Monetary Integration under Household Heterogeneity and Bounded Rationality
[Work in Progress]

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Outline

Motivation

Model

Bayesian Estimation

Findings: Shock Transmission

Findings: What Could Have

Conclusion

References

Motivation: Why This Matters

- Joining a monetary union (MU) is a major commitment with long-term implications.
- Most existing studies examine the effects of membership from an ex-ante perspective.
- We ask: What would have happened in Poland under different entry dates?
- Poland outside MU offers and interesting perspective for ex post—what would have—evaluation.
- We also employ behavioral models that challenge standard assumptions.
- Our focus: the effects of losing autonomous monetary policy and a flexible exchange rate

Motivation: Literature 1/2

- Large literature on the macroeconomic effects of monetary unions, ex-ante perspective
  Gradzewicz and Makarski, 2013; Lama and Rabanal, 2014
- Typically conducted under rational expectations
- Including analysis of optimal monetary and fiscal policy
  Galí and Monacelli, 2008
- Particular focus on fiscal devaluations
  Kaufmann, 2019
- And the role of fiscal unions
  Farhi and Werning, 2017; Kaufmann et al., 2023

Motivation: Literature 2/2

However:

- Limited literature taking an ex post perspective
- Growing support for behavioral expectations, which affect:
  Gabaix, 2020; Brzoza-Brzezina et al., 2025; Kolasa et al., 2025
  - monetary policy transmission
  - fiscal policy multipliers
  - effects of macroeconomic shocks
  - exchange rate behavior

Motivation: Poland

- Poland is a compelling case for studying the effects of joining a monetary union:
  - Closely integrated with the euro area
  - Experienced two major macroeconomic shocks:
    - Global Financial Crisis (2008–2009)
    - More recent marked by COVID-19 pandemic and Russia's full-scale invasion of Ukraine
  - Relatively calm period in the 2010s

This Paper

We use a two-country New Keynesian model (Poland and the euro area) to study:

- Poland's ex post–what would have—experience using counterfactual simulations.
- How results change under behavioral expectations with cognitive discounting.
  Gabaix, 2020
- The role of fiscal policy in stabilizing the domestic economy within a monetary union.
- The effects of euro adoption at alternative exchange rates at entry.

Preview of the Results

- Monetary union (MU) amplifies output volatility but stabilizes inflation.
- Expectations Matter: Compared to RE, macroeconomic volatility is often lower under BE.
- Realistic fiscal policy wouldn't have replicated the stability of autonomous monetary policy.
- The macroeconomic impact of MU depends on the exchange rate at entry.

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Behavioral Expectations: A Brief Introduction
Gabaix, 2020

- Behavioral agents perceive future deviations from the steady state myopically
- The expectation rule is microfounded under noisy information assumptions:

$$E_t^{BE}(X_{t+1}) = E_t^{BE}(\bar{X} + \hat{X}_{t+1}) = E_t(\bar{X}) + m \cdot E_t(\hat{X}_{t+1})$$

  where $m \in [0, 1]$ is the cognitive discounting parameter

- They dampen the expectations effect making individuals more reactive to current conditions.
- Nest rational expectations, $m = 1$.

Model Structure: New Keynesian Framework

- Two-country setup: Home and Foreign
- Ricardian households: Work, consume, and save in real assets, domestic and foreign bonds
- Hand-to-mouth (HtM) households: Work and consume all disposable income; do not save
- Wages are sticky
- Final goods are assembled from domestic and foreign intermediate goods
- Intermediate goods are produced using capital and labor, with sticky prices
- Monetary policy follows a Taylor rule
- Expectations are behavioral (Gabaix-style cognitive discounting)

Households & Firms - equilibrium conditions

- Behavioral Euler equation (simplified)

$$\underbrace{\hat{c}_{R,t}}_{\text{consumption}} = \underbrace{m E_t \hat{c}_{R,t+1}}_{\text{behaviorally expected consumption}} - \underbrace{\frac{1}{\sigma_c}\left(\hat{R}_t - m E_t \hat{\pi}_{t+1}\right)}_{\text{behaviorally expected real interest rate}} + \xi(1-m)\underbrace{\left(\hat{b}_{H,t} + \hat{b}^*_{H,t} + \dots\right)}_{\text{domestic and foreign debt}}$$

- Phillips curve (domestic producers, simplified)

$$\hat{\pi}^*_{H,t} = m\beta E_t \hat{\pi}^*_{H,t+1} + \frac{(1-\theta^*_H)(1-\beta\theta^*_H)}{\theta}(\hat{mc}_{H,t} + \hat{\varepsilon}^*_{p,t})$$

where $\hat{mc}^*_{H,t} = \alpha \hat{r}_{k,t} + (1-\alpha)\hat{w}_t - \hat{p}^*_{H,t} - \hat{z}_t - \hat{q}_t$

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Bayesian Estimation 1/2

- Estimation period: 2000Q1–2024Q3
- Model estimated for Poland (Home) and the euro area (Foreign)
- Parameters estimated using Bayesian methods
- Observables:
  - 2x HICP, 2x GDP, 2x Consumption, 2x Investment
  - 2x Government Expenditure, 2x Real Wages
  - 2x Interest Rate, 1x Real Exchange Rate
- Prior for m: Beta distribution with mean 0.85

Bayesian estimation 2/2

- BE are strongly favored by the data over RE.
- BE models exhibit stronger internal propagation mechanisms compared to RE models.
- As a result, shock volatilities are estimated to be lower under BE than under RE.

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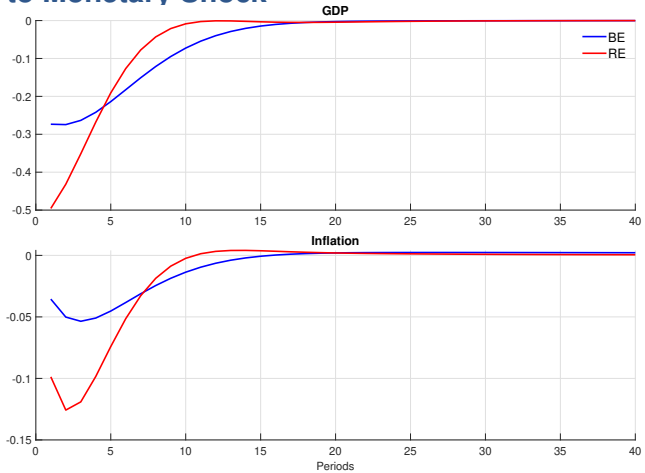
The working of monetary policy

- Behavioral expectations significantly reduce the short-run effectiveness of monetary policy.

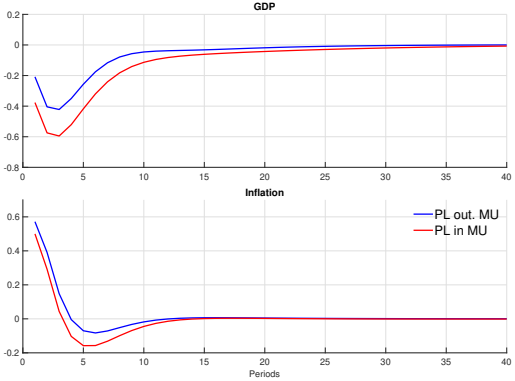
Impulse Response to Monetary Shock



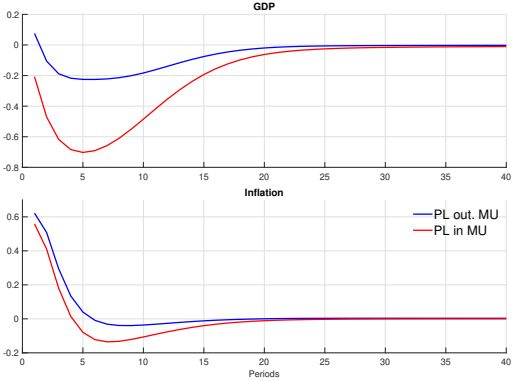
Shock Transmission: In vs. Out of MU

- Markup shock and consumption preference shock
- In MU: no nominal exchange rate adjustment
  - Stronger GDP response to markup shock; opposite but limited effect for consumption preference shock
  - Weaker inflation response
- Under behavioral expectations:
  - MU amplifies GDP response to markup shock; little change for consumption preference shock
  - Inflation response is similar across regimes

Impulse Response to Markup Shock

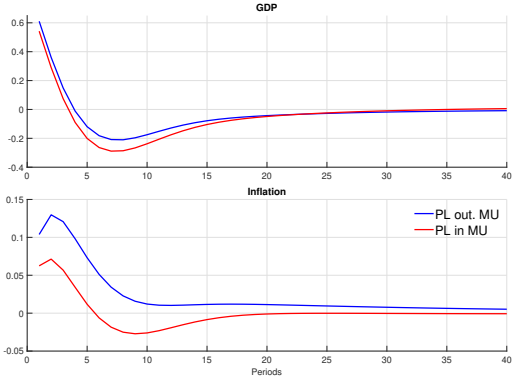


Rational Model

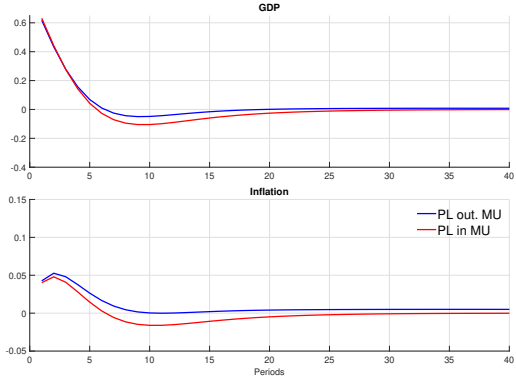


Behavioral Model

Impulse Response to Consumption Preference Shock



Rational Model



Behavioral Model

Findings on Behavioral Expectations (BE) relative to Rational Expectations (RE)

- Weaker monetary policy transmission
- Stronger propagation of certain shocks
- Lower estimated shock volatility

Conclusion:

Under BE, the net effect of joining a monetary union may be stronger or weaker than under RE.

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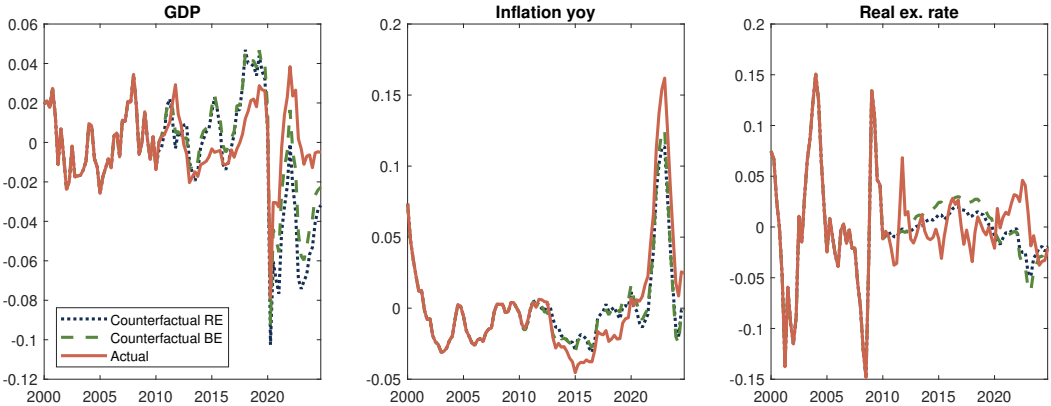
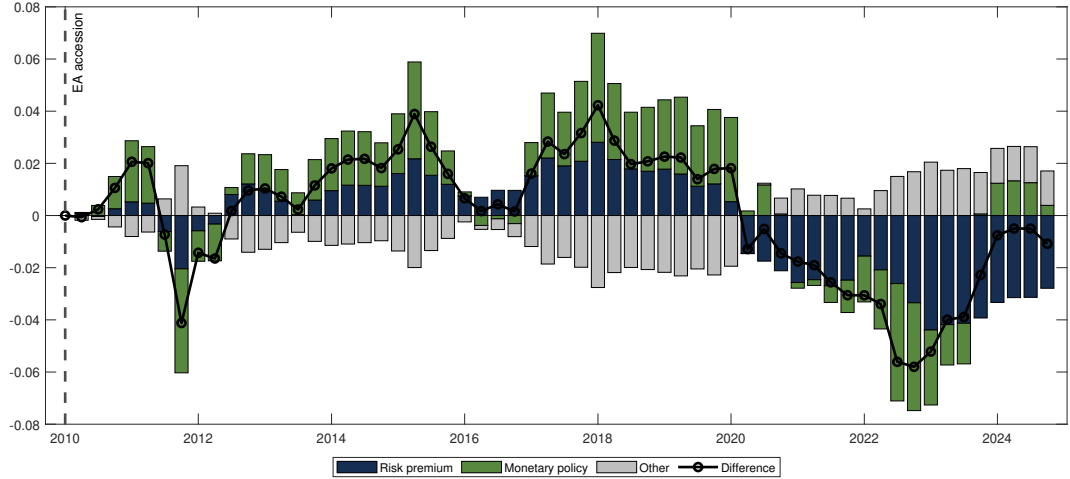
What Could Have Happened: Counterfactual Simulations

- Euro adoption raises output volatility and lowers inflation volatility.
- Effects of monetary integration are less pronounced under behavioral expectations.
- Realistic counterfactual fiscal policy wouldn't have replicated monetary policy stability.
  - government expenditure
  - government transfers

Euro Adoption in 2010Q1: Actual vs. Counterfactual



Difference decomposition: GDP



Macroeconomic Volatility: Euro Adoption in 2010Q1 with and without Fiscal Rules

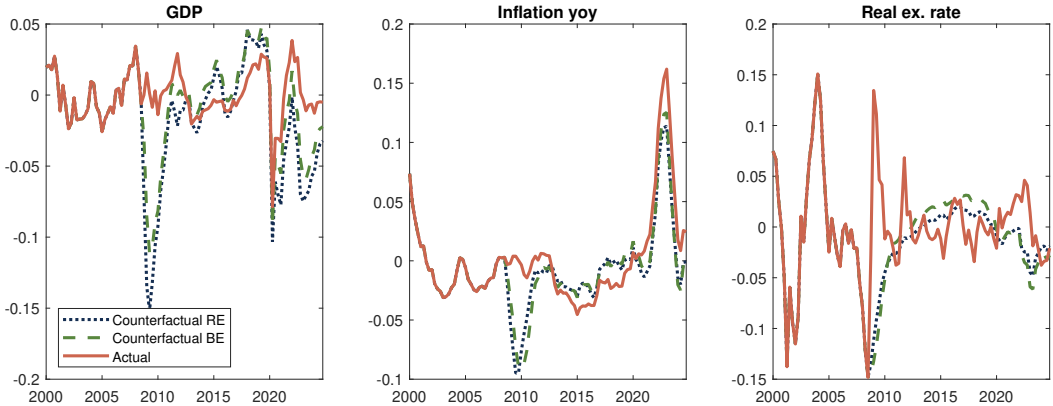
Variable	Historical	Counterfactual			
		No Fiscal Rule		With Fiscal Rule	
		BE	RE	Transfers	Gov. Spending
GDP	1.9	3.0	3.5	2.5	2.5
Inflation (YOY)	4.8	3.5	3.2	3.6	3.5

Note: The change in fiscal variables used in fiscal rules capped at 2.5% of GDP.

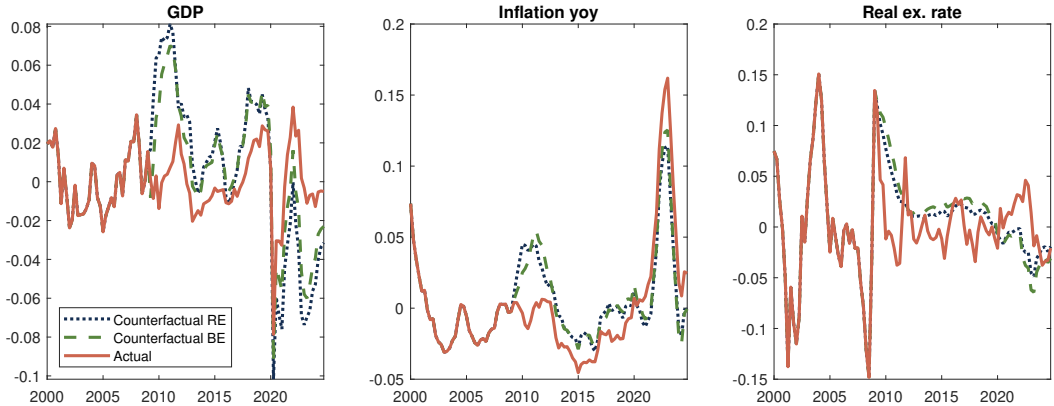
What Could Have Happened: Counterfactual Simulations (cont'd)

- Entry with appreciated exchange rate: lasting output loss and deflation.
- Entry with depreciated exchange rate: lasting boom and inflation.

Euro Adoption with strong currency at entry: Actual vs. Counterfactual



Euro Adoption with weak currency entry: Actual vs. Counterfactual



Conclusion

- MU amplifies output volatility while inflation is more stable.
- Expectations Matter: Compared to RE, macroeconomic volatility is often lower under BE.
- Realistic fiscal policy wouldn't have replicated the stability of autonomous monetary policy.
- The macroeconomic impact of MU depends on the exchange rate at entry.

Additional slides

(e.g., robustness checks, extended results, or technical details)

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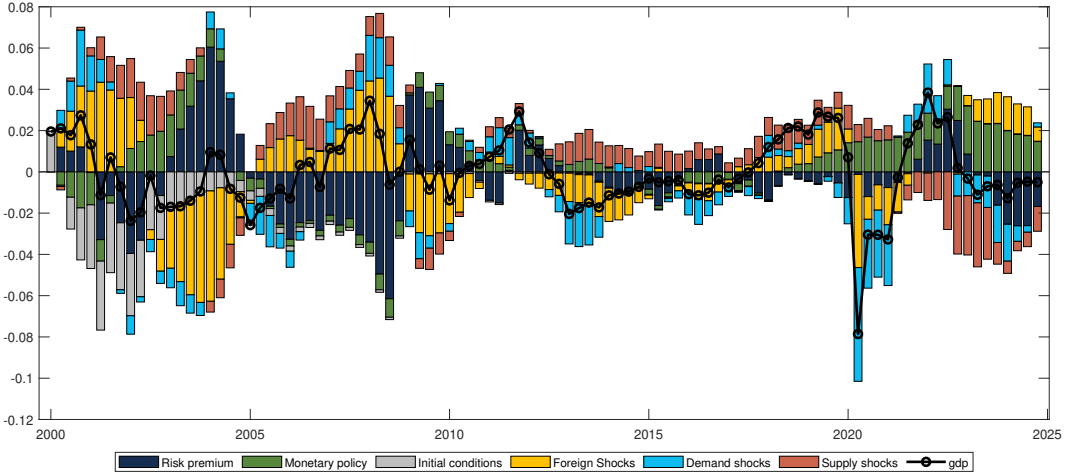
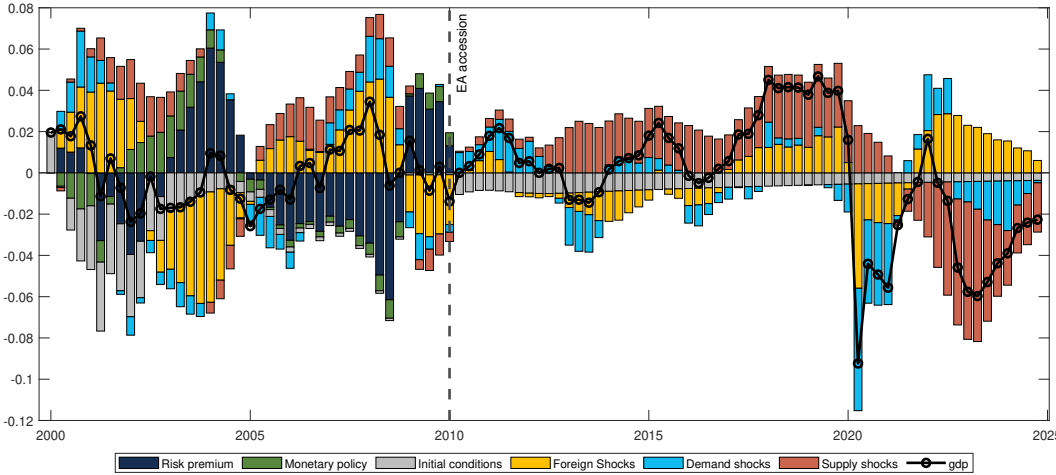
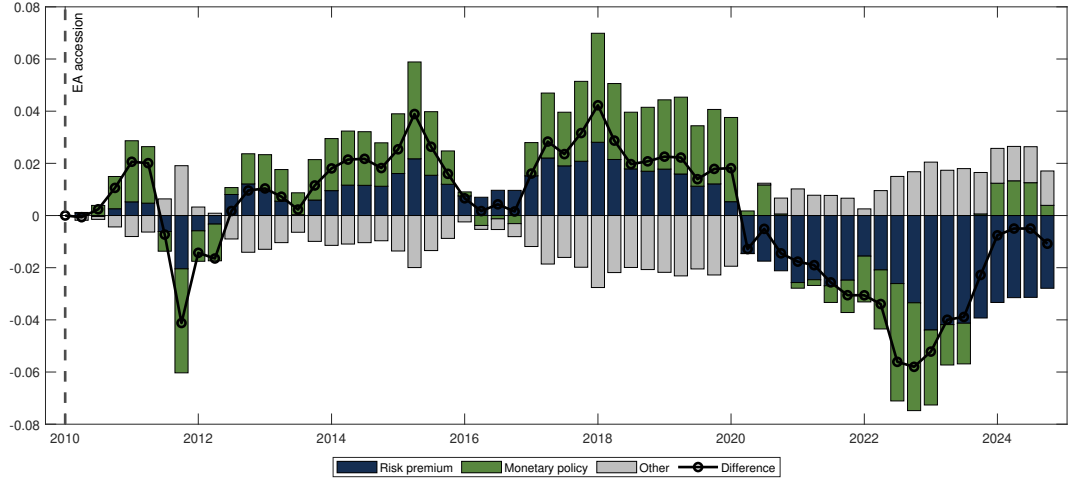
What Happened: Historical GDP Decomposition



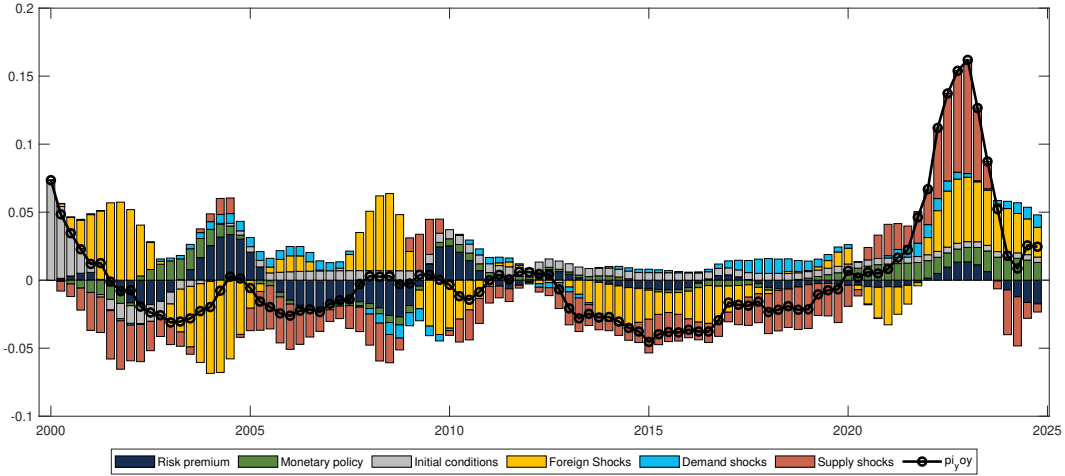
What Could Have: Counterfactual GDP Decomposition



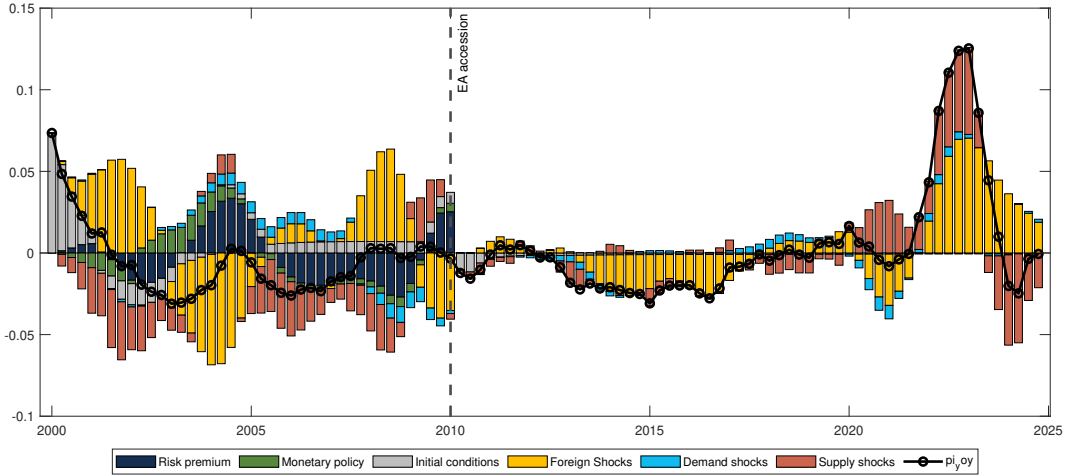
Difference decomposition: GDP



What Happened: Historical Inflation Decomposition



What Could Have: Counterfactual Inflation Decomposition



Difference decomposition: Inflation