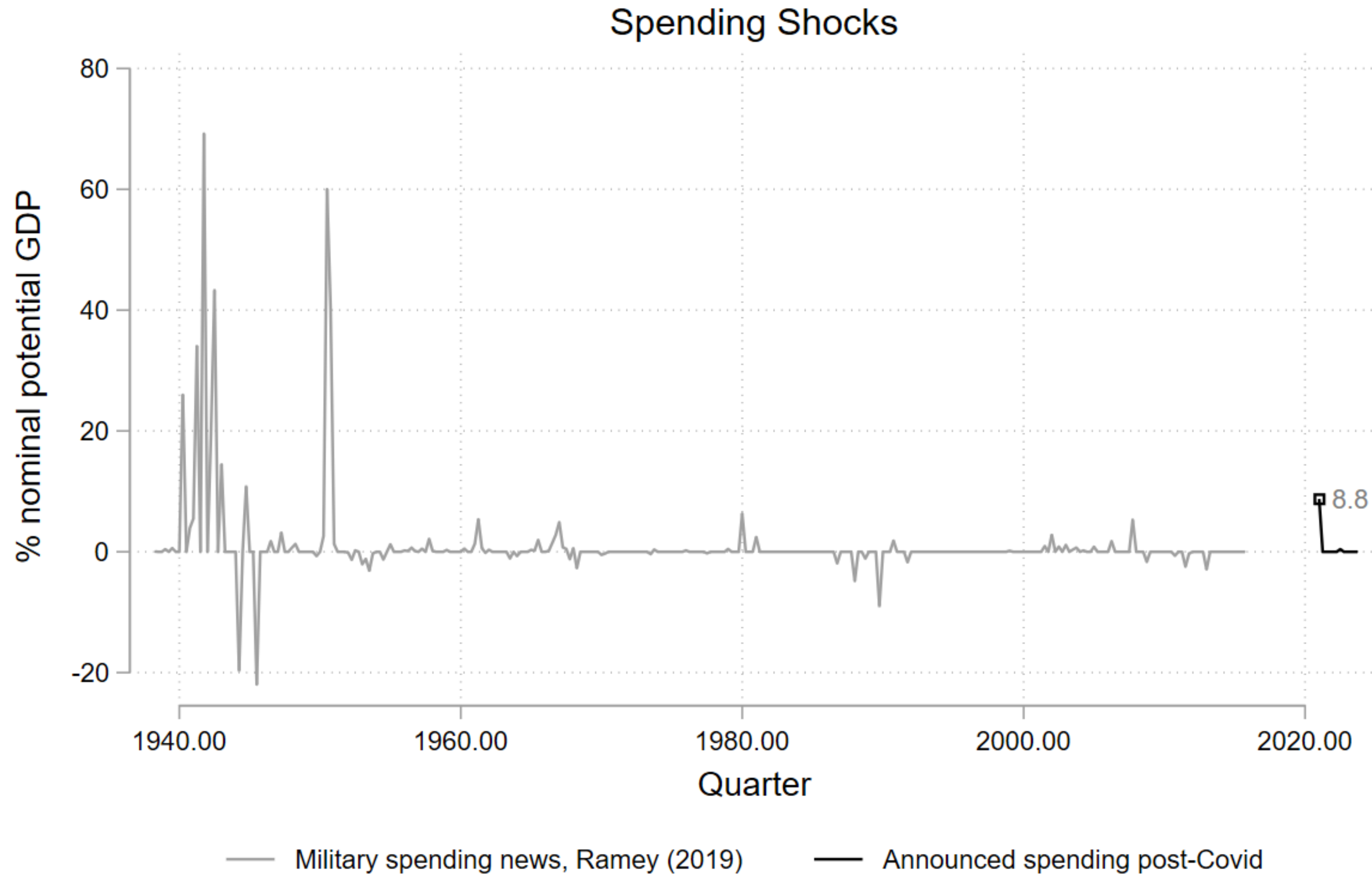
- Autonomous shocks & long-run credibility are expectational drivers of inflation. Yes.
- But, without them, $\mathbb{E}_t(\pi_{t+1}) = 0$ and so is useless. No.
- Expectations data in the plots does not distinguish between these. Just a signal.

A better approach: shocks



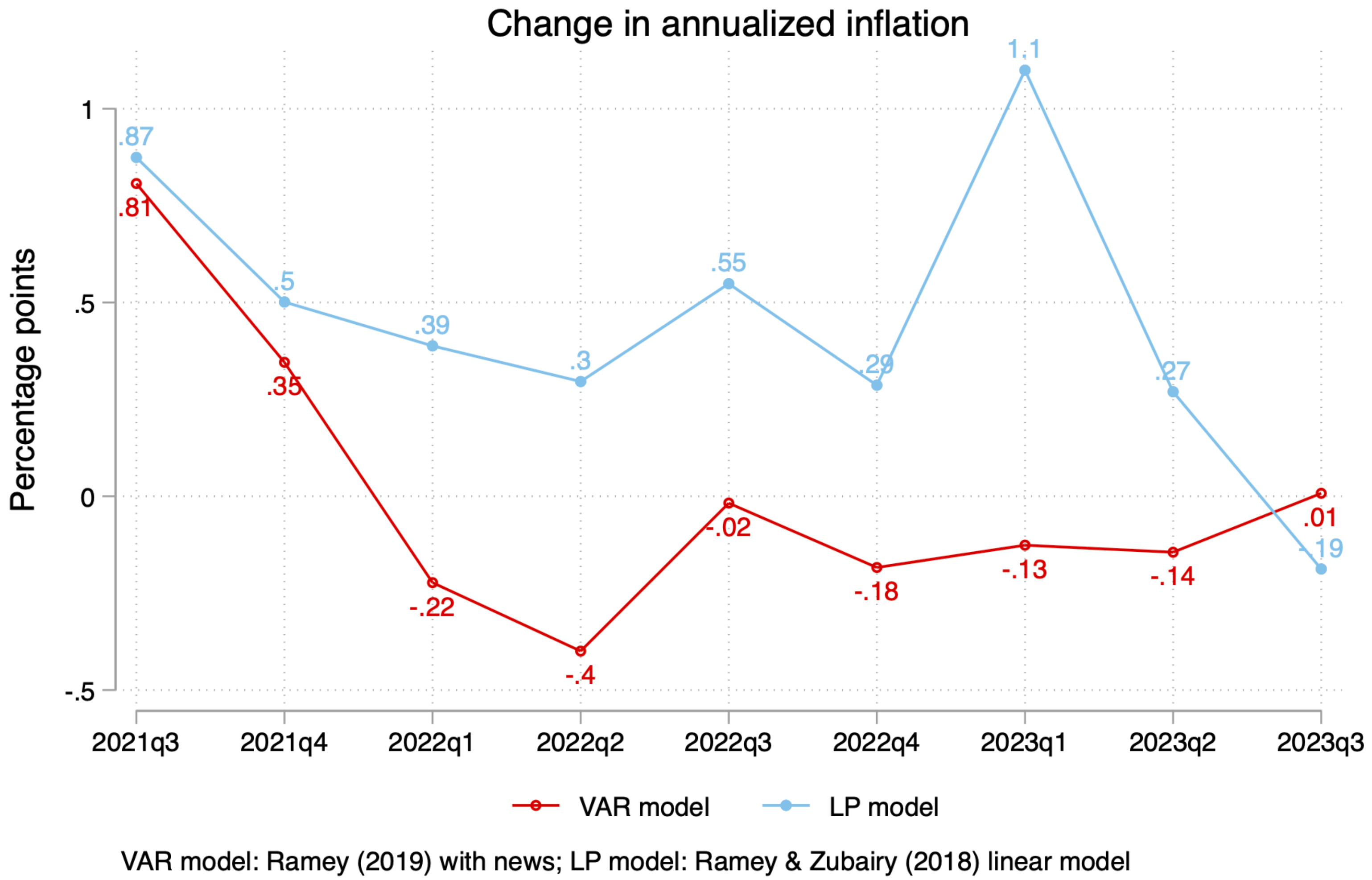
- Fourth candidate: fiscal shocks
- Two spending plans from Biden administration. Recovery plan and the IRA.
- Treat them as news (overstate them), and take forecasts from administration at face value (understate them)
- Promising, very large in last 40 years.

A better approach: shocks



- Fourth candidate: fiscal shocks
- Two spending plans from Biden administration. Recovery plan and the IRA.
- Treat them as news (overstate them), and take forecasts from administration at face value (understate them)
- Promising, very large in last 40 years.
- ... not so large in 80 years

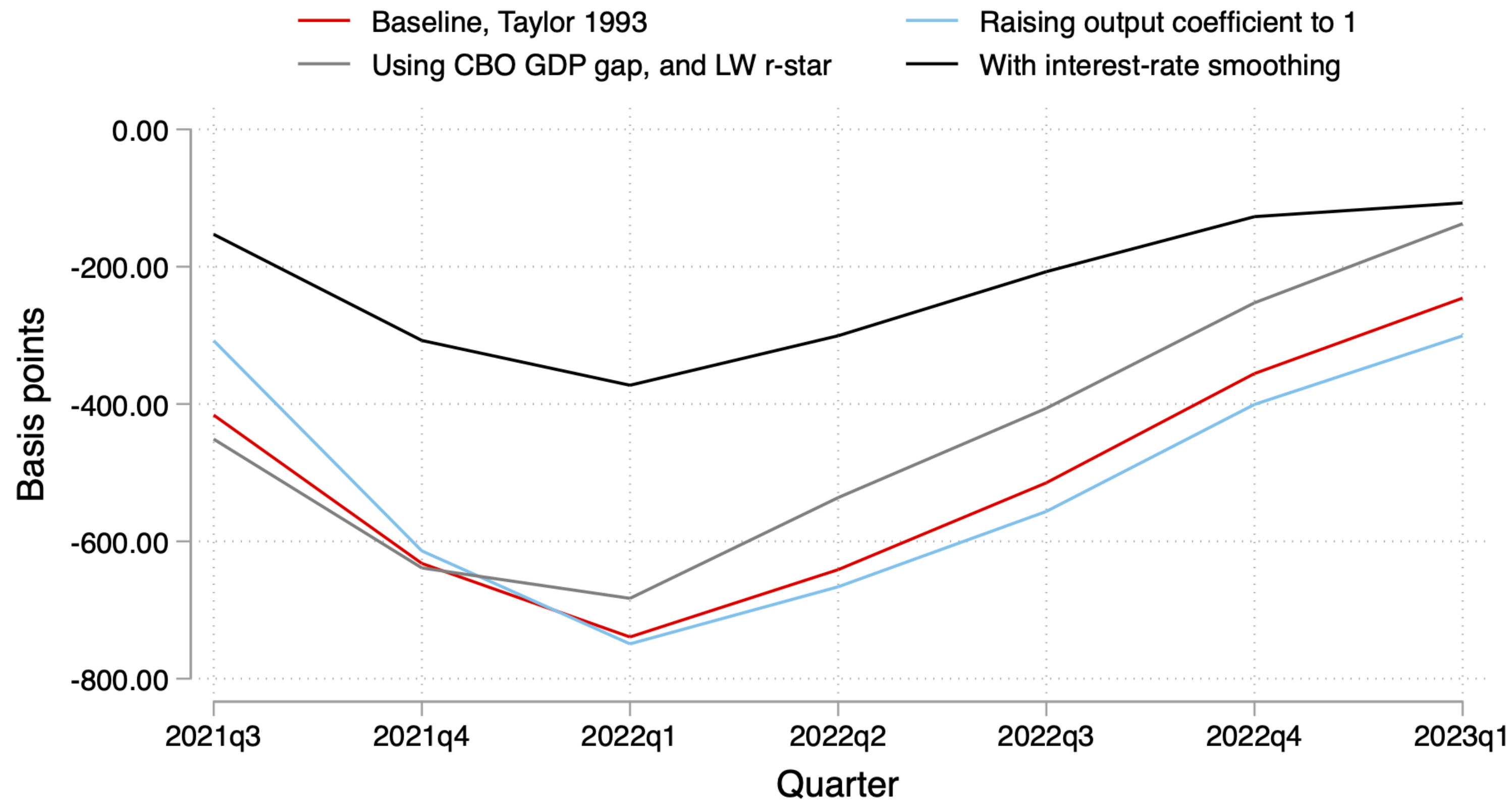
Fourth candidate: Biden's fiscal expansion



- Use VAR estimated by Ramey and the LP estimated by Ramey and Zubary
- Feed in these new shocks
- Predicted inflation as a result
- **First answer:** at most 1% of past inflation, none of the 2023 inflation
- **Second answer:** austerity is not the recipe to bring inflation down.

Fifth candidate: monetary policy

Monetary Shocks

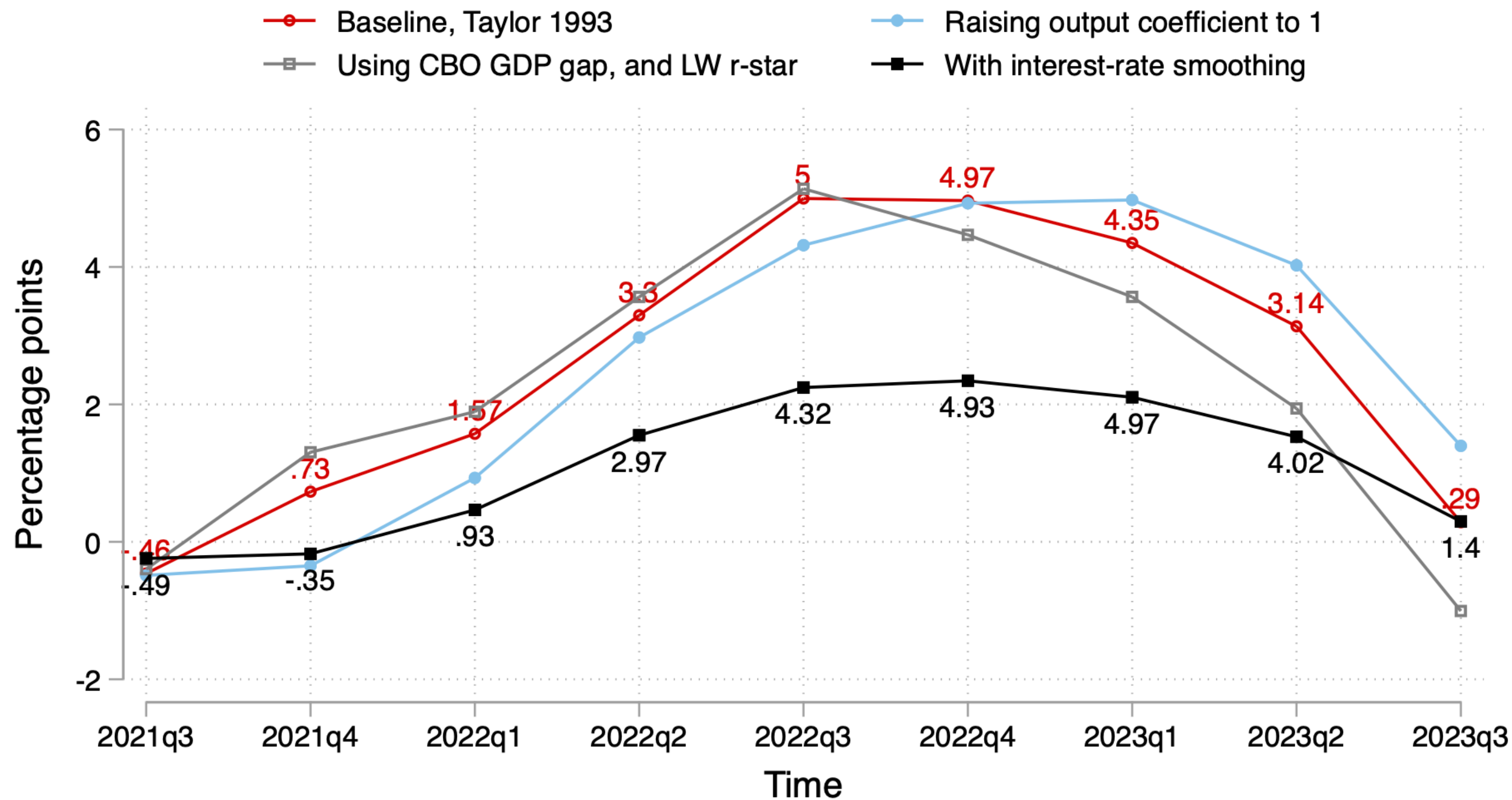


Notes: From Atlanta Fed simulator. Baseline has variables: Core PCE for inflation, FOMC median for r-star, FOMC u3 gap for gap. Coefficients: 1.5 on inflation, 0.5 on output, 0 on lagged rate.

- Taylor rule fits well behavior of policymakers for a long time during which inflation was under control, and taught by us to economic agents
- Very loose policy in 2021, arguably need to get to 6-7% to renormalize.
- Objection: mechanical or backward-looking and inflation is moving fast

Fifth candidate: monetary policy

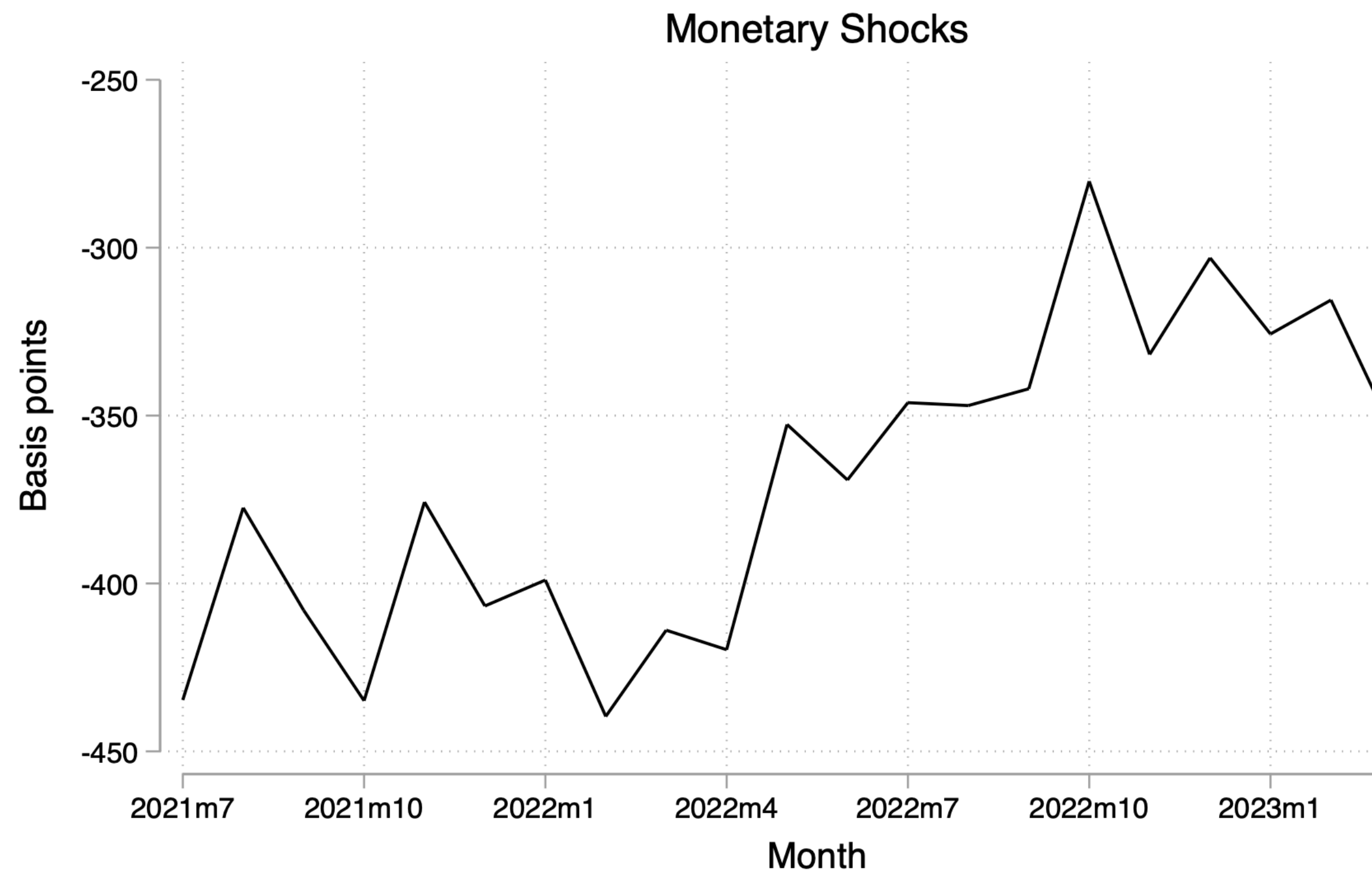
Change in annualized inflation



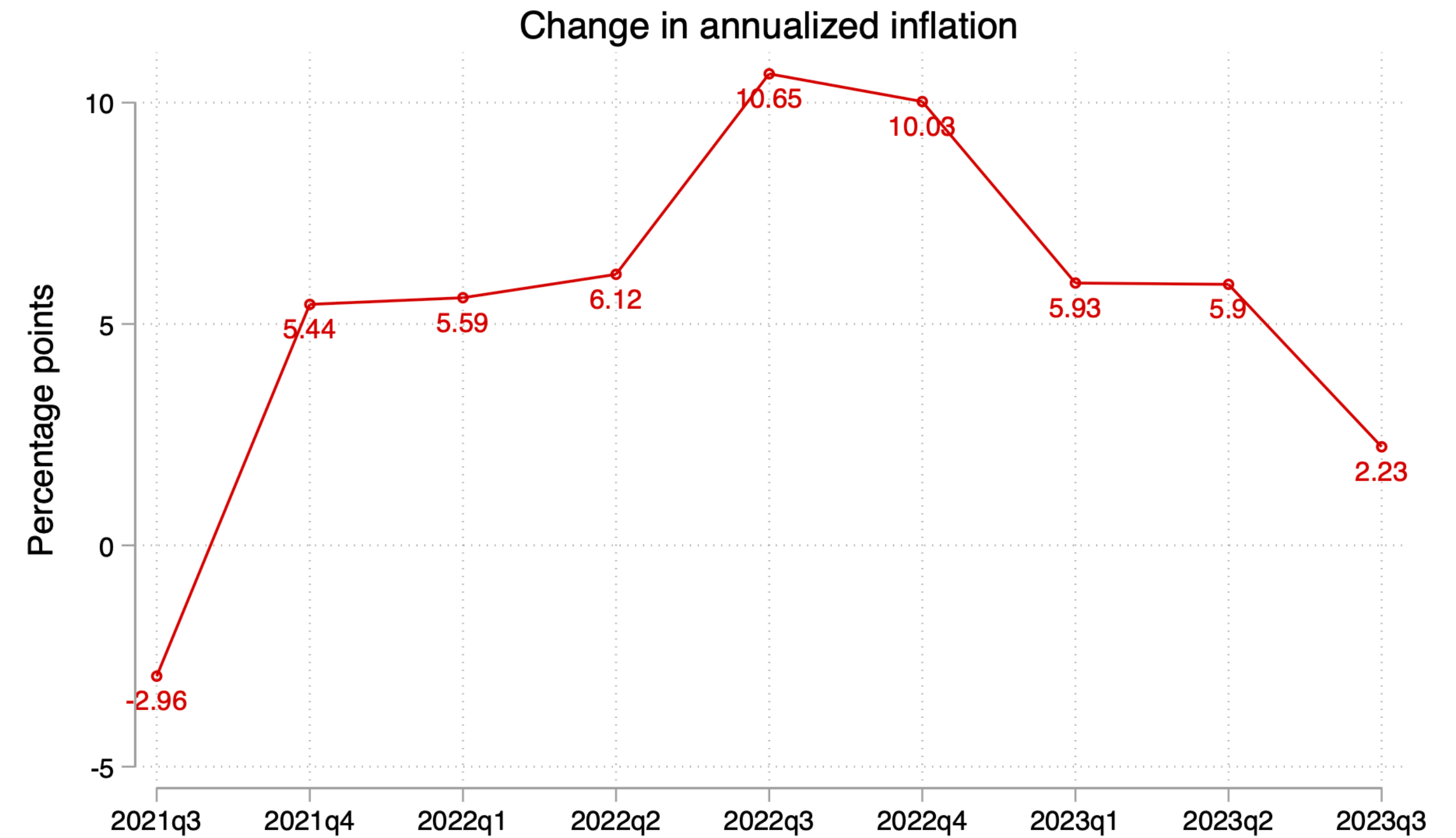
From Ramey (2016), VAR à la Christiano, Eichenbaum, Evans (1999) on 1983m1-2007m12 sample
Shocks: Residual of Taylor Rule FED Atlanta

- Plug these into the IRFs estimated by CEE to forecast inflation (Ramey's update)
- **First answer:** account for much of the rise in core inflation, as well as start of decline in the last few months
- **Second answer:** normalization of policy of the last 9-12 months is about to start having last effects. Optimism as long as stay on course in this hiking cycle.

Fifth candidate: monetary policy, alternative



Residuals from VAR à la Christiano, Eichenbaum, Evans (1999) on sample: 1983m1-2007m12, from Ramey(2016)



From Ramey (2016), VAR à la Christiano, Eichenbaum, Evans (1999) on 1983m1-2007m12 sample
Shocks: Residuals from the estimated VAR

- Instead use one-month ahead forecast errors from VAR applied to today as shocks
- Miss some of the decline in r-star, double the effects, but reassuring that qualitatively similar

Conclusions

- What is driving inflation? Will it stay high and what can policy do differently?
- This dramatic bout of inflation has come with:
 1. Large and persistent relative price dispersion
 2. Output in some sectors booming, in others contracting
 3. Expectations got out of hand, then re-anchored once policy shifted.
- All very interesting and useful, but they do not answer the two questions above.
- Textbook VARs provide some answers:
 - ★ Fiscal policy is contributing little right now, no more stimulus in horizon (but not EA)
 - ★ Monetary policy behind inflation spike, but if keep to planned hiking, inflation is about to start falling fast, and by second half of year only 1-2% of inflation above target
- DSGEs would provide other answers (left for others to do...)