Exchange rate pass-through in the euro area: a counterfactual SVAR approach

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Outline

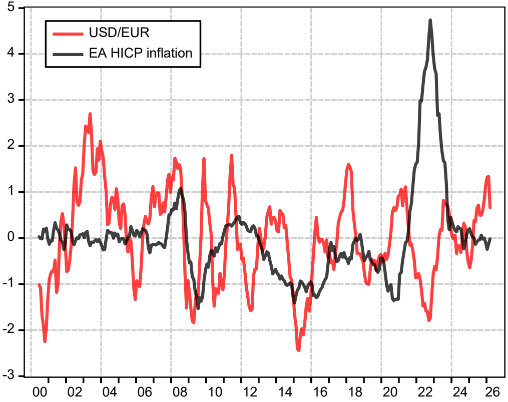
- Motivation
- Literature
- Model
- Results
- Conclusion

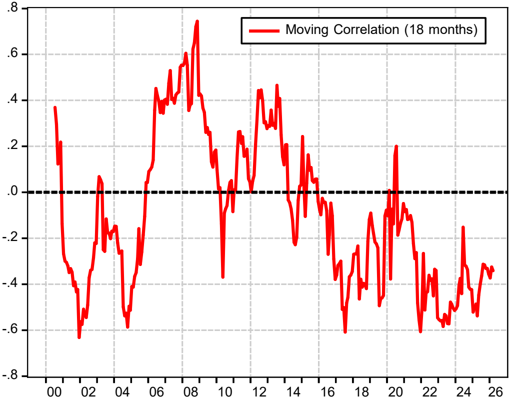
The views expressed are those of the authors and do not necessarily reflect those of Croatian National Bank (HNB).

Motivation

- What is the effect of exchange rate movements on prices/inflation? Exchange Rate Pass-Trough (ERPT)
- Example: Huge swings in USD/EUR in 2025?
- Prevailing view: small macro effects (growth, inflation...)
- Reasons: Market power, pricing-to-market, transportation costs, currency pricing, other frictions...
- We revisit the existing estimates of ERPT for euro area and study whether this "benign" view holds and whether it is affected by "flawed" methods.

Correlation between inflation and exchange rate





Literature Review: Methodological Evolution

- **Single-equation regressions** *Campa & Goldberg (2005)*
  - ! Endogeneity — exchange rate and prices are jointly determined
- **Recursive (Cholesky) VARs** *McCarthy (2007)*
  - ! Arbitrary ordering; implicitely collapses all drivers into a single "exchange rate shock"
- **Structural VARs** *Shambaugh (2008); Comunale & Kunovac (2017); Forbes et al. (2018)*
  - ! Shocks move inflation *directly* and through other channels
  - ! PERR (price-to-exchange-rate ratio) captures *co-movement*, not causation

This paper

A counterfactual SVAR that isolates the *pure causal* contribution of the exchange rate channel.

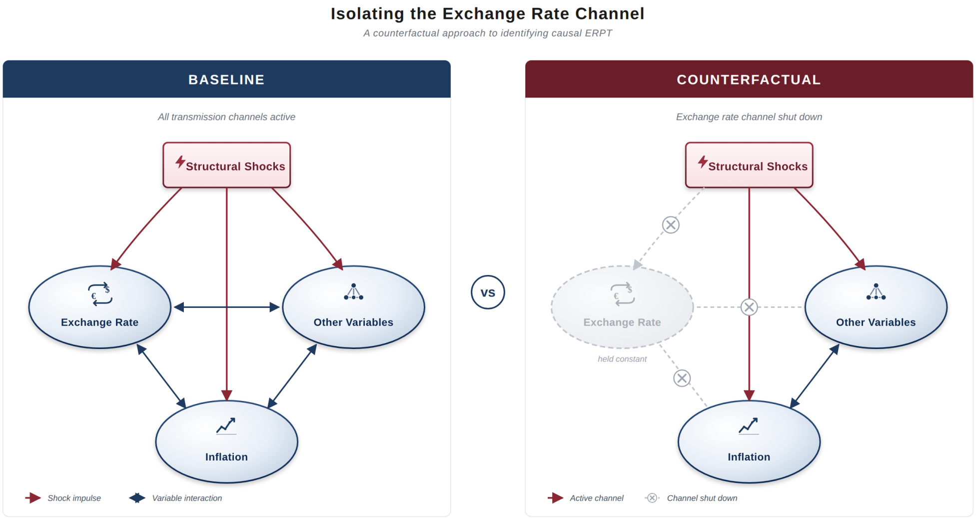
Contribution

- **A relative EA–US SVAR with sign-restriction identification**, in which we *shut down the exchange rate channel* of each structural shock.
- Two complementary counterfactual constructions:
  - **Offsetting shocks** : hold the exchange rate constant via a sequence of counteracting structural shocks *cf. Sims & Zha (2006); Bernanke, Gertler & Watson (1997); Wong (2015)*
  - **Zero-restriction model** *(robustness)*: alternative specification imposing restrictions on the exchange rate response *cf. Bachmann & Sims (2012)*
- The difference between baseline and counterfactual identifies a **causal ERPT** — not the co-movement captured by conventional measures.

Results preview: EA–US pass-through is relatively low

Consumer prices (HICP)	5–10%
Import prices	35–45%

Counterfactual



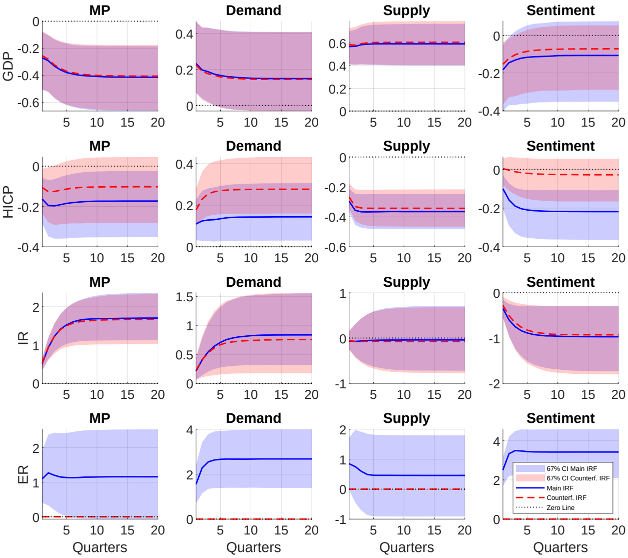
Sign restrictions

Table: Sign Restrictions on Impact

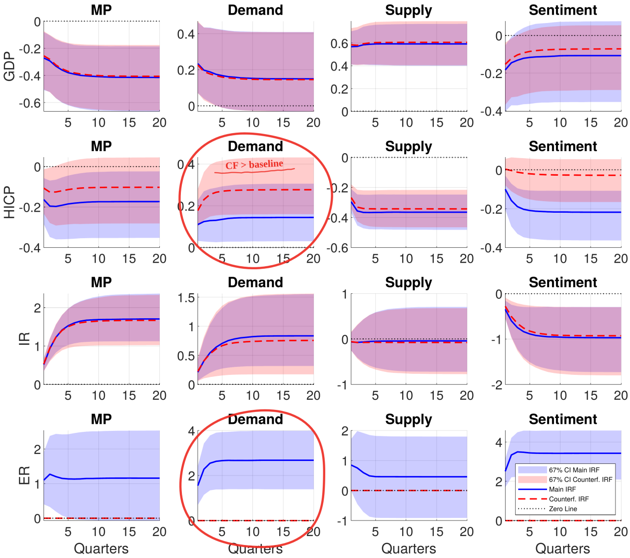
	Structural Shocks			
Variable	Monetary Policy	Demand	Supply	Sentiment
GDP	$-$	$+$	$+$	$-$
HICP	$-$	$+$	$-$	$-$
Interest Rate	$+$	$+$		$-$
Exchange Rate (USD/EUR)	$+$	$+$		$+$

Notes: Sign restrictions imposed on impact impulse responses. "$+$" ("$-$") denotes a positive (negative) restriction; blank entries are unrestricted.

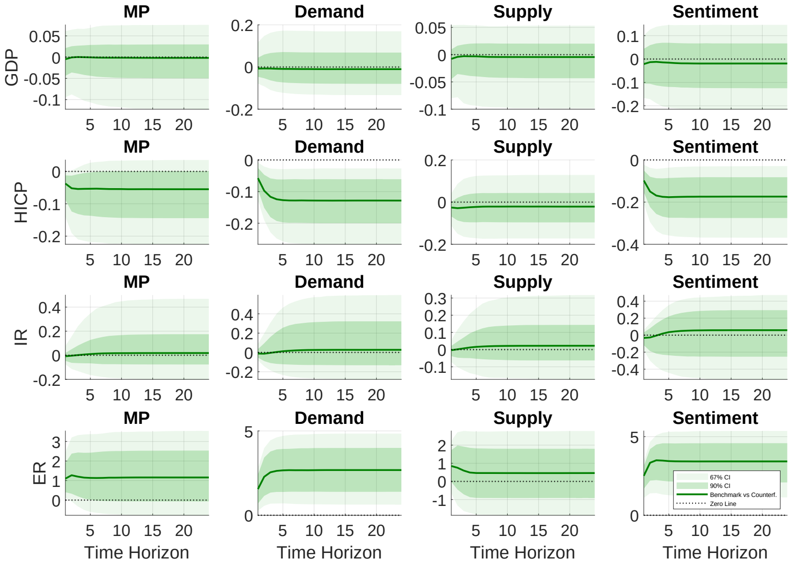
IRFs: baseline and counterfactual



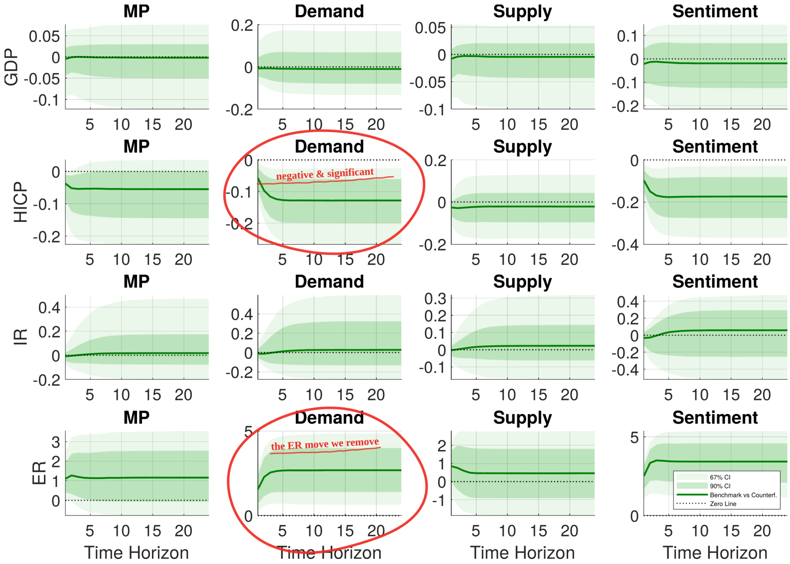
IRFs: baseline and counterfactual



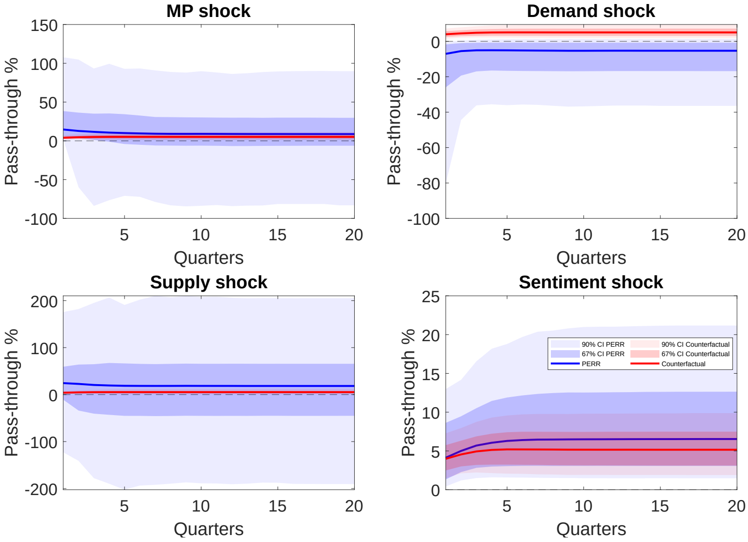
IRFs: difference between the baseline and counterfactual



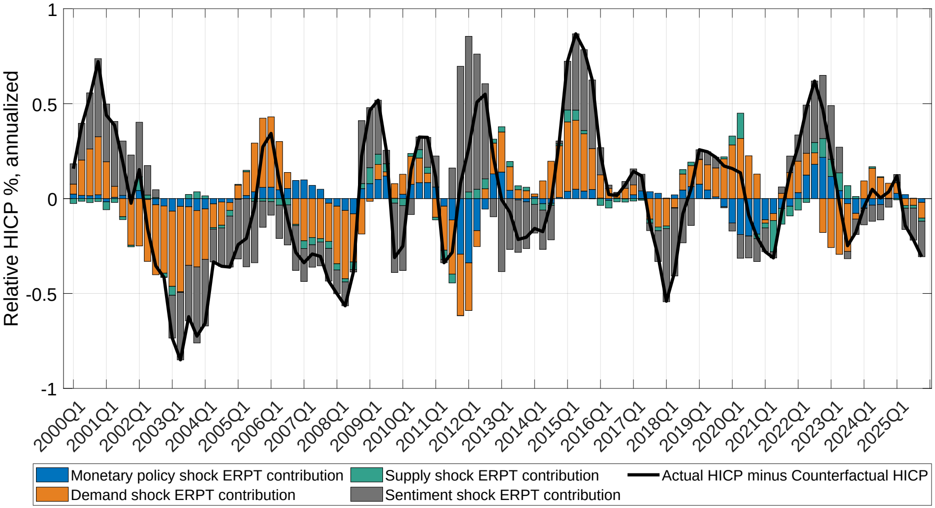
IRFs: difference



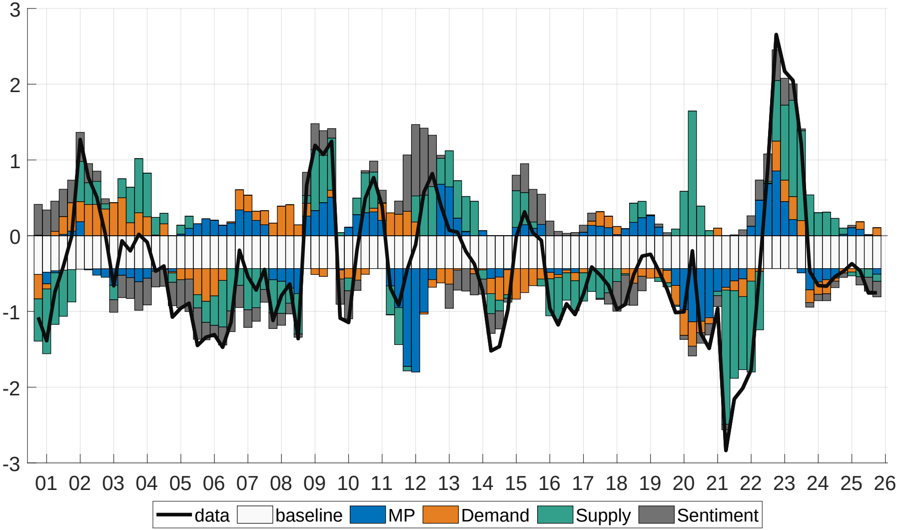
ERPT


MP shock
Demand shock
Supply shock
Sentiment shock
Pass-through %
Quarters
90% CI PERR
67% CI PERR
PERR
90% CI Counterfactual
67% CI Counterfactual
Counterfactual

Historical decomposition: ERPT



Historical decomposition: Inflation overall



Conclusion

- **A counterfactual approach** measures ERPT through a *causal* lens, rather than the co-movement captured by conventional measures.
- **The sign can flip.** Once the exchange rate channel is isolated, exchange rate movements are *deflationary* following a demand shock — reversing the puzzling co-movement-based estimate.
- **Heterogeneity decreases.** The dramatic cross-shock variation in conventional ERPT mostly reflects differing co-movements of macro variables, not genuine differences in the causal pass-through itself.
  - Non-linear model left for future research!
- EPRT is $5-10\%$ for HICP and $35-45\%$ for import prices

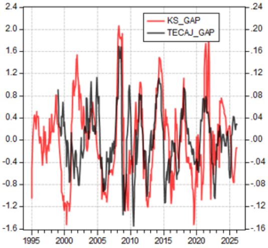
Takeaway

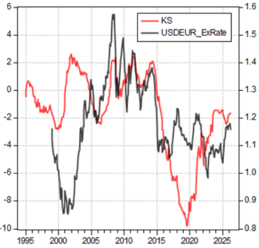
What moves the exchange rate matters, but also dis-entangling the channels.
Co-movement alone is not enough; causality offers deeper insight.

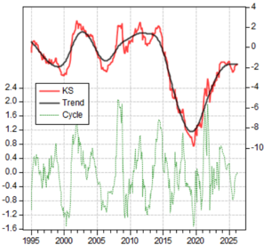
Thank you for your attention!

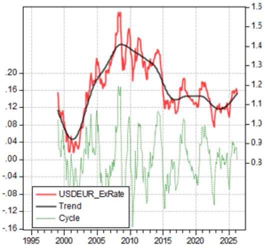
Appendix

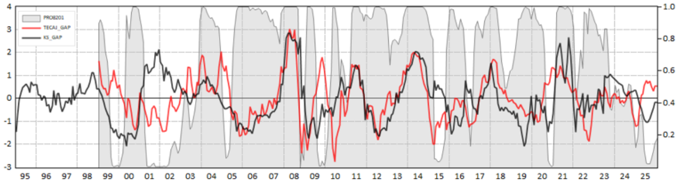
Exchange rate movements











Counterfactual

The counterfactual IRF for variable j at horizon k is:

$$\hat{\Psi}_j^k = \Psi_j^k + \sum_{n=0}^{k} e_j \Lambda^{k-n} \tilde{A}_0^{-1} e_f' \hat{\epsilon}_n^s, \quad j = \{1, 2, \ldots, N\}$$

What would inflation have been if shock X had *not* moved the exchange rate?

Counterfactual

We reconstruct the alternative (counterfactual) scenario in which the shocks did not influence the exchange rate, and therefore change in exchange rate did not influence the inflation. This is done using the formula:

$$\underbrace{\tilde{y}_{i,t}}_{counterfactual} = \underbrace{y_{i,t}}_{actual} - \underbrace{\sum_{s=0}^{t-1} \sum_{j=1}^{N} \left(\Psi_{ij,s} - \hat{\Psi}_{ij,s} \right) u_{j,t-s}}_{\text{contribution of the muted channel}}$$

where $u_{i,t}$ are the estimated structural shocks and $\Psi_{i,j}$ and $\hat{\Psi}_{i,j}$ are the actual and counterfactual IRFs. Index j designates different structural shocks.