

Exchange Rate Dynamics and its Effects on the Macroeconomic Volatility

Czech Republic and Selected CEE Countries

CZECH  NATIONAL BANK

Volha Audzei
František Brázdík

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- Optimal Currency Area/Monetary Union:
 - Relative importance of shocks: symmetric and asymmetric, real exchange rate
 - Symmetric shocks: Exchange rate does not react
 - Asymmetric shock: The role of exchange rate as a shock absorber is desirable
 - Synchronization of business cycles with trading partners (costs of abandoning independent monetary policy)
- Audzei and Brázdik (2018) SVAR for 10 CEE countries (relative to their effective Eurozone).
 - Czech Republic, Slovakia, Poland, Hungary, Lithuania, Latvia, Estonia, Slovenia, Bulgaria and Romania
- This presentation: an update for CZ, SK and PL.

- How to assess importance of symmetric and asymmetric shocks?
- To what extent are real exchange rate shocks driving fluctuations in output and prices?
- What drives the volatility of the real exchange rate?

- Theoretical discussion goes back to Obstfeld et al. (1985)
- Empirical literature is not definitely conclusive about the importance of real, nominal or exchange rate shocks for macroeconomic fluctuations
- Clarida and Gali (1994) conclude real shocks are important in explaining real ex. rate volatility:
 - Monetary shocks contribution to the variance of the real exchange rate is less than 3%, demand shocks 95% at short and long horizons
- Later studies Peersman (2011), Amisano et al. (2009), Farrant and Peersman (2006), and Mallick and Rafiq (2008), find significant contribution of the nominal shocks to economic volatility

- How to account for the structural differences in transmission mechanism?
- Solution: Define shocks by assessing their effects
- Peersman (2011):
 - Criticize the models based on the relative variables
 - Promote identification based on the shocks' responses
- Sign restrictions approach:
 - Developed by Uhlig (2005): Effects of monetary policy on output
 - Since then used in many studies
 - Fry and Pagan (2011): Comments on methodology and use of the method

- Framework: Open economy model of two countries
- Economies described by output, inflation and monetary policy and real exchange rate
- Model identification is based on sign restrictions
- All restrictions hold simultaneously in the first period, responses in the later periods are unrestricted

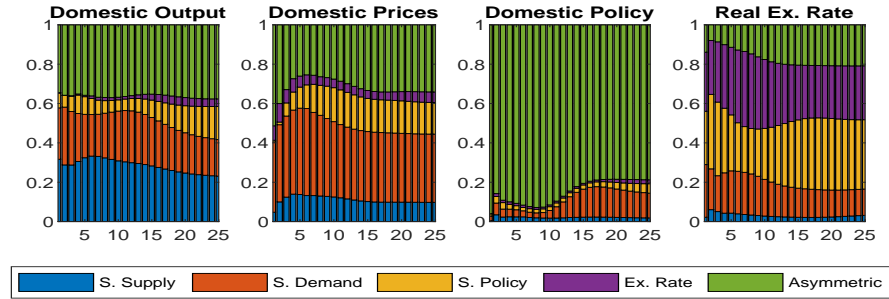
Variable	y_t	p_t	i_t	y_t^*	p_t^*	i_t^*	q_t
Structural Shock							
Symmetric Supply	≥ 0	≤ 0		≥ 0	≤ 0		
Symmetric Demand	≥ 0	≥ 0	≥ 0	≥ 0	≥ 0	≥ 0	
Symmetric Monetary Policy	≤ 0	≤ 0	≥ 0	≤ 0	≤ 0	≥ 0	
Exchange Rate	≤ 0	≤ 0		≥ 0		≥ 0	≥ 0

- Estimate the VAR model
- Identify structural model based on the sign restrictions
- Identify the closest to median response parametrization as the representative: Fry and Pagan (2011)
- Compute Impulse Response Function as a test: Model uncertainty
- Compute Forecast Error Variance Decomposition

- Eurostat database: covering 1998–2021 for Czech Republic, Slovakia, and Poland
- Quarterly data and seasonally adjusted
- Detrended using a procedure described in Hamilton (2017)
- Foreign economy: Effective eurozone is constructed - export weights
- Inflation: Constant taxes inflation
- Real exchange rate: Effective rate - export weights

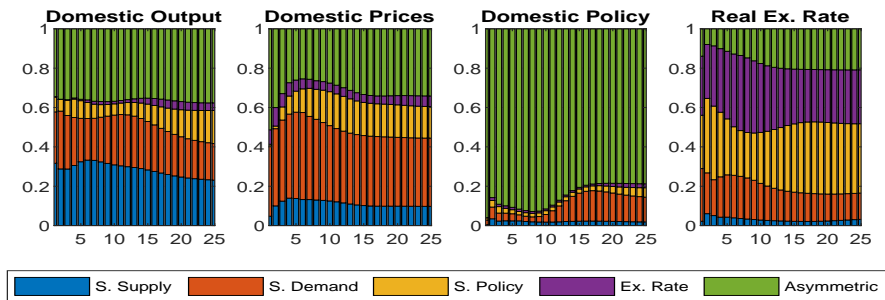
Variance Decomposition

- Czech Republic:



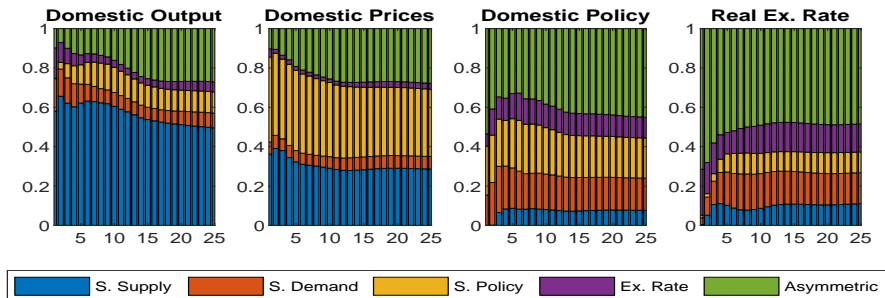
Previous Results

- Czech Republic:



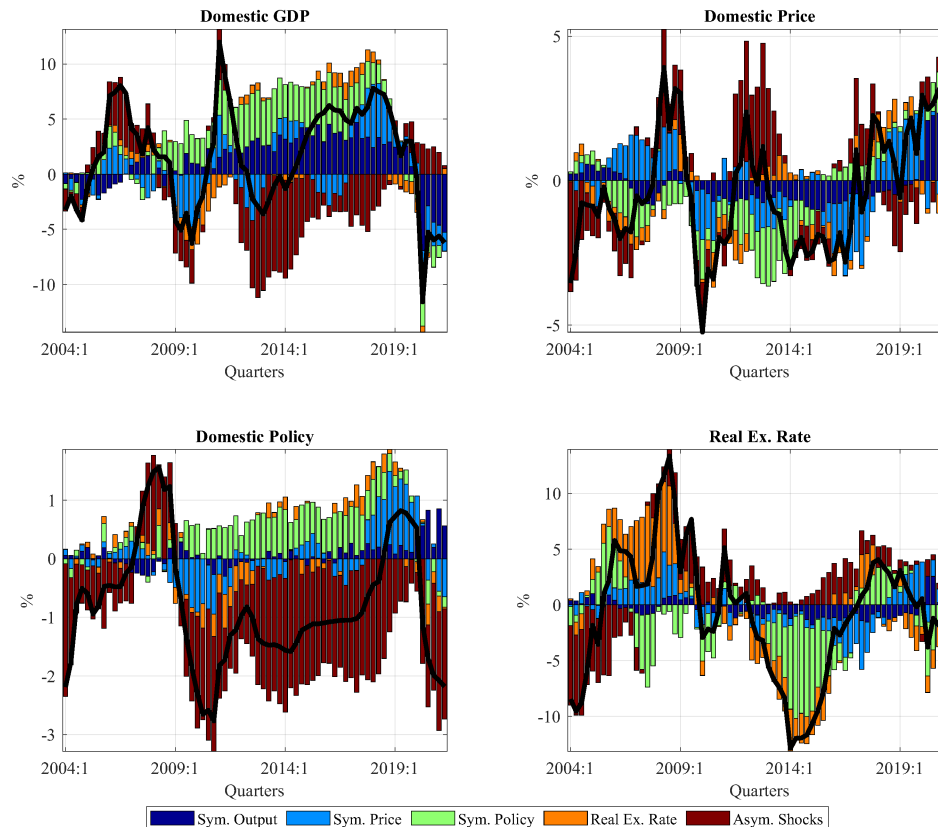
Previous Results

- Slovakia:



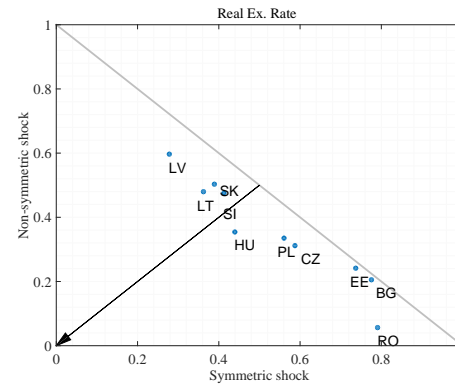
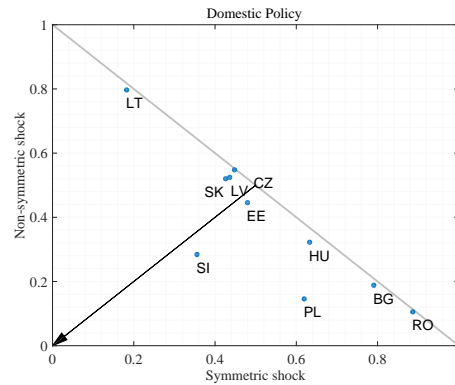
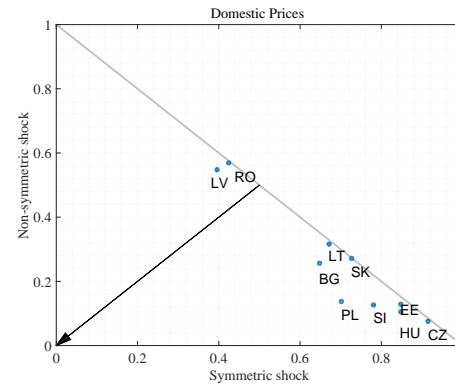
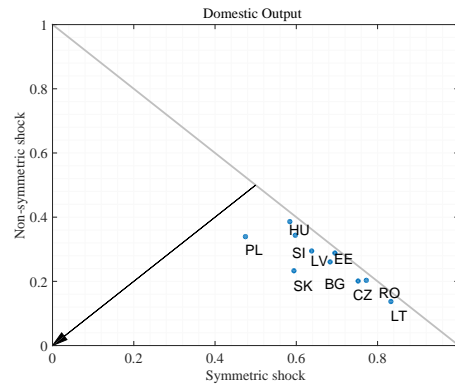
Previous Results Poland

Historical Contributions: Czech Republic

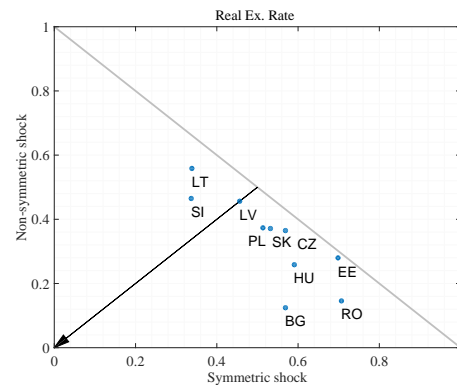
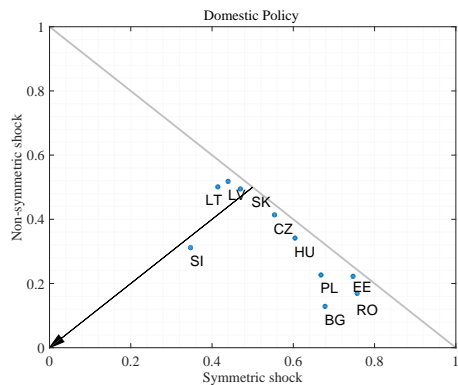
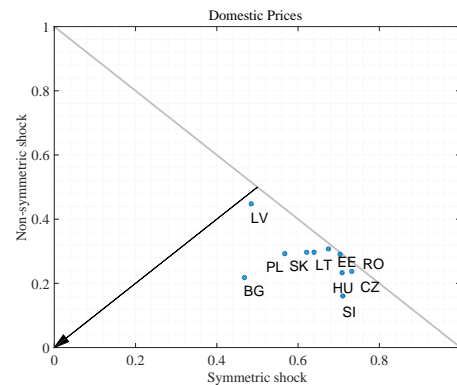
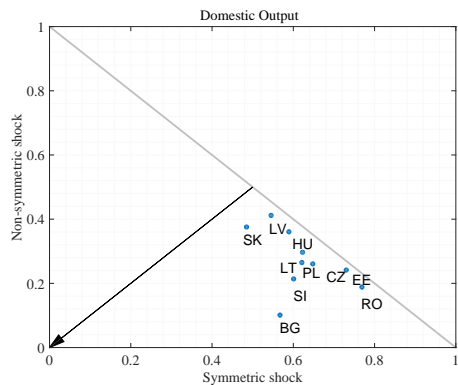


- Short run (first 6 periods) and Business cycle (6-32 periods) frequency view
- General results:
 - Symmetric shock prevails for most of the countries and variables
 - Only few cases of high contribution of the real exchange rate shock

Short Run Frequency: 1-6 period

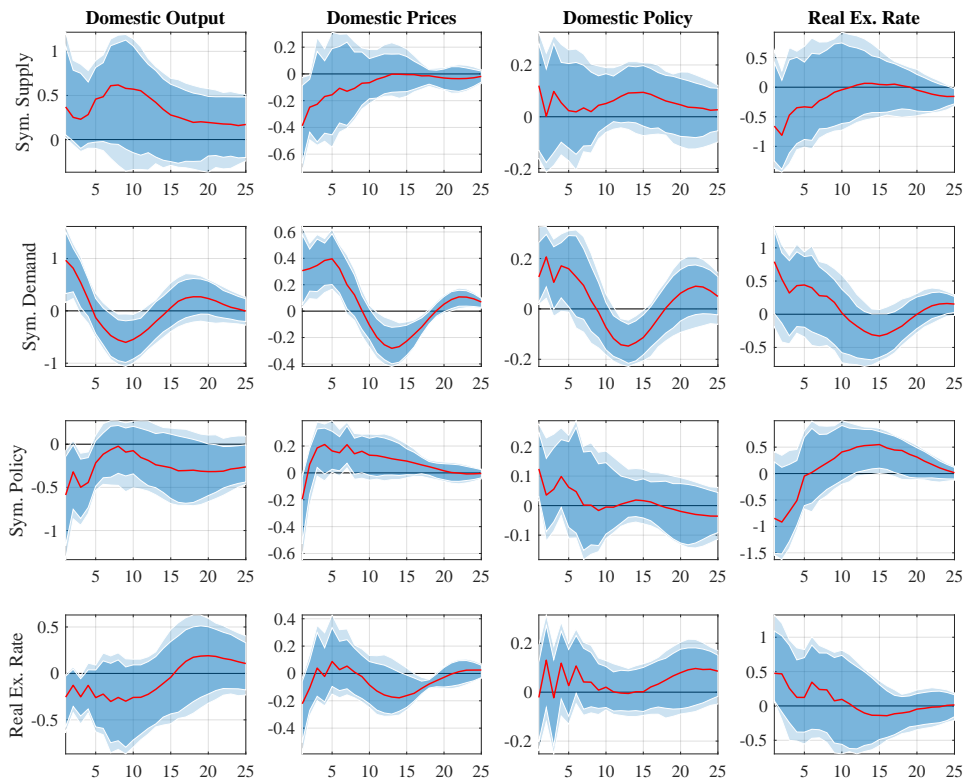


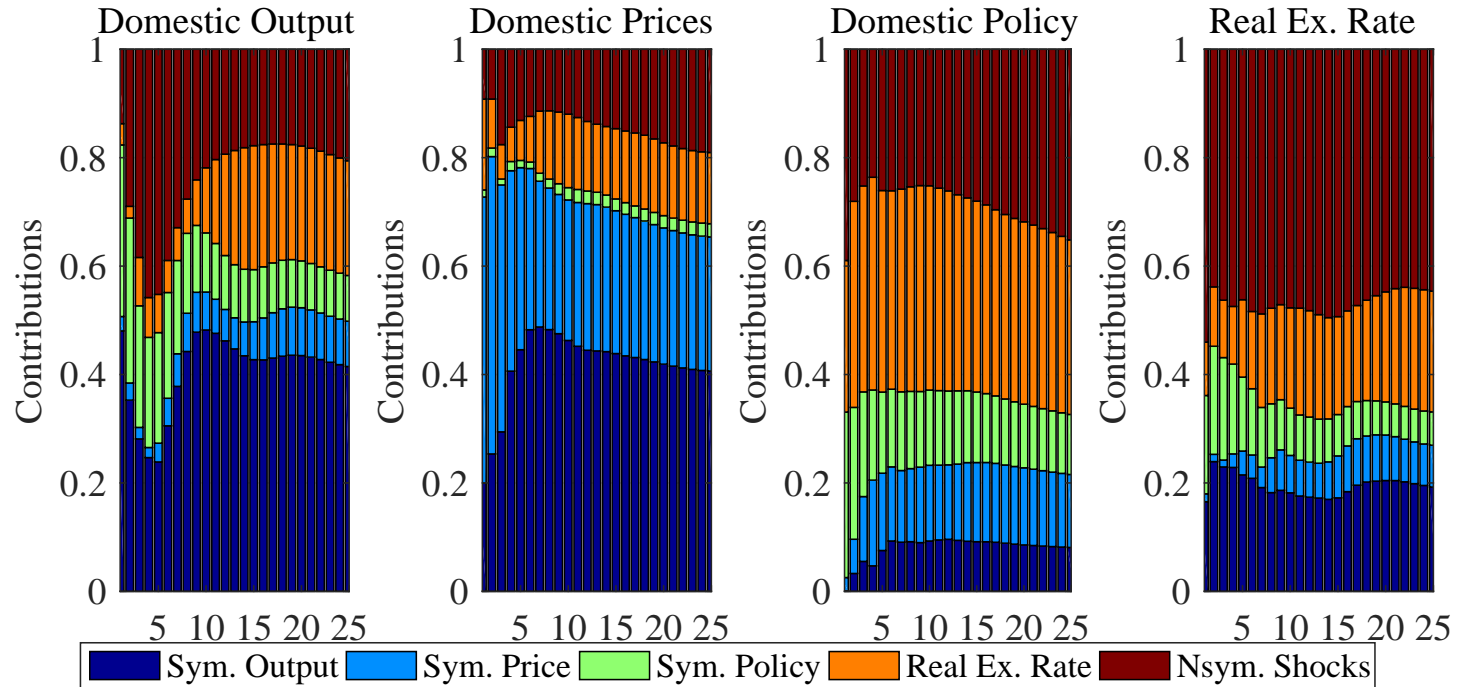
Business Cycle Frequency: 7-32

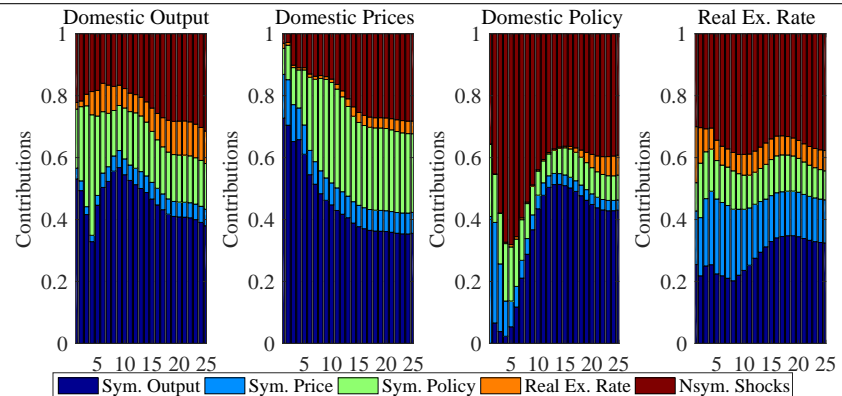
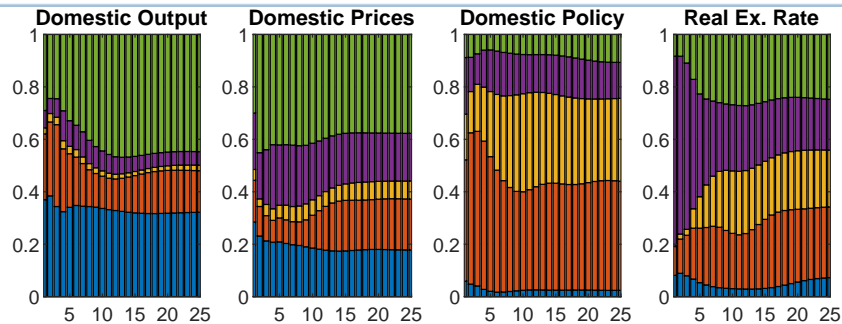


- Real exchange rate is not found to be a shock generator, the results are consistent with its shock absorbing role (incl for the countries in the EA)
 - For most of the countries (except for Bulgaria and Slovenian policy rate), the results reveal that real exchange rate shock does not generate significant volatility in macroeconomic variables.
- Symmetric shocks mostly dominate domestic output and prices
- We identify economies, with the relatively large importance of non-symmetric shocks, up to 30-40 percent, as well as those with very low impact - around 10 percent.
- Limitations of the study: analysis of rear events (Covid-19).

- Czech Republic example: Bands represent model uncertainty

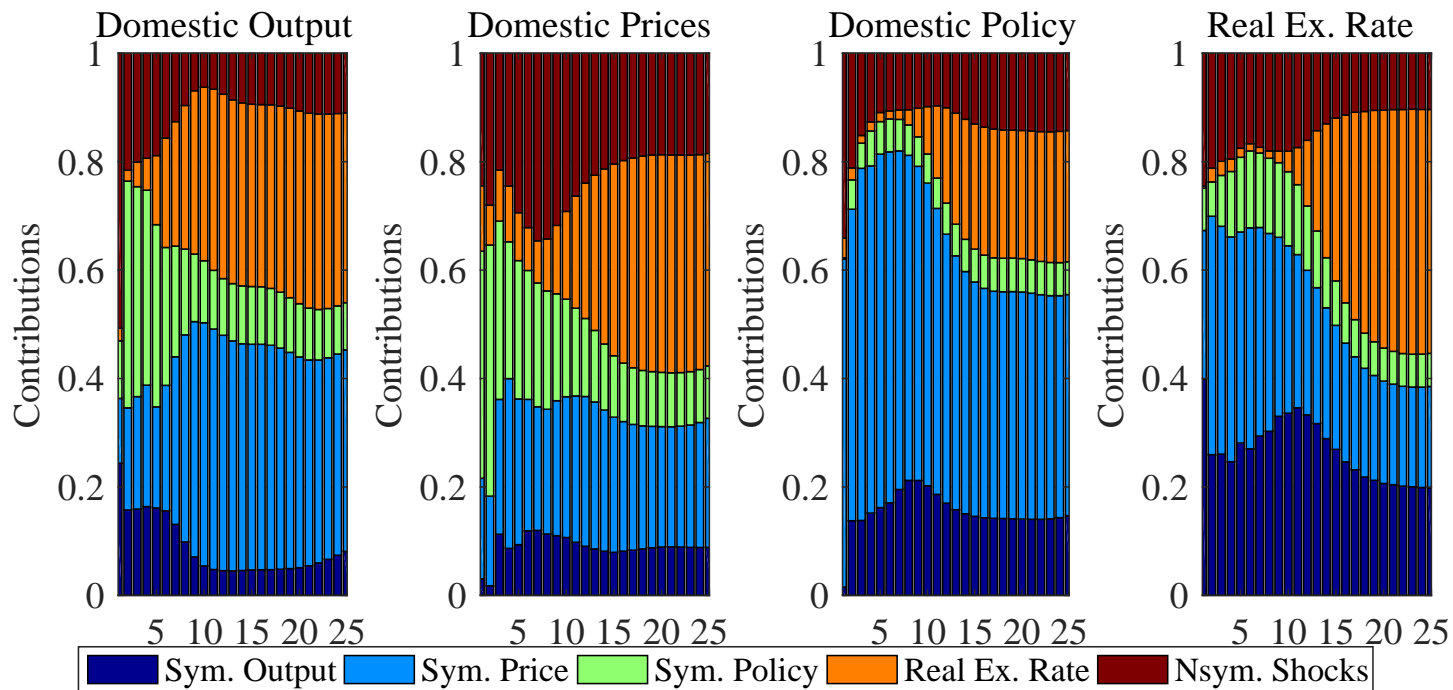


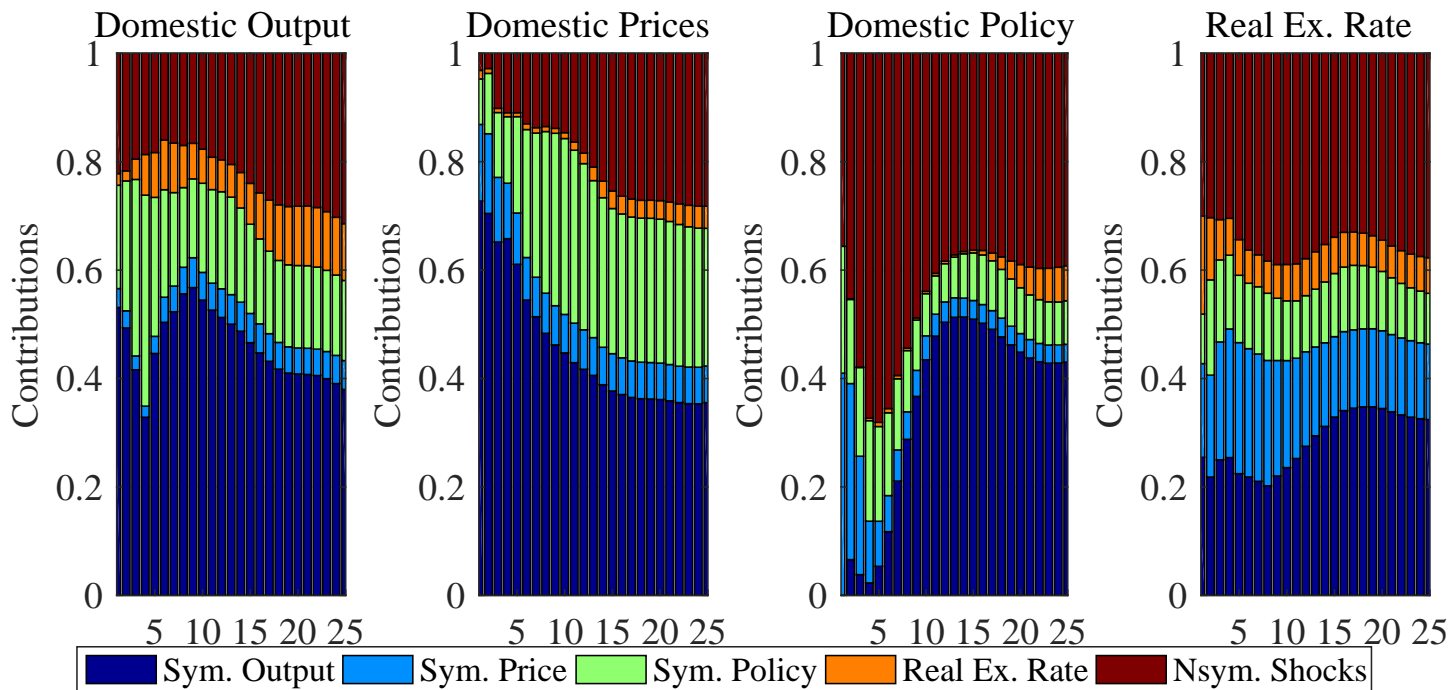




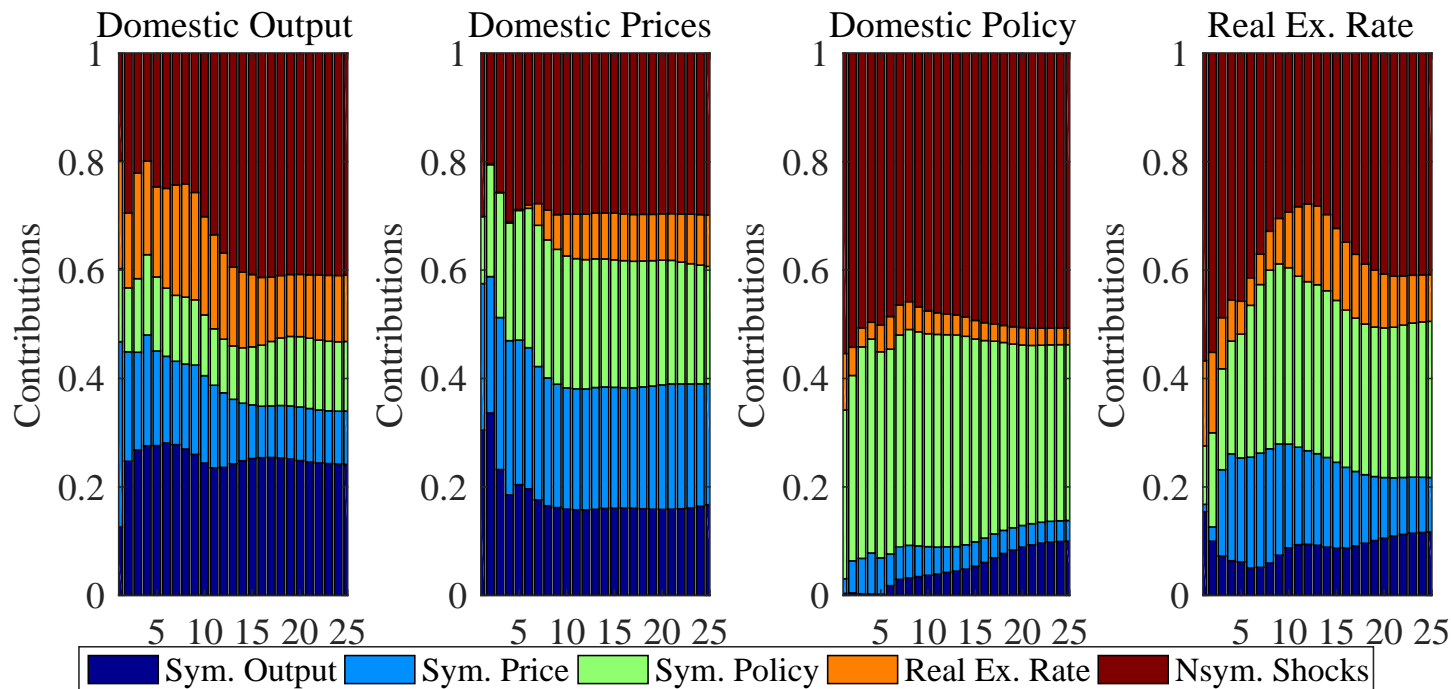
New Results

Bulgarian FEVD: Previous Research





New Results



New Results

- Amisano, G., N. Giammarioli, and L. Stracca (2009, Dec). EMU and the adjustment to asymmetric shocks: The case of Italy. Working Paper Series 1128, European Central Bank.
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Uhlig, H. (2005, March). What are the effects of monetary policy on output? results from an agnostic identification procedure. *Journal of Monetary Economics* 52(2), 381–419.

