

# The energy price channel of (European) monetary policy

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## Motivation: ECB Press Conference, 3. February 2022

### Question from audience:

“[...] if I listen to you and your colleagues one always has the impression that energy prices are something a central bank can't do much about. [...] what would you say?”

### Answer of Ms. Lagarde:

“If the ECB was to [...] raise interest rates in short order, do you think it would have any impact on energy prices? No, it is **not in the ambit of monetary policy to decide the price of the barrel** that is **organised predominantly outside of Europe.**”

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### Ms. Lagarde at the monetary dialogue on 7. February:

“Now, if we were to take monetary policy action [...] and rapidly hiking interest rates, would that have an **impact on energy prices right away? I don't think so.**”

# Can the ECB influence energy prices?

Stylised New-Keynesian open economy model yields:

The ECB can influence **global energy prices** (in \$) if

- ▶ Euro Area energy demand is elastic
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The ECB can influence **local energy prices** (in €) if

- ▶ Monetary policy influences the exchange rate
- ▶ Producer currency pricing holds for energy imports → FX pass-through

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  - The **ECB's MP decision** (just like the FED's) **do impact** global and local **energy prices**
  - The EA is not a Small Open Economy (SOE) in the global energy market



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4. Policy application: post-pandemic inflation surge

# High-frequency event study of energy prices

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	US	EA	UK
	LOE	SOE?	SOE
$\hat{\beta}$	-2.3*** (0.83)	-3.38*** (1.14)	0.37 (0.67)
Sample	1996:1-2019:12	2002:1-2021:12	1997:6-2021:3
N	182	212	257

► Results for Gas

► Robustness

## Next Step: Bayesian proxy VAR model

Bayesian proxy SVAR (BPSVAR) model allows us to

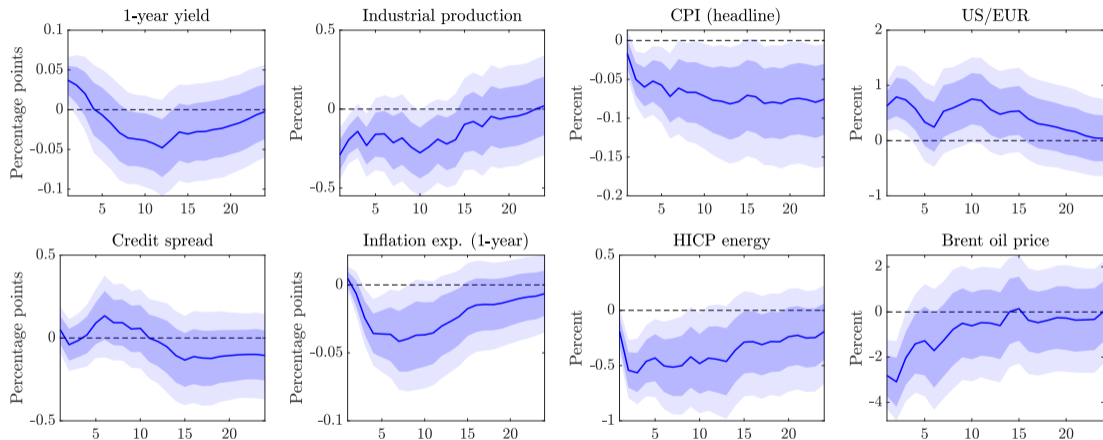
1. Analyze dynamic effects of MP shock on energy prices at business cycle frequency
2. Conduct counterfactual experiments to isolate channels and quantify importance

# BPSVAR model: Euro Area specification

- ▶ Variables: 1-year Bund yield, Industrial Production, HICP, BAA-spread, +
  - \* \$-€ exchange rate
  - \* (Consensus) 1-year inflation expectations
  - \* Brent oil price (in \$) to measure **global energy price**
  - \* HICP energy component (in €) to measure **local energy price**
- ▶ MP surprise: 3-month OIS, poor man's sign restriction (Jarociński and Karadi (2020))
- ▶ Sample: 1999m1 to 2019m12 (robust to pandemic)
- ▶ 12 lags
- ▶ Model & estimation algorithm and priors follow: Arias et al. (2021)

▶ Model & Algorithm

# Euro Area monetary policy shock - Baseline



► Including Pandemic



► HICP subcomponents

► US MP shock



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# SVAR counterfactuals: dissecting the energy price channel

Counterfactual questions:

1. SOE: Importance of "**global** energy price channel" for domestic transmission of MP?  
→ Response of global oil price =  $o \forall h$

# SVAR counterfactuals: dissecting the energy price channel

Counterfactual questions:

1. SOE: Importance of "**global** energy price channel" for domestic transmission of MP?
  - Response of global oil price =  $\alpha \forall h$
2. What if ECB can't affect **global** and **local** energy prices?
  - Response of global oil price & HICP energy component =  $\alpha \forall h$
  - Difference to baseline gives total contribution of energy-price channel

# SVAR counterfactuals: Methods

1. Structural Shock Counterfactual (SSC) (Sims and Zha (2006))
  - \* adding IRFs of another **specific identified shock** to IRF of interest (Känzig (2021))
  - \* so that IRFs satisfy counterfactual condition  $\forall h$

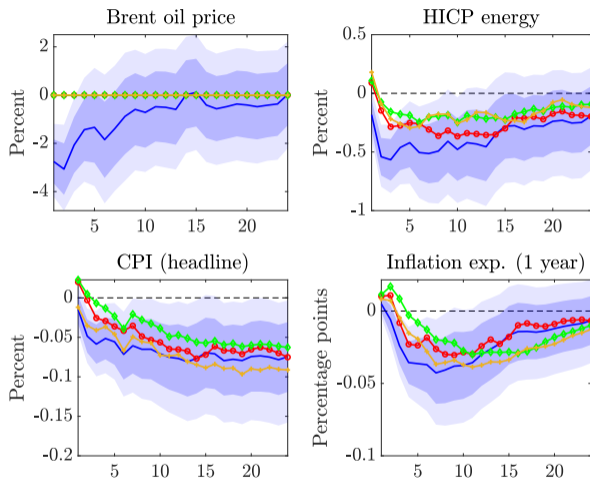
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2. Structural Scenario Analysis (SSA) (Antolin-Diaz et al. (2018); Breitenlechner et al. (2021))
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# SVAR counterfactuals: Methods

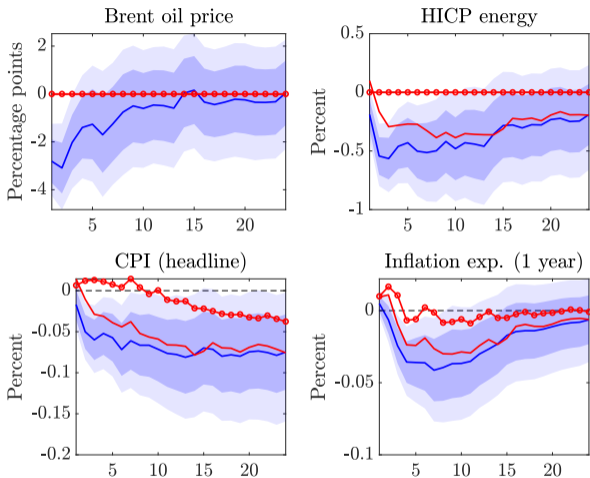
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  - \* “Identifying the system” i.e. back out all orthogonal shocks
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3. Minimum relative entropy (MRE) (Breitenlechner et al. (2021); Georgiadis et al. (2021))
  - \* No other shocks: structural VAR parameters change s.t. counterfactual constraint holds
  - \* But posterior of VAR model parameters are minimally different

# What if the ECB could not affect global oil prices?



Gold=SSC, Green=SSA, Red=MRE

# What if ECB does not affect energy prices at all?



**Solid Red**=SOE assumption,    **Dotted Red**=No energy-price channel

# Policy Application: the energy price channel during the post pandemic period

Previous sections: ECB MP can influence global and local energy prices

→ **Did ECB monetary policy contribute to latest rise and fall of energy prices?**



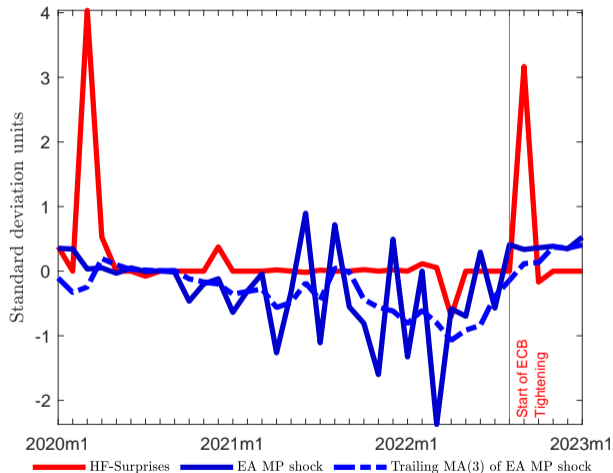
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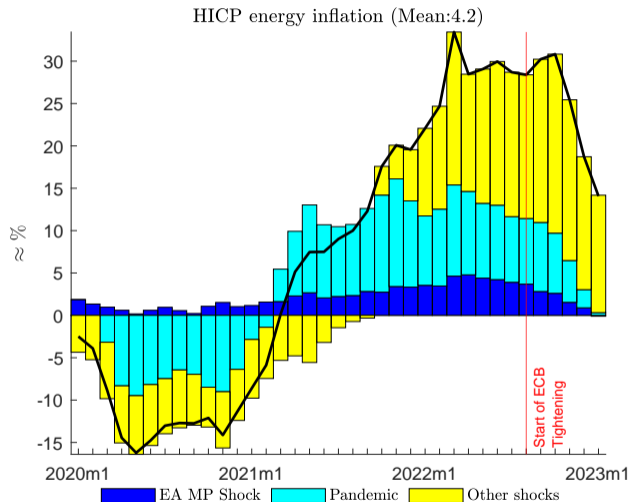
→ **Did ECB monetary policy contribute to latest rise and fall of energy prices?**

- ▶ Include (post) Pandemic period into estimation
- ▶ Account for lockdown period using “Pandemic Prior” approach of Cascaldi-Garcia (2022)
- ▶ Compute historical decomposition → contribution of **exogenous** component of MP

# Recent ECB decisions through the lens of the BPSVAR



# The contribution of ECB MP shocks to global energy prices



► Pure effect of tightening cycle

# Conclusion:

## Takeaways and policy implications

1. EA (and US) monetary policy affects energy prices “right away” and at business cycle frequency
2. Energy price channel important for the transmission of monetary policy to headline inflation ...
3. ...and for anchoring inflation expectations
4. ECB policy contributed to recent surge and fall of energy prices

Thank you!

# References

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# HF-Robustness

**Table** Results for the event study regression for the euro area, US and UK (Equation ??)

	EA	EA	EA	US	US	UK	UK
	(1)	(2)	(3)	$mps_{FF4}^{pm}$	$mps^{\perp}$	(1)	(2)
$\hat{\beta}$	-3.48*** (1.14)	-2.10* (1.10)	-1.80* (1.08)	-2.15** (1.01)	-2.23*** (0.83)	0.37 (0.67)	0.36 (0.68)
$R^2$ (%)	2.60	1.48	1.07	2.21	3.21	0.33	0.38
Sample	2002:1 2021:12	1999:1 2021:12	1999:1 2019:12	1996:1 2019:6	1996:1 2019:12	1997:6 2021:3	1997:6 2019:12
$N$	212	278	262	182	187	257	246

# HF-Analysis: Results (Gas)

Replace Brent oil price futures with natural gas price (Dutch TTF) futures

	1-month TTF	1-year TTF	1-month TTF	1-year TTF
$\hat{\beta}$	-17.42*** (4.50)	-12.32*** (3.12)	-13.85*** (3.92)	-13.41*** (3.23)
Sample	2007:10-2019:12	2007:10-2019:12	2007:10-2021:12	2007:10-2021:12

▶ Return



# Bayesian proxy SVAR of Arias et al. (2021)

Structural shocks in the VAR  $A(L)y_t = \epsilon_t$  are

$$\epsilon_t = \begin{bmatrix} \epsilon_t^{*'} & \epsilon_t^{o'} \end{bmatrix}' \quad (1)$$

Identifying assumptions with proxy variables  $m_t$

$$E[m_t \epsilon_t^{*'}] = V, \quad E[m_t \epsilon_t^{o'}] = \mathbf{0} \quad (2)$$

## Bayesian proxy SVAR of Arias et al. (2021)

Subject to Relevance and Exogeneity conditions, estimate 'augmented VAR'

$$\tilde{A}(L) \begin{bmatrix} y_t \\ m_t \end{bmatrix} = \begin{bmatrix} \epsilon_t \\ \nu_t \end{bmatrix} \quad (3)$$

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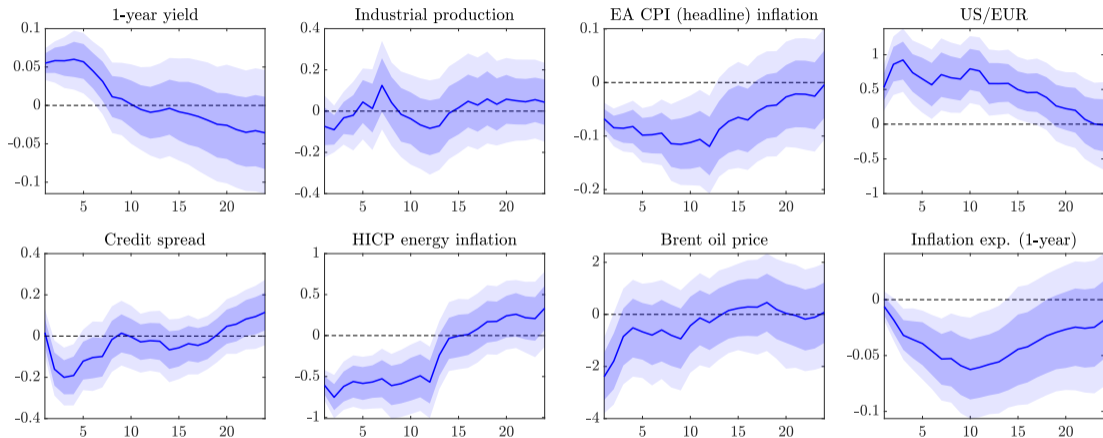
$$\tilde{A}(L) \begin{bmatrix} y_t \\ m_t \end{bmatrix} = \begin{bmatrix} \epsilon_t \\ \nu_t \end{bmatrix} \quad (3)$$

Allows flexible relationship between proxy and structural shocks

$$m'_t = \tilde{y}'_{t-1} C(L) + \epsilon_t^{\star'} V + \epsilon_t^{o'} O + \nu_t' D. \quad \nu_t \sim \mathcal{N}(0, I) \quad (4)$$

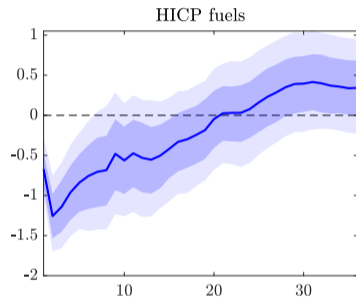
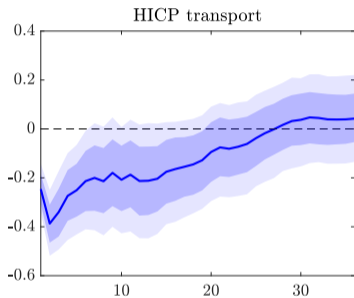
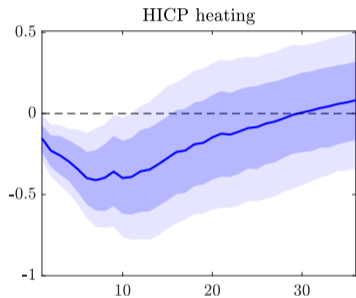
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# Euro Area monetary policy shock - Including Pandemic



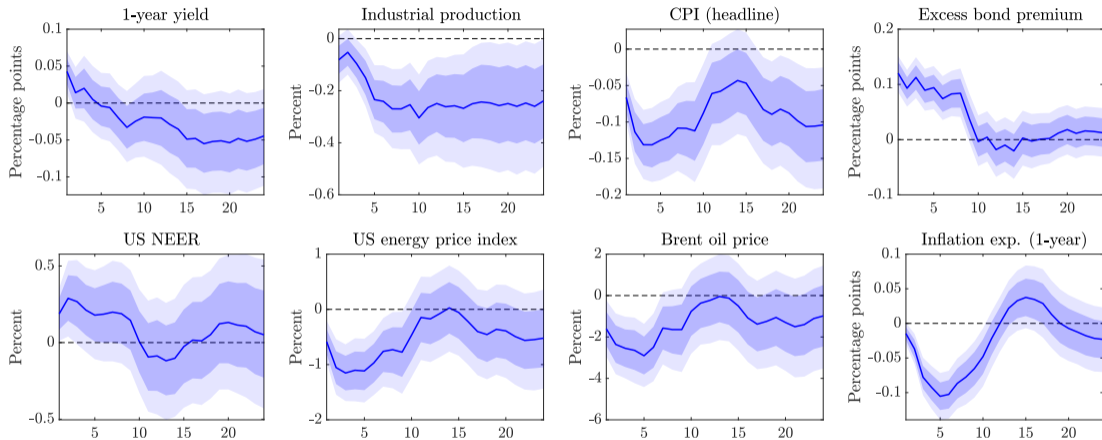
► Return

# Euro Area monetary policy shock - HICP components



[▶ Return](#)

# US monetary policy shock - Baseline



► Return

## CF 3: Does € app. (given global price) lower local energy prices

**Approach:** Simulate ECB tightening that

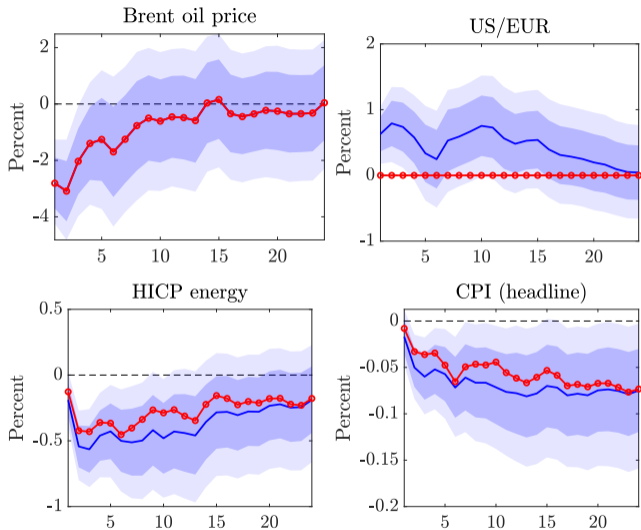
1. has the same impact on global energy price as baseline
2. does not appreciate the €

**Counterfactual constraint 1:** Response of the global oil price to MP shock is at baseline  $\forall h$

**Counterfactual constraint 2:** Response of the €-\$ exchange rate to MP shock is 0  $\forall h$

**Methods employed:** MRE

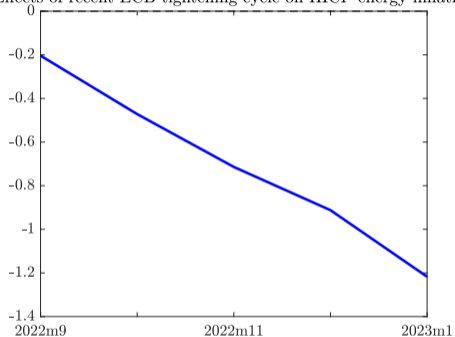
# Is there exchange rate pass-through to local prices (in €) ?



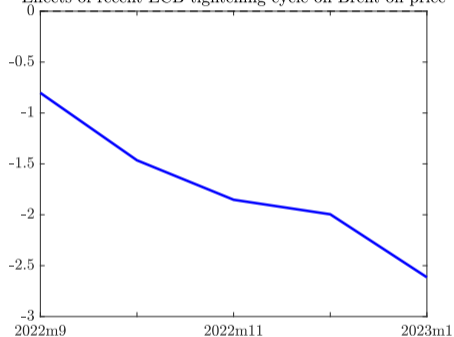


# The effect of the latest tightening cycle

Effects of recent ECB tightening cycle on HICP energy inflation

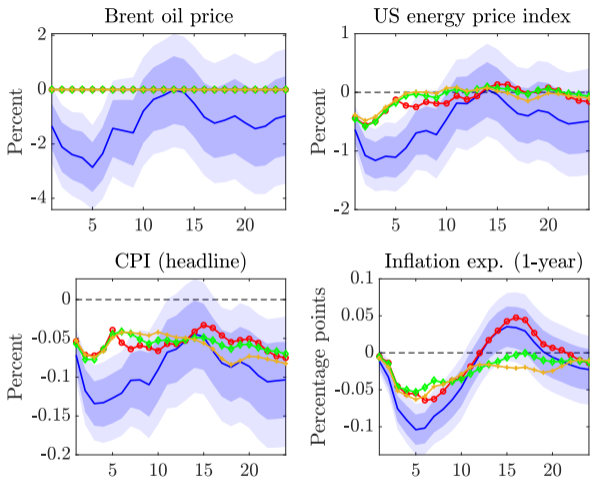


Effects of recent ECB tightening cycle on Brent oil price



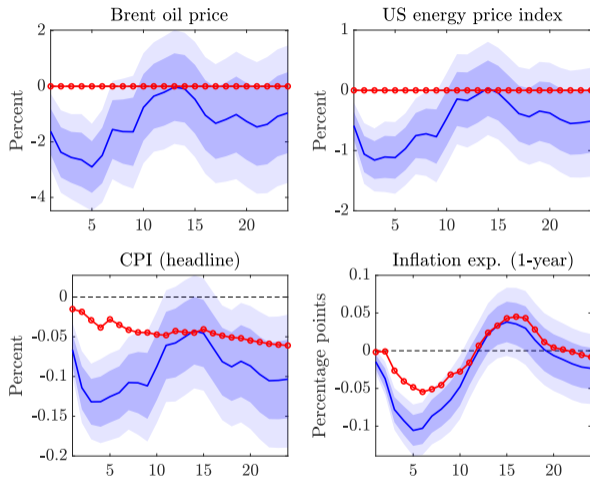
▶ Return

# What if the Fed could not affect global oil prices?



Gold=SSC, Green=SSA, Red=MRE

# What if the Fed could not affect any energy prices?



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