

Inflation dynamics and monetary policy under relative price shocks: Evidence from the United States, the Euro Area, and Peru

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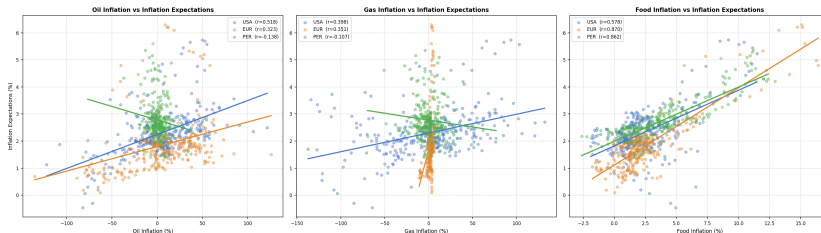
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Table: Descriptive Statistics of Food and Energy Inflation by Country (2003–2025)

	Food Inflation			Energy Inflation		
	% in CPI	Mean	Variance	% in CPI	Mean	Variance
USA	13.56	2.93	5.07	7.09	4.56	181.11
EUR	18.89	2.62	11.51	9.03	4.28	107.54
PER	39.96	3.96	10.44	4.77	3.92	44.43

Notes: Mean and standard deviation are expressed in percentage points. % in CPI denotes the weight of each component in the national consumer price index.

Oil, Gas & Food Inflation vs Inflation Expectations (USA, EUR & PER)



Research Questions and Contribution

Research Questions

- ① What role do relative-price shocks play in inflation dynamics and inflation expectations?
- ② Do monetary policy responses to these shocks differ across countries?

Empirical Strategy

- Estimate a Bayesian Structural VAR identified through sign and zero restrictions.
- Recover:
 - **Global shocks:** Energy, Supply Chain, Foreign Demand.
 - **Domestic shocks:** Local Supply, Food Inflation, Local Demand, Monetary Policy.

Main Contribution

- Compare the transmission of global and domestic supply shocks across economies with different CPI compositions.
- Quantify their effects on inflation, inflation expectations, and monetary policy.

Methodology

We estimate a Bayesian Structural VAR following Korobilis (2022). The reduced-form VAR is given by:

$$y_t = \Phi x_t + \varepsilon_t,$$

where ε_t denotes reduced-form innovations and $\Omega = \mathbb{E}(\varepsilon_t \varepsilon_t')$.

To recover structural shocks, innovations are modeled using a factor structure:

$$\varepsilon_t = \Lambda f_t + v_t,$$

with $f_t \sim \mathcal{N}(0, I_r)$, $v_t \sim \mathcal{N}(0, \Sigma)$, where Σ is diagonal. This implies $\Omega = \Lambda \Lambda' + \Sigma$.

- f_t : common factors interpreted as structural shocks
- v_t : idiosyncratic disturbances

Replacing ε_t , we get

$$y_t = \Phi x_t + \Lambda f_t + v_t$$

which is then premultiplied by $(\Lambda' \Lambda)^{-1} \Lambda'$ to recover the structural shocks.

$$A_1 y_t = B_1 x_t + f_t + (\Lambda' \Lambda)^{-1} \Lambda' v_t.$$

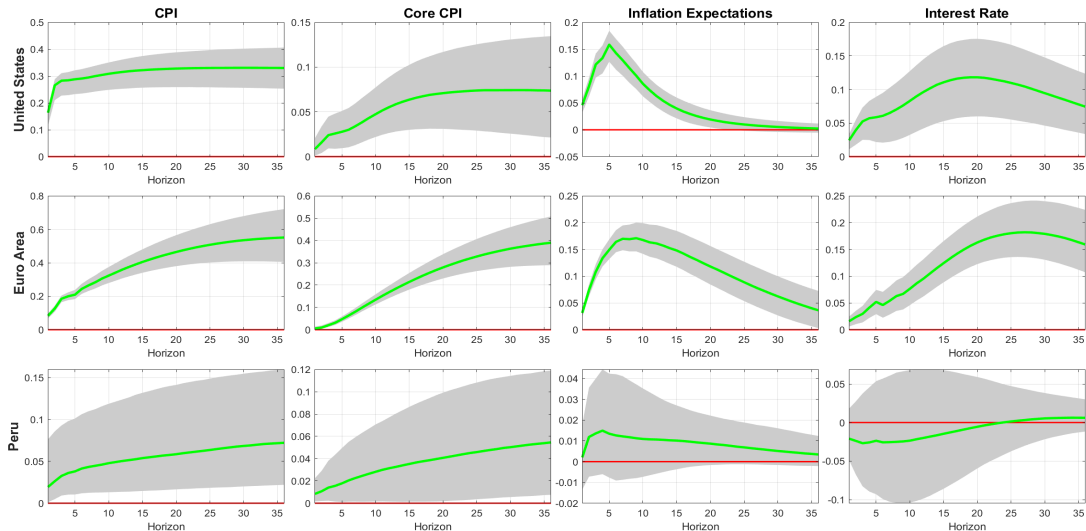
Identification Restrictions

Variables	Supply Shocks			Monetary
	G. Energy Prices	G. Supply Chain	Food Prices	Monetary Policy
Inflation	+	+	+	-
Core Inflation	+			-
Services Inflation				
Oil Inflation	+	0	0	0
Gas Inflation	+	0	0	0
Ind. Prod growth	-	-	-	-
Global Conditions	-	-	0	0
GSCPI	0	+	0	0
PPI Total growth	+	+		
PPI Energy growth	+			
Exch. Rate growth	+; - (USA;others)			
Wages growth	-	-		-
Food Inflation	+		+	
Inflation expect.				
Interest Rate				+

Note: '+' positive restriction, '-' negative restriction, '0' zero restriction. Red '0' restrictions are imposed only for Peru.

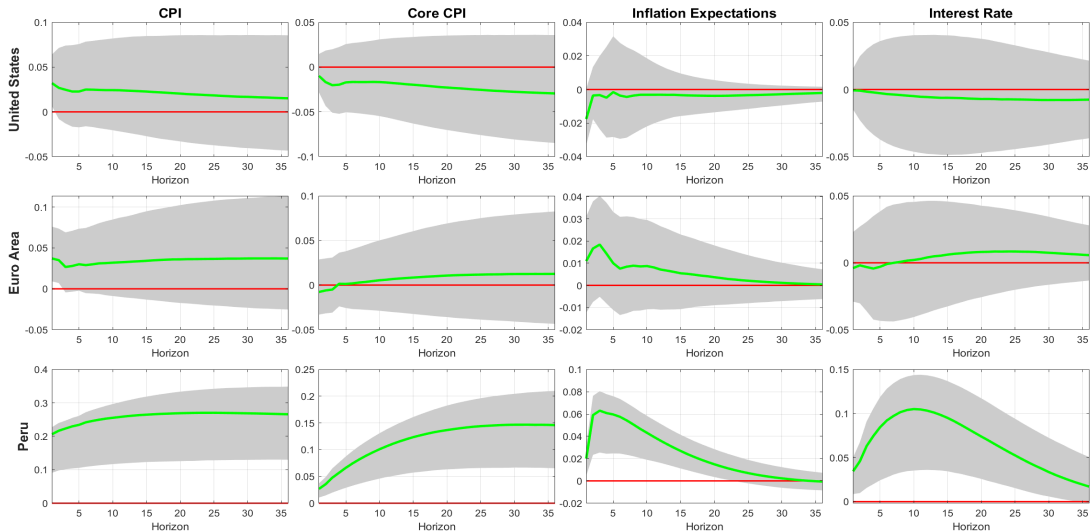
IRFs: Global Energy Price Shock

Responses to a Global Energy Prices Shock

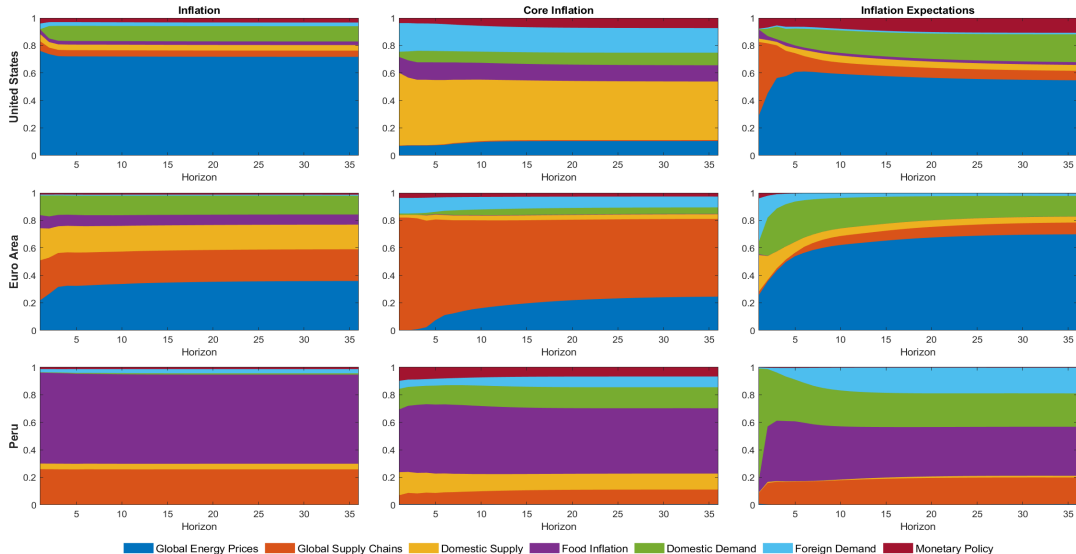


IRFs: Food Inflation Shock

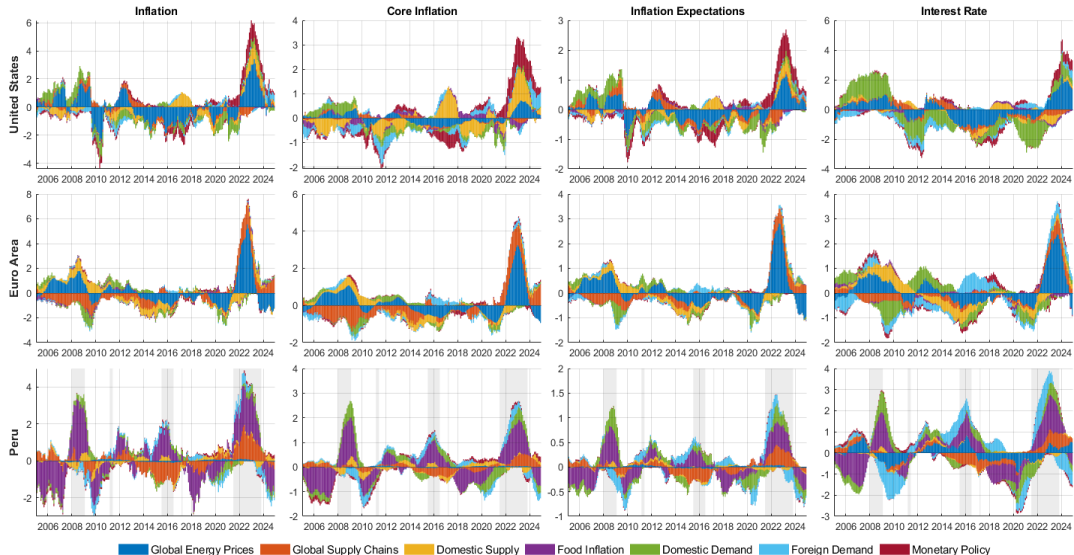
Responses to a Food Inflation Shock



Forecast Error Variance Decomposition



Historical Decomposition



Main Takeaways

RQ1. What is the role of relative-price shocks?

- **United States & Euro Area:** Global **energy-price shocks** are the main drivers of headline inflation and inflation expectations.
- **Euro Area:** **Supply-chain shocks** generate persistent inflationary pressures and larger effects on economic activity.
- **Peru:** **Food-price shocks** dominate inflation and inflation expectations, consistent with the high food share in the CPI basket.

RQ2. How do central banks respond?

- **Advanced economies** respond mainly to **energy-price shocks**, whereas the **BCRP** reacts primarily to **food-price shocks**.
- Monetary policy responses depend on both the **source of inflationary pressures** and the **composition of the CPI basket**.