

The economic impact of Russia's invasion of Ukraine on European countries – a SVAR approach

Jonas M. Bruhin¹ Rolf Scheufele² Yannic Stucki²

¹University of St. Gallen ²Swiss National Bank

1. Motivation and research question

- Surge in energy prices, financial market turmoil and serious economic concerns after onset of Russia's war on Ukraine.
- We want to **quantify the impact of Russia's invasion of Ukraine on the economies of several European countries (France, Germany, Italy, Switzerland, and the United Kingdom).**
- We study historical geopolitical conflicts that are similar to Russia's war on Ukraine, i.e., conflicts associated with fears of disruption or actual disruptions of energy supply.
- Figure 1 shows geopolitical conflicts that are associated with oil price increases.

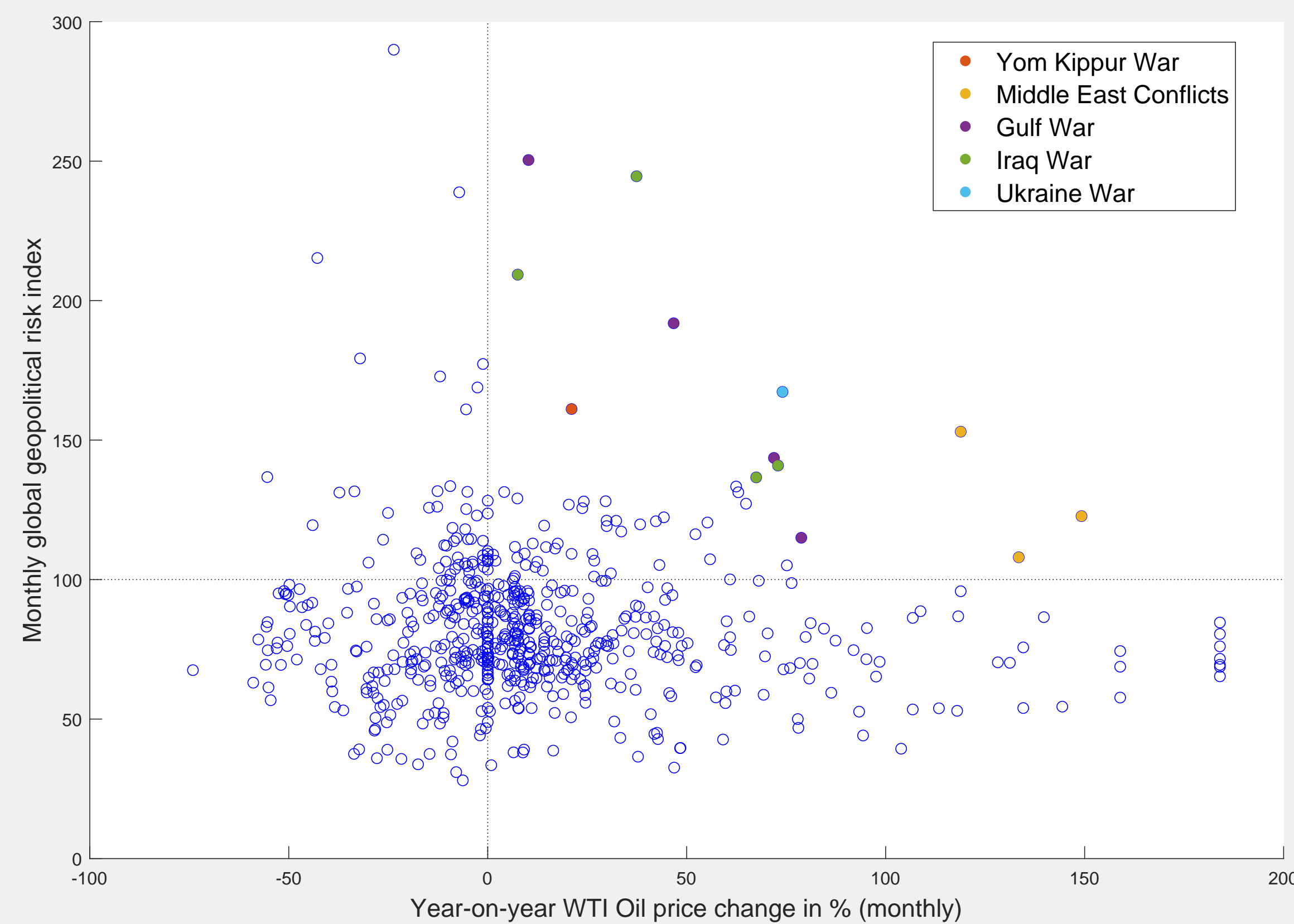


Figure 1. Scatterplot of monthly oil price change (yoy) and GPR index from January 1970 to December 2022

- We employ a structural VAR model with zero, sign and narrative restrictions.
- Separate VAR for each country with global (block-exogenous) and country-specific part.

2. Data

Global block

- Logarithm of the global geopolitical risk index by Caldara and Iacoviello (2022)
- US short-term interest rates (shadow rate)
- Quarter-on-quarter global real GDP growth
- Quarter-on-quarter global CPI inflation
- Standardized global consumer sentiment
- Logarithmic change in the WTI oil price

Country-specific block

- Logarithm of the country-specific geopolitical risk index
- Quarter-on-quarter energy CPI inflation
- Short-term interest rates (shadow rate)
- Quarter-on-quarter real GDP growth
- Quarter-on-quarter CPI inflation
- Standardized consumer sentiment

The quarterly data covers the period 1973Q1–2022Q4 (except for the UK, where the data starts in 1974Q1 because of the availability of consumer sentiment data).

3. Empirical approach

Baseline VAR specification (2 lags)

$$\begin{pmatrix} g_t \\ d_t \end{pmatrix} = \begin{pmatrix} \theta_{0,g} \\ \theta_{0,d} \end{pmatrix} + \begin{pmatrix} \theta_{1,gg} & 0 \\ \theta_{1,dg} & \theta_{1,dd} \end{pmatrix} \begin{pmatrix} g_{t-1} \\ d_{t-1} \end{pmatrix} + \begin{pmatrix} \theta_{2,gg} & 0 \\ \theta_{2,dg} & \theta_{2,dd} \end{pmatrix} \begin{pmatrix} g_{t-2} \\ d_{t-2} \end{pmatrix} + \begin{pmatrix} \varepsilon_{g,t} \\ \varepsilon_{d,t} \end{pmatrix}$$

g_t : block-exogenous global variables; d_t : country-specific variables

The VAR is estimated using a Bayesian estimation approach.

Identification strategy

- Combination of zero and sign restrictions [Uhlig 2005] with narrative sign restrictions [Antolín-Díaz and Rubio-Ramírez 2018] to identify the impact of similar conflicts.
- We separately identify a global and a local channel.
- The local channel captures the disproportional exposure of Europe to the War in Ukraine compared to similar conflicts.

Global channel – identification

| | $u_{t,GPR}$ | $u_{t,GPR,2}$ | $u_{t,remaining}^{global}$ | u_t^{local} | | $u_{t,GPR}$ | |
|-----------------|-------------|---------------|----------------------------|---------------|-----------------------|---------------|---|
| GPR | + | + | 0 | 0 | Yom Kippur War | 1973Q4 | + |
| Oil price infl. | + | - | 0 | 0 | Middle East Conflicts | 1980Q1 | + |
| Interest rate | 0 | 0 | 0 | 0 | Gulf War | 1990Q3–1990Q4 | + |
| GDP | 0 | 0 | 0 | 0 | Iraq War | 2002Q4–2003Q1 | + |
| CPI Infl. | 0 | 0 | 0 | 0 | Ukraine War | 2022Q1–2022Q2 | + |
| Cons. Sent. | 0 | 0 | 0 | 0 | | | |

Table 1. Global zero and sign restrictions

Local channel – identification

| | u_t^{global} | $u_{t,GPR}^{local}$ | $u_{t,remaining}^{local}$ | | $u_{t,GPR}^{local}$ | |
|--------------|----------------|---------------------|---------------------------|-------------|---------------------|---|
| GPR | | + | | Ukraine War | 2022Q1–2022Q2 | + |
| Energy infl. | | + | | | | |

Table 3. Local sign restrictions

Table 2. Global narrative restrictions

Table 4. Local narrative restrictions

4. Results

Impulse responses – global channel

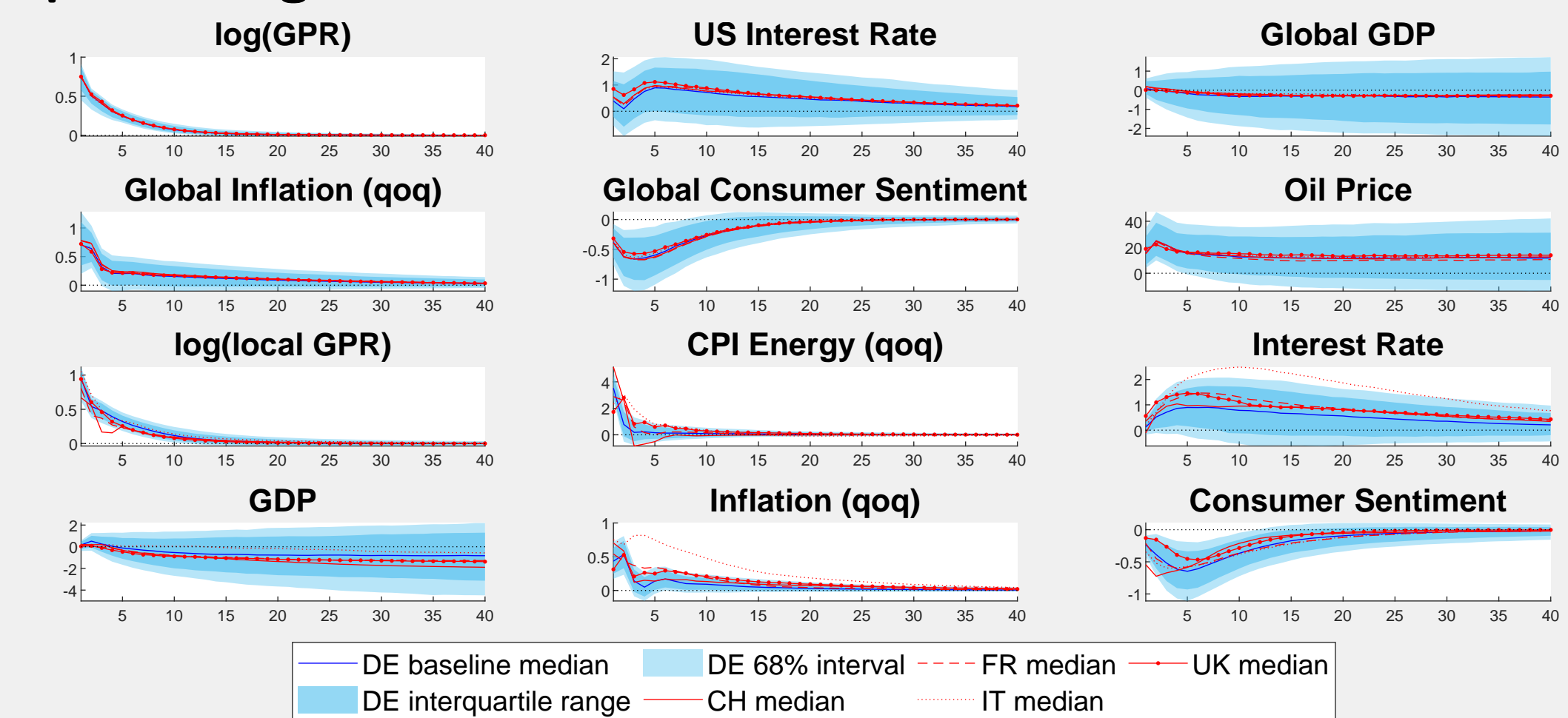


Figure 2. Impulse responses to a geopolitical conflict shock using the global channel only

Impulse responses – local channel

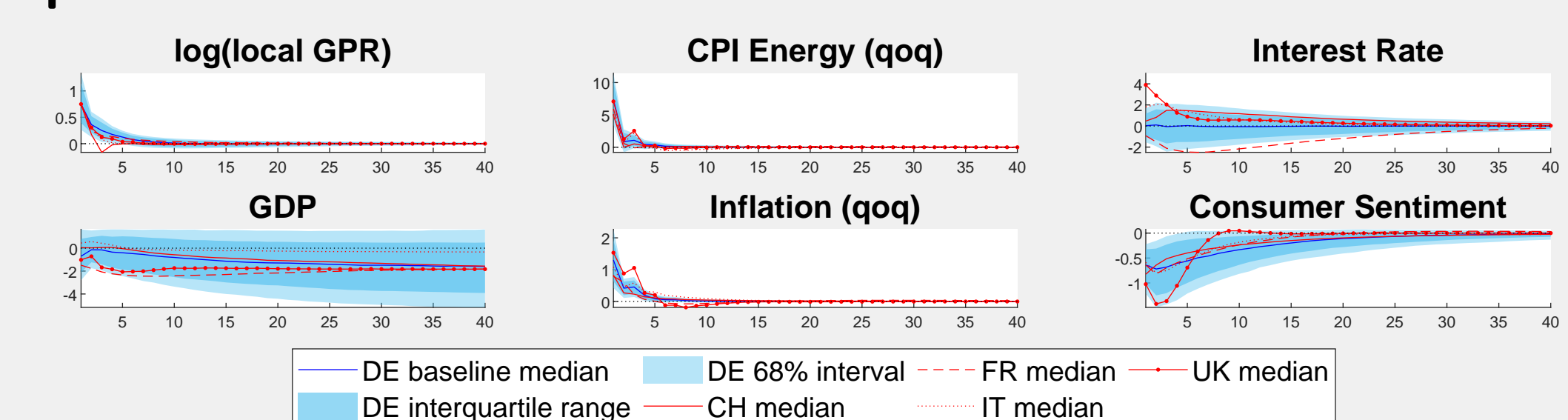


Figure 3. Impulse responses to a geopolitical conflict shock using the local channel only

Counterfactual: What if Russia did not attack Ukraine?

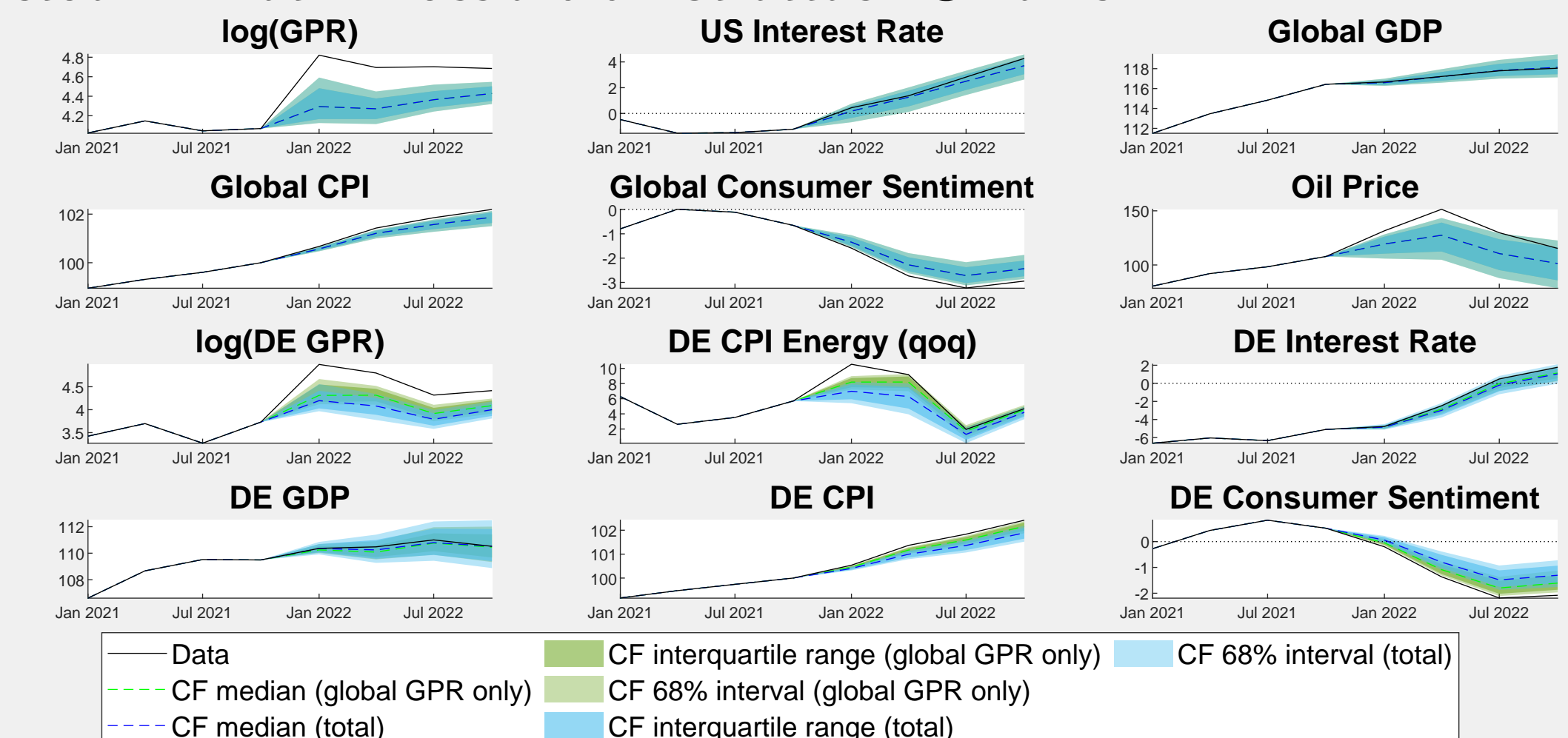


Figure 4. Counterfactual for Germany if Russia had not attacked Ukraine

The results for the other countries are qualitatively similar:

| Country | CPI [global] | CPI [total] | GDP [global] | GDP [total] |
|---------|----------------------------|----------------------------|---------------------------|---------------------------|
| DE | -0.25% [-0.43%, -0.10%] | -0.52% [-0.75%, -0.31%] | -0.06% [-0.76%, 0.81%] | 0.00% [-1.01%, 1.18%] |
| FR | -0.43% [-0.73%, -0.21%] | -0.51% [-0.82%, -0.29%] | 0.10% [-0.38%, 0.71%] | 0.39% [-0.14%, 1.06%] |
| IT | -0.41% [-0.62%, -0.24%] | -0.56% [-0.78%, -0.37%] | -0.15% [-0.85%, 0.66%] | -0.26% [-1.06%, 0.72%] |
| UK | -0.15% [-0.34%, 0.00%] | -0.31% [-0.52%, -0.13%] | 0.21% [-0.59%, 1.13%] | 0.68% [-0.31%, 1.92%] |
| CH | -0.33% [-0.55%, -0.17%] | -0.50% [-0.72%, -0.31%] | 0.01% [-0.53%, 0.65%] | 0.02% [-0.74%, 0.84%] |

Table 5. Median percentage difference to no-war counterfactual by 2022-Q4. Interquartile interval in brackets. Global denotes the global channel.

5. Conclusion and work in progress

- Our analysis suggests that if Russia had not attacked or threatened Ukraine, consumer prices of the countries considered would have been 0.3% to 0.6% lower by 2022Q4.
- The adverse effects are likely to unfold over the coming years and become much stronger, particularly with regard to the impact on real economic activity.
- Limitations to our study suggest that the estimates represent a lower bound.
- Work in progress:
 - Estimate the model with monthly data
 - Refine the identification strategy

References

- Antolín-Díaz, Juan, and Juan F Rubio-Ramírez. 2018. "Narrative sign restrictions for SVARs." *American Economic Review* 108 (10): 2802–29.
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- Uhlig, Harald. 2005. "What are the effects of monetary policy on output? Results from an agnostic identification procedure." *Journal of Monetary Economics* 52 (2): 381–419.

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