Cross-Country Differences in the Effects of Oil Shocks

Gert Peersman
Ghent University

Ine Van Robays
Ghent University

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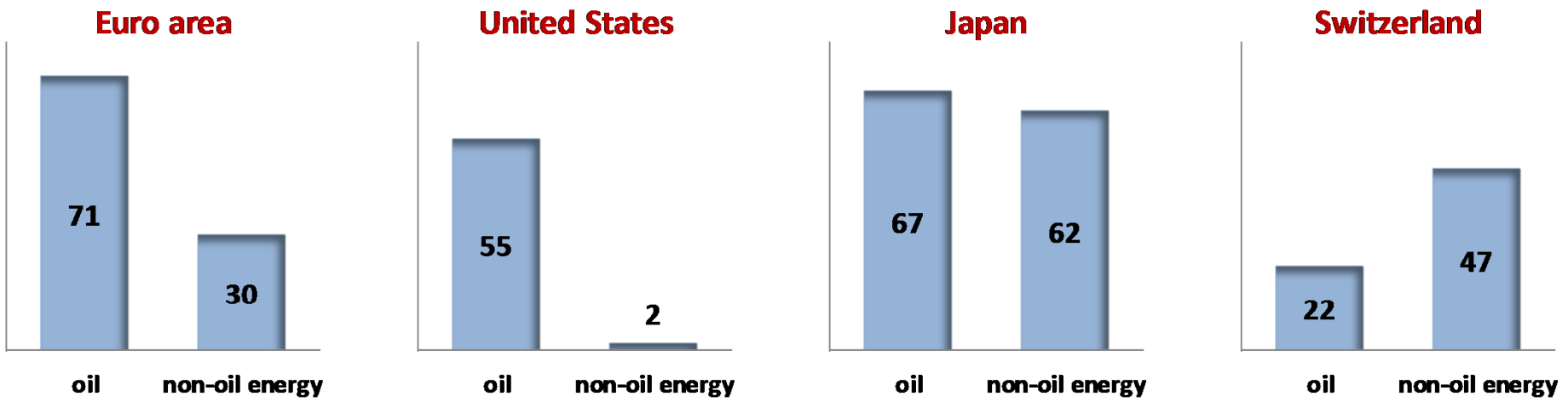
Analysis in this paper

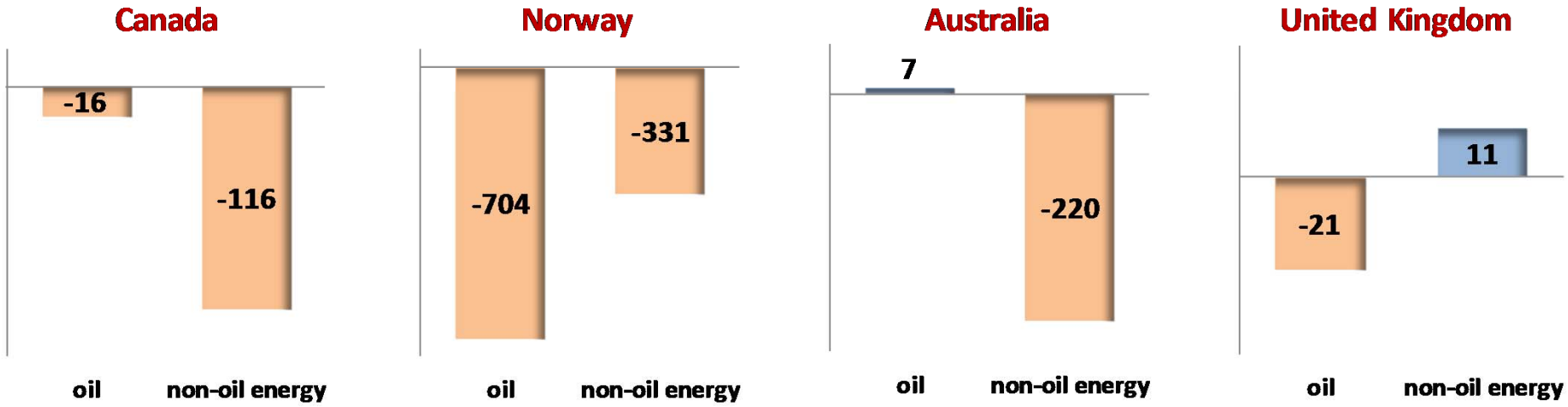
- Macroeconomic consequences of oil shocks across a set of countries which are very diverse with respect to the role of oil and energy in the economy
  - Oil/energy importing and exporting countries
  - Relevance of non-oil energy products also taken into account to assess cross-country differences
- Distinguish between several types of oil shocks
  - Peersman (2005), Kilian (2009), Peersman and Van Robays (2009): effects crucially depend on the underlying source of oil price shift in US and Euro area
- Has impact changed over time; and can time variation be explained by changes in macroeconomic relevance of oil and other sources of energy?

Net import oil and non-oil energy

Tonnes of oil equivalent / GDP (millions USD, PPP weighted): average 1986-2008



in paper also Germany, France, Italy and Spain



Benchmark SVAR model

$$\begin{bmatrix} X_t \\ Y_{j,t} \end{bmatrix} = c + A(L)\begin{bmatrix} X_{t-1} \\ Y_{j,t-1} \end{bmatrix} + B\begin{bmatrix} \varepsilon_t^X \\ \varepsilon_{j,t}^Y \end{bmatrix}$$

Oil market variables (X)

- Global oil production
- World crude oil price (US dollars)
- World economic activity

Country-specific variables (Y)

- Real GDP
- Consumer prices
- Nominal short-term interest rate
- Nominal effective exchange rate

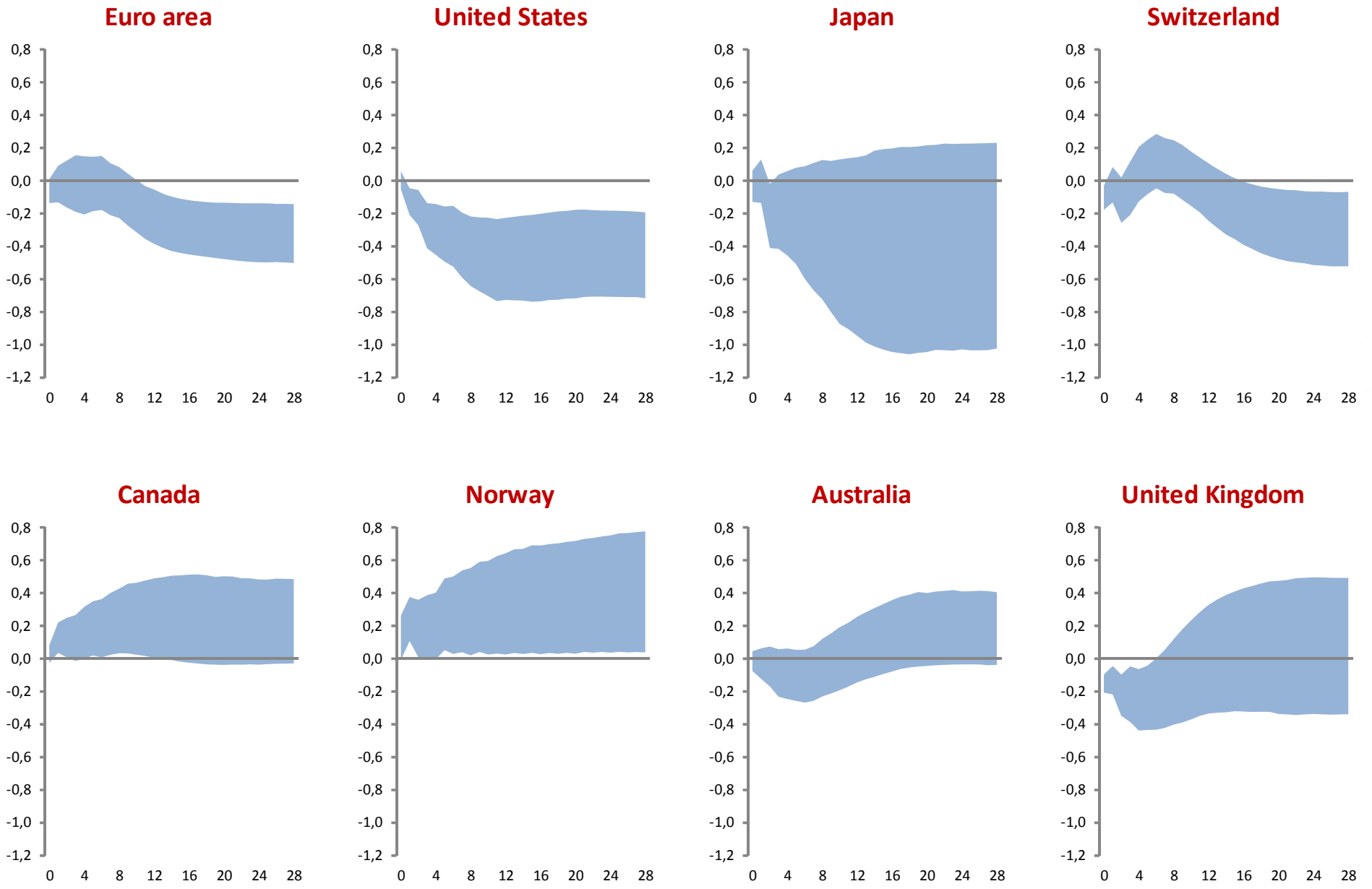
- Sample period 1986Q1-2010Q4 with 3 lags
  - Structural break in oil market dynamics in 1986Q1

Identification of three types of oil shocks

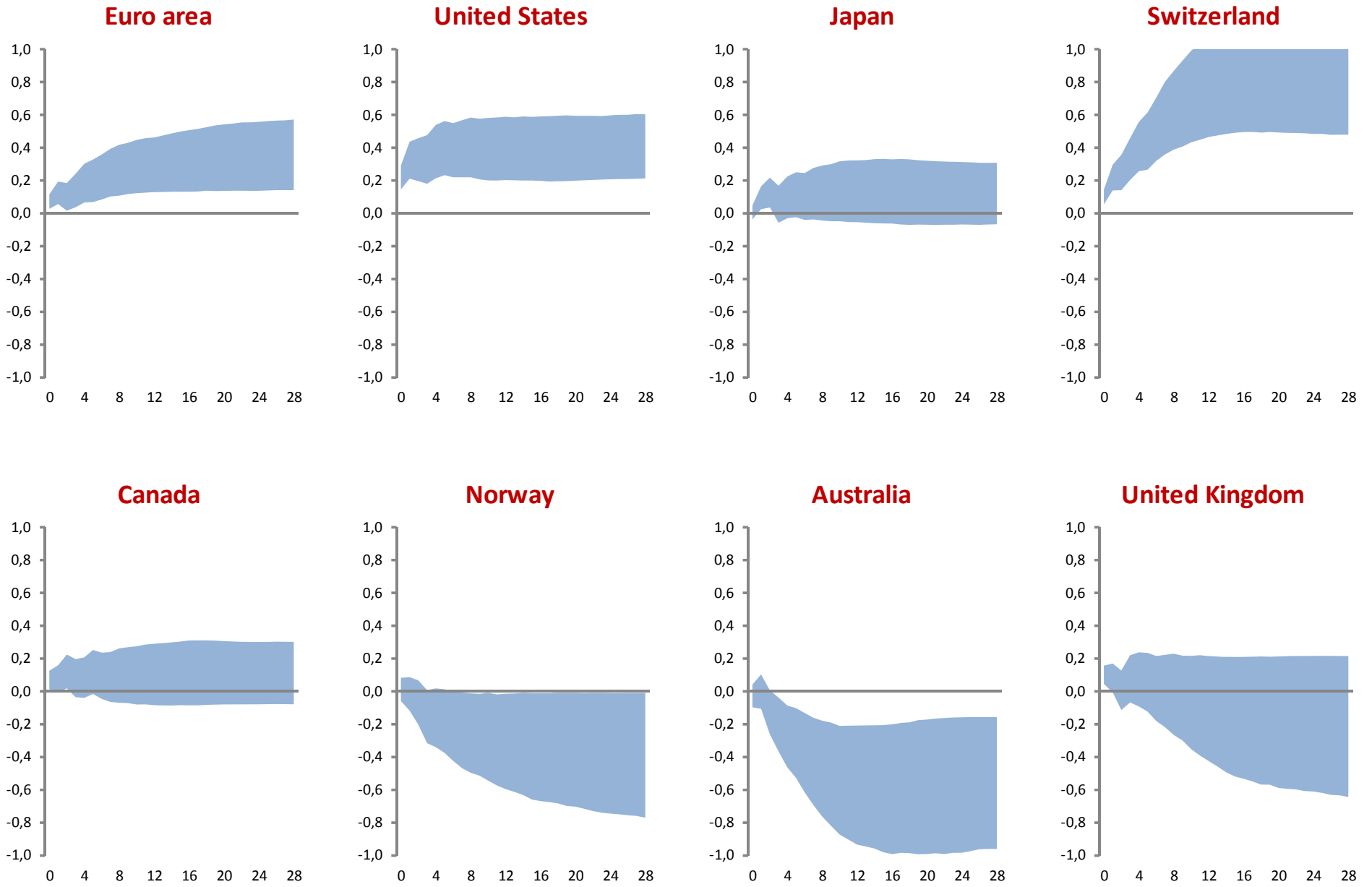
- Peersman and Van Robays (2009): sign restrictions on oil market variables
  - **Oil supply shocks**
  - **Oil demand shock driven by global economic activity**
  - **Oil-specific demand shock**
- No restrictions on other (country-specific) variables

	Q_{oil}	P_{oil}	Y_{wd}	Y_j	P_j	i_j	S_j
Oil supply shock	<0	>0	≤0				
Global economic activity shock	>0	>0	>0				
Oil-specific demand shock	>0	>0	≤0				

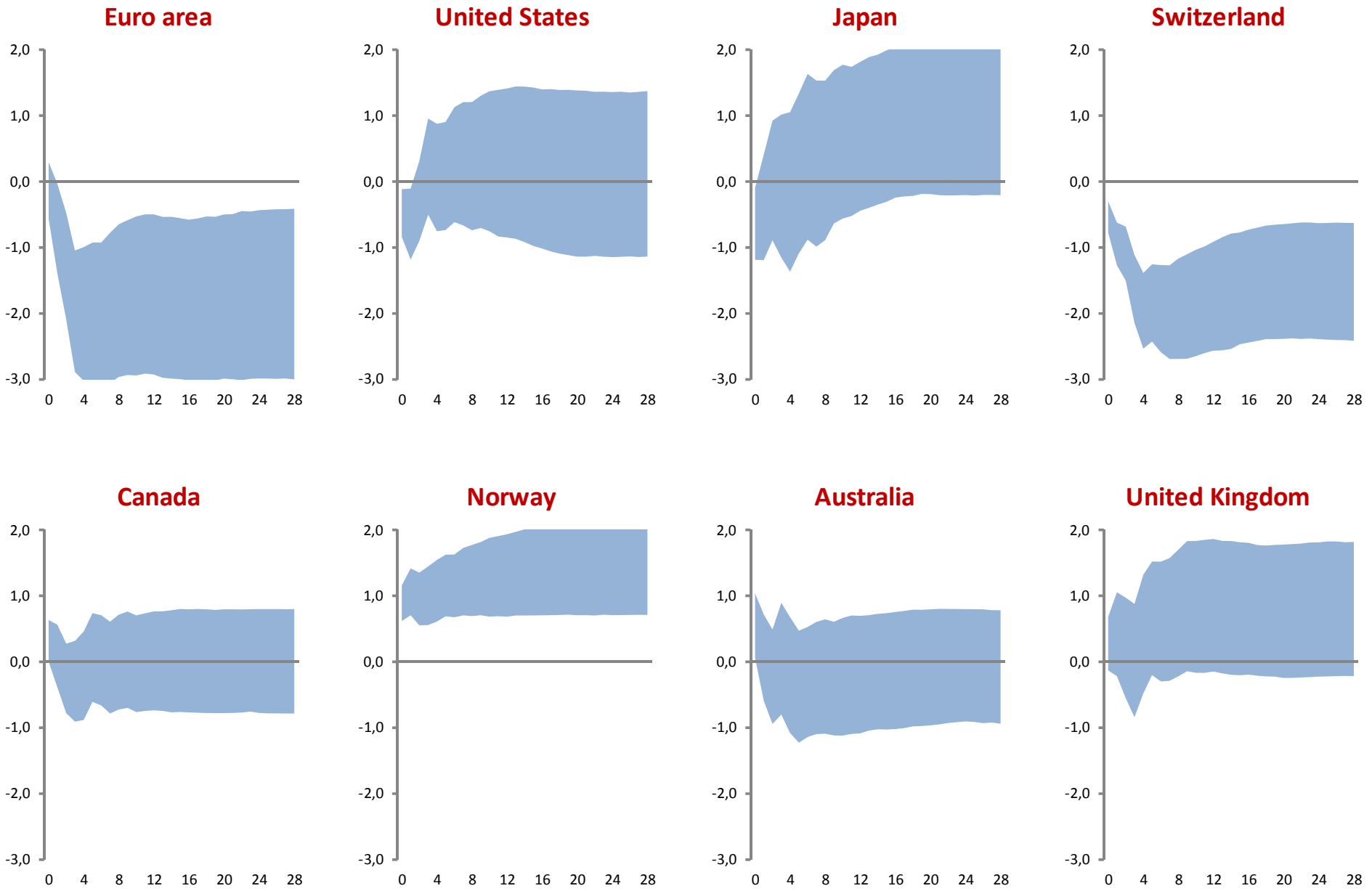
Oil supply shock => output



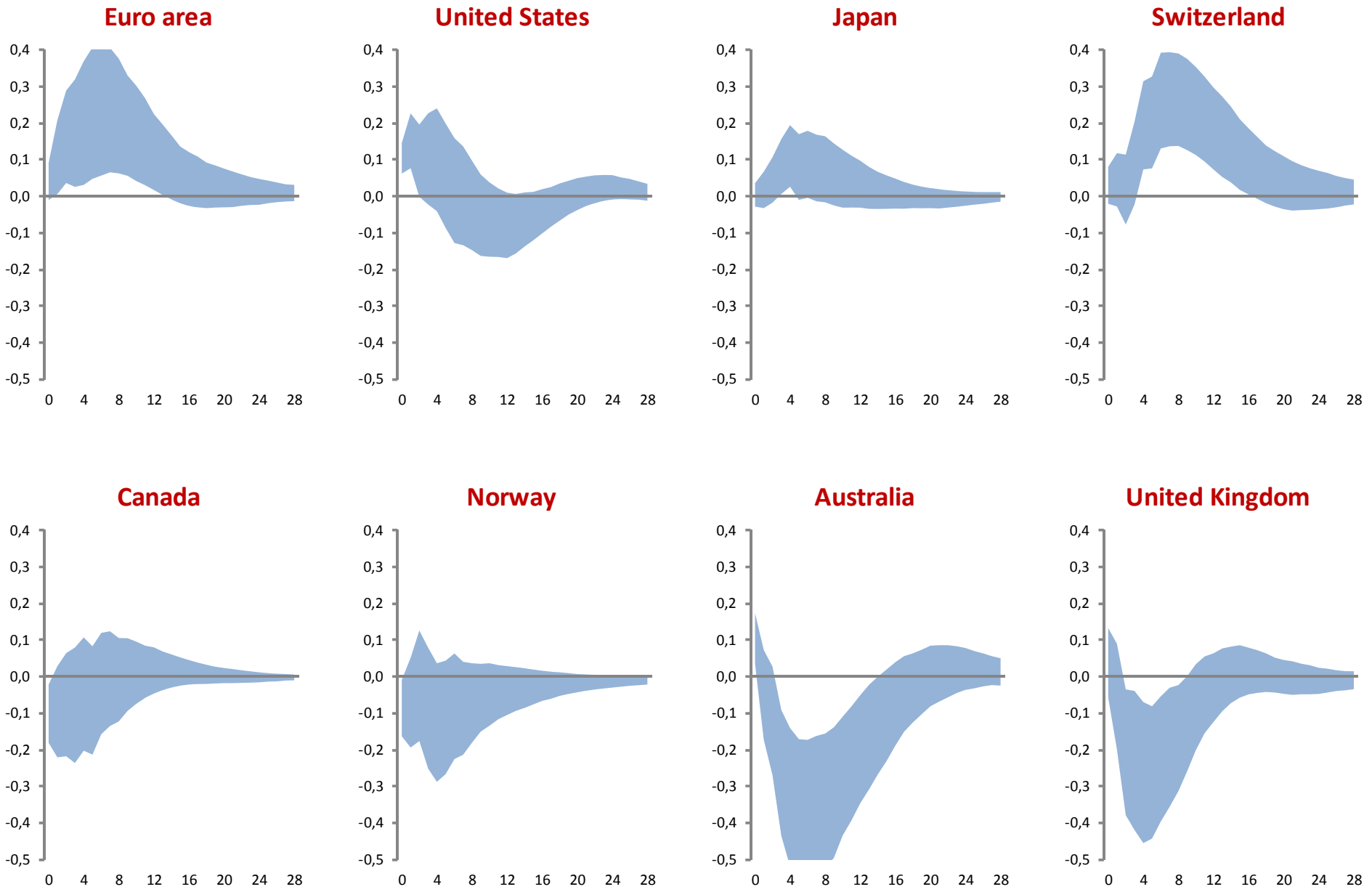
Oil supply shock => consumer prices



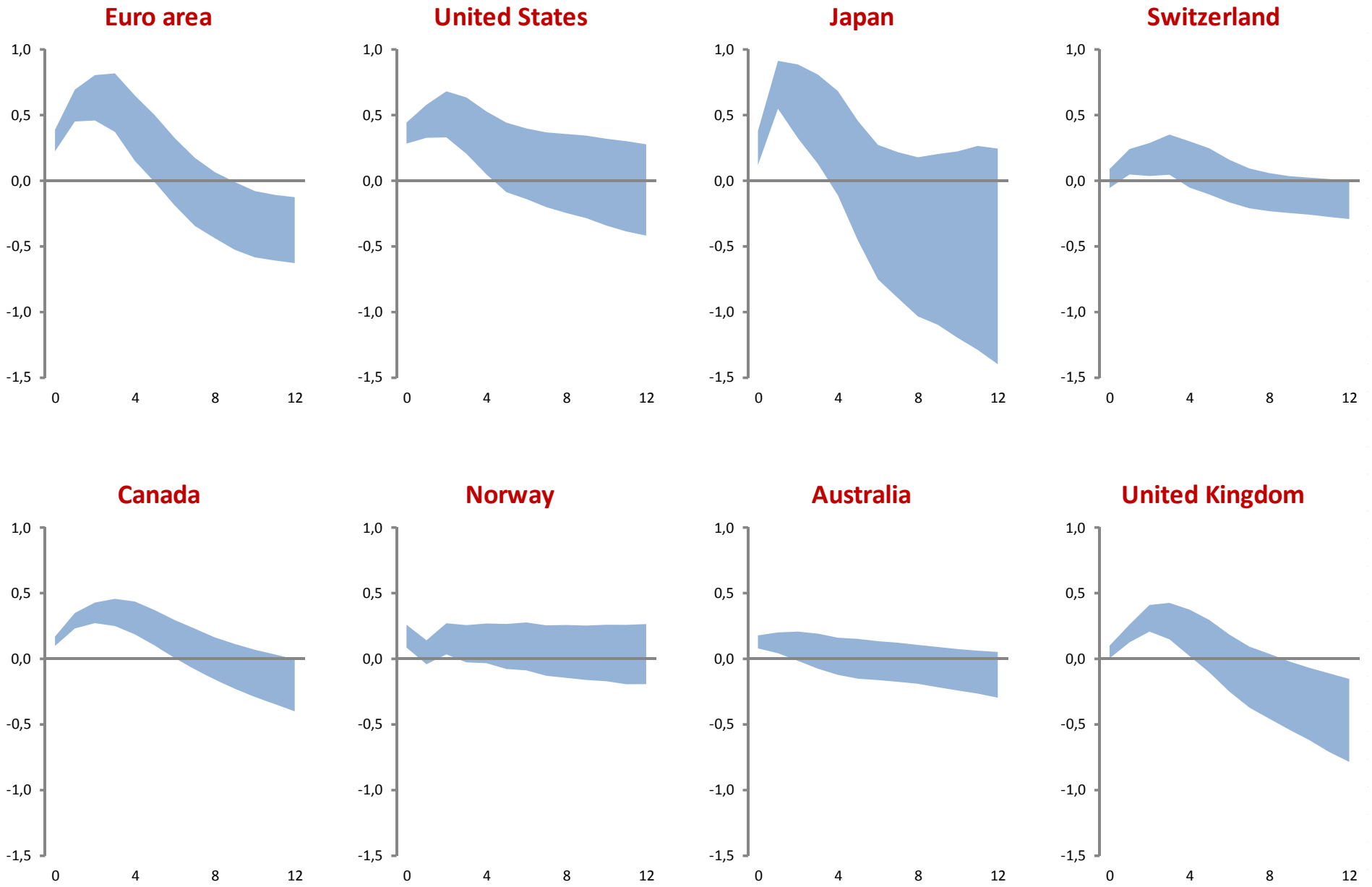
Oil supply shock => exchange rate



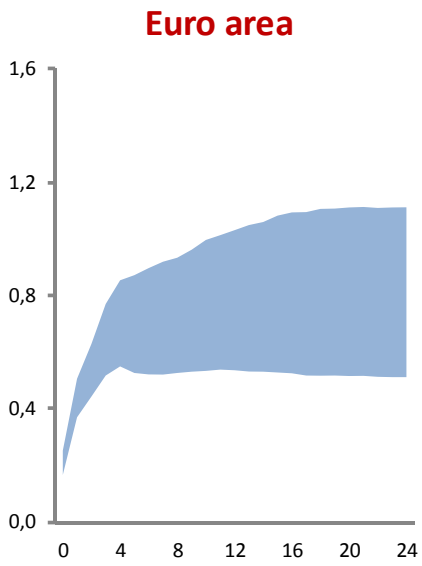
Oil supply shock => interest rate

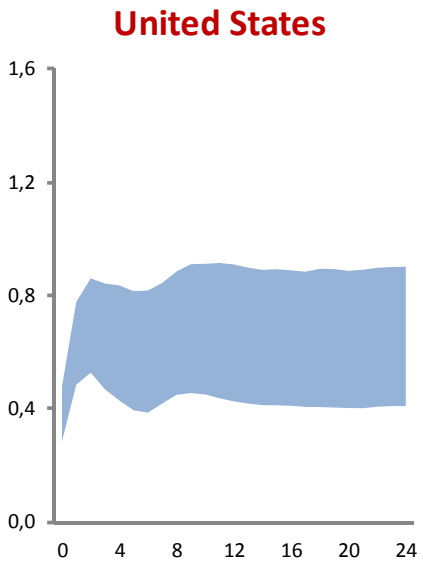


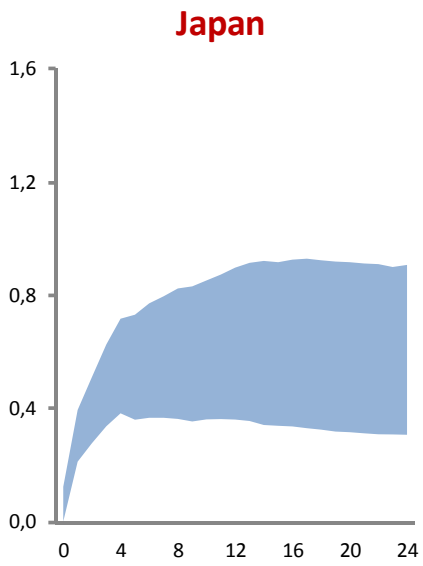
Global economic activity shock => output

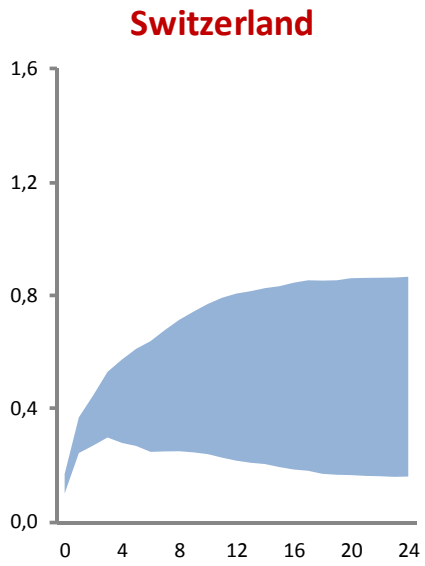


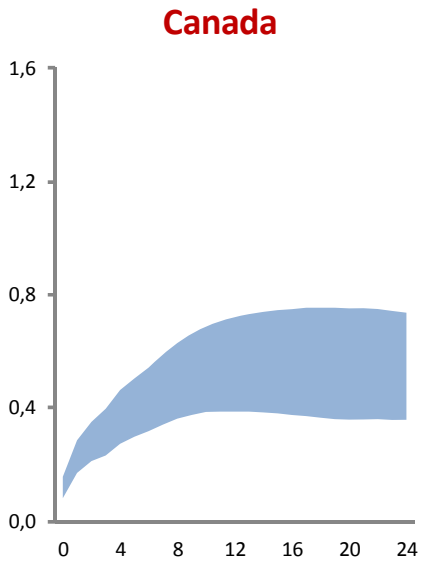
Global economic activity shock => consumer prices

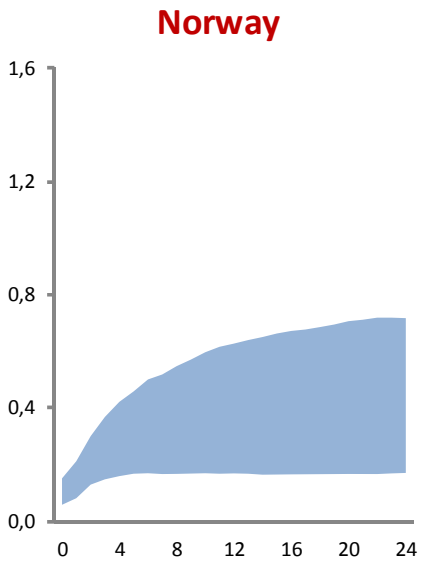


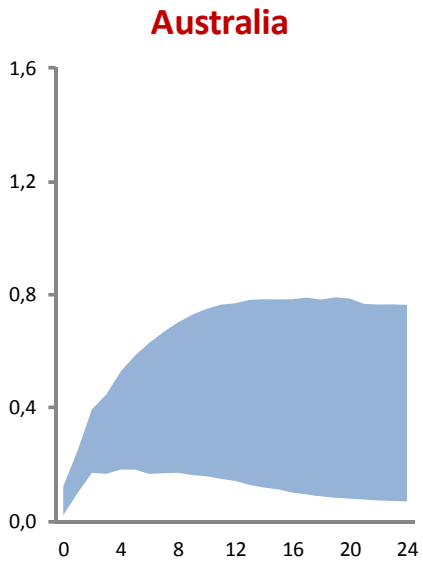


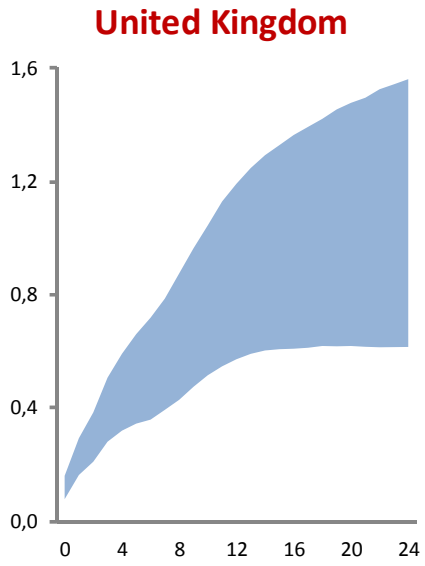




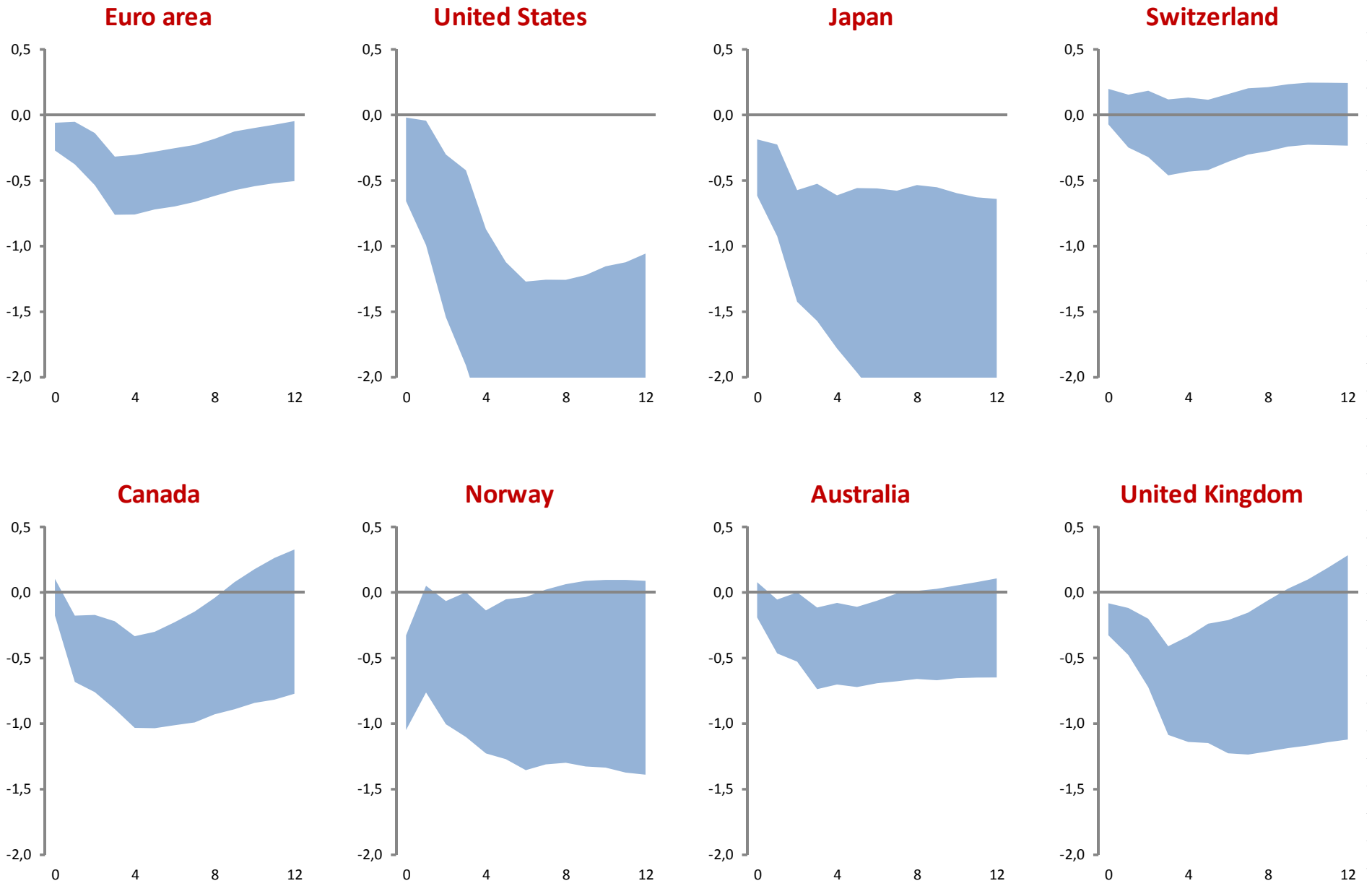




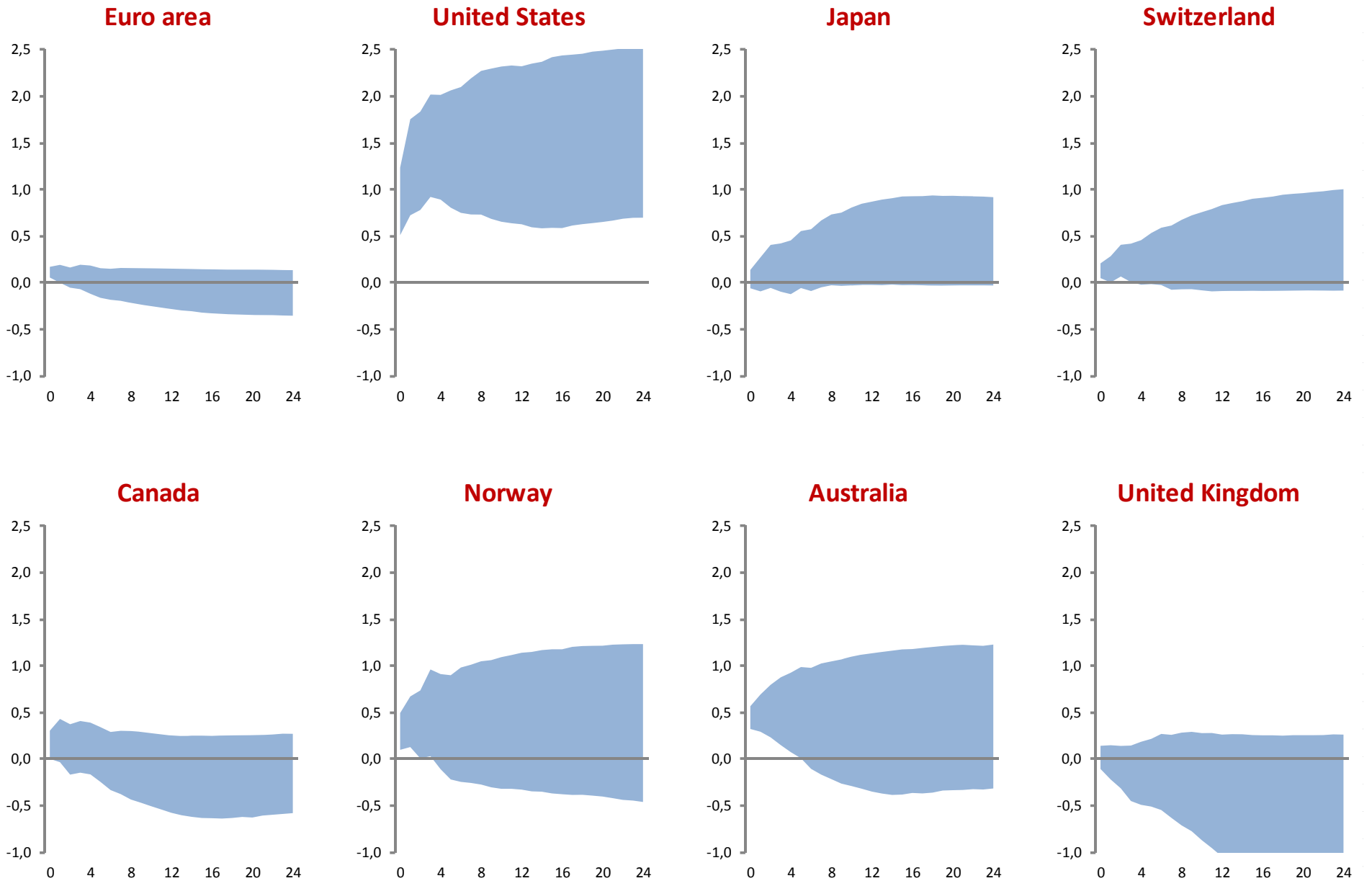




Oil specific demand shock => output



Oil specific demand shock => consumer prices



Source of oil shock does matter

- Oil supply shocks
  - Oil and energy importing countries: permanent decline economic activity and rise of consumer prices
  - Oil and/or non-oil energy exporting countries: output increases, while consumer prices decline or remain constant probably due to exchange rate appreciation
- Oil demand shocks driven by economic activity
  - Output and consumer prices rise in all countries: role of oil and other forms of energy does not matter for cross-country differences
- Oil-specific demand shocks
  - All countries experience a (temporary) decline in economic activity, hardly an inflationary effect: role of oil and other forms of energy does not matter

Relevance of oil/energy and time variation of effects

- Several studies find reduced impact of oil price shocks on output and prices in more recent periods, and refer to decreased dependency on crude oil as a possible explanation (e.g. Blanchard and Gali 2010)

- Baumeister and Peersman (2008): comparisons over time are seriously distorted and misleading because of structural change in oil market

  - Considerable decline of price elasticity oil demand and supply since mid 1980s

    - Also found in Krichene (2002), Ryan and Plourde (2002), Cooper (2003), Kilian (2008), Hamilton (2009), Baumeister and Peersman (2010)

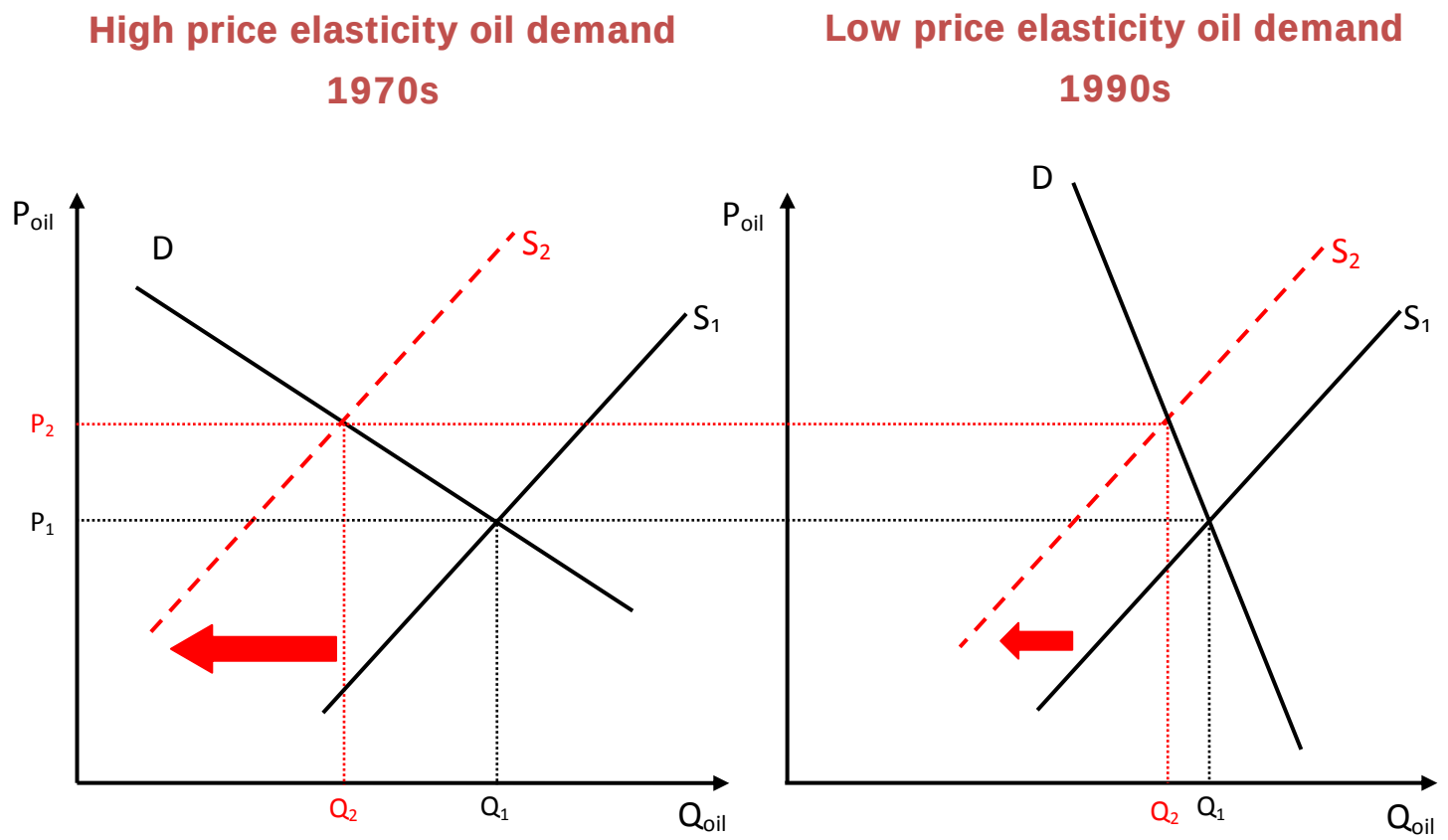
  - Conclusion depends on way of normalization: reduced impact of oil supply shock over time when normalized on oil price shift (e.g. 10% oil price increase), but stronger effects when normalized on oil production (e.g. 1% fall oil production)

    - Different oil supply shocks are compared over time

    - Story is same for oil demand shocks and declining price elasticity oil supply

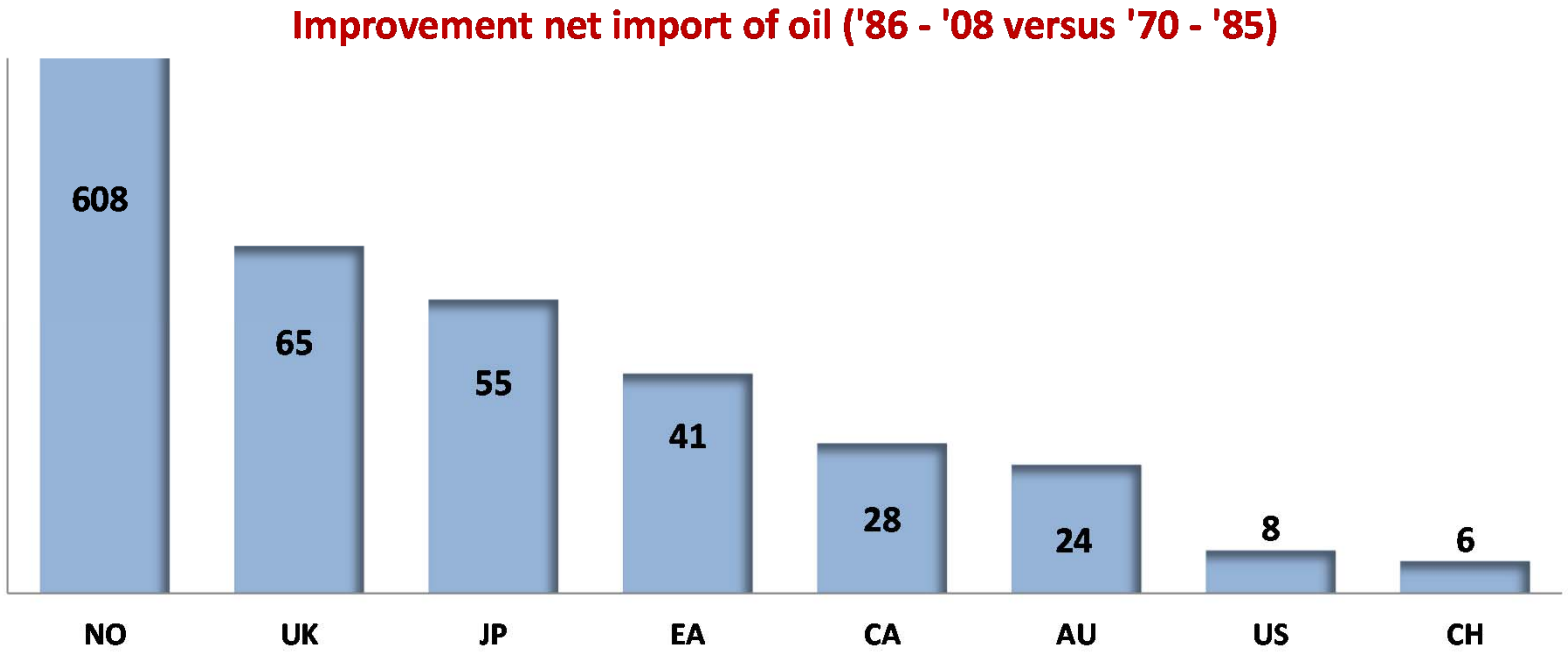
Relevance of oil/energy and time variation of effects

- Illustration: oil supply shock and normalization on similar oil price increase



Relevance of oil/energy and time variation of effects

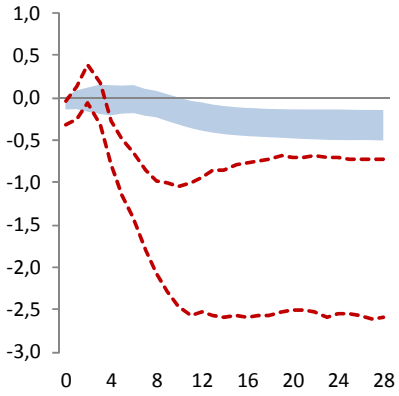
- Cross-country dimension could avoid normalization problem by comparing **relative changes** over time
  - Normalization problem essentially the same for all countries
  - If role and share oil/energy in economy is important for time variation: changes over time should be more favorable for countries that improved their net oil and energy position the most over time



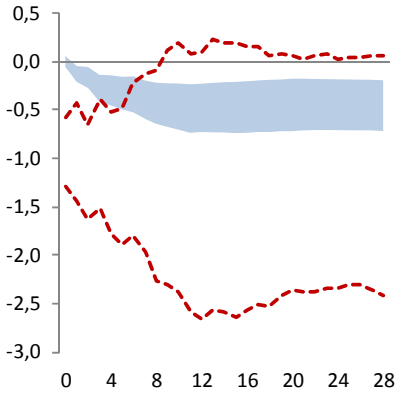
Impact oil supply shock over time

- Impact normalized on 10% oil price increase

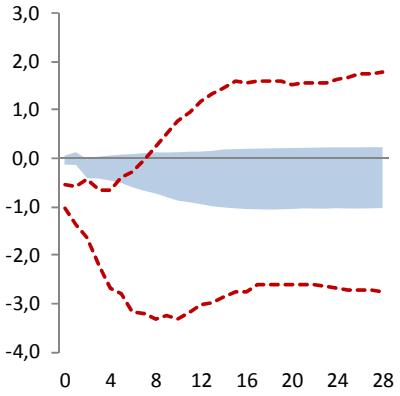
Euro area



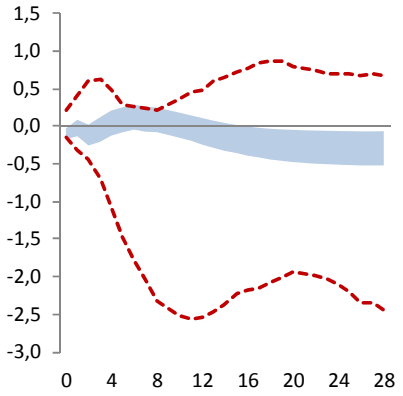
United States



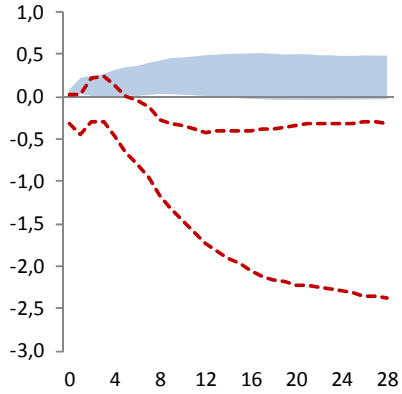
Japan



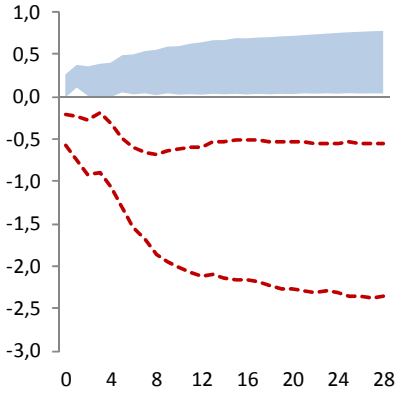
Switzerland



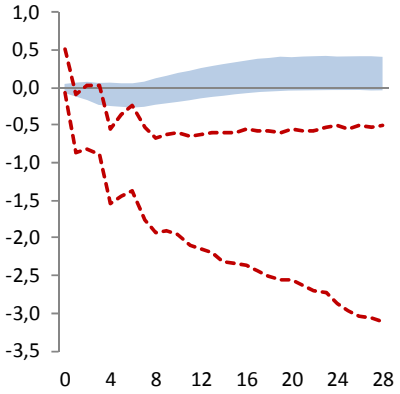
Canada



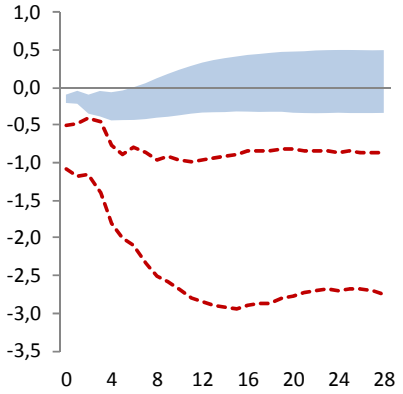
Norway



Australia



United Kingdom



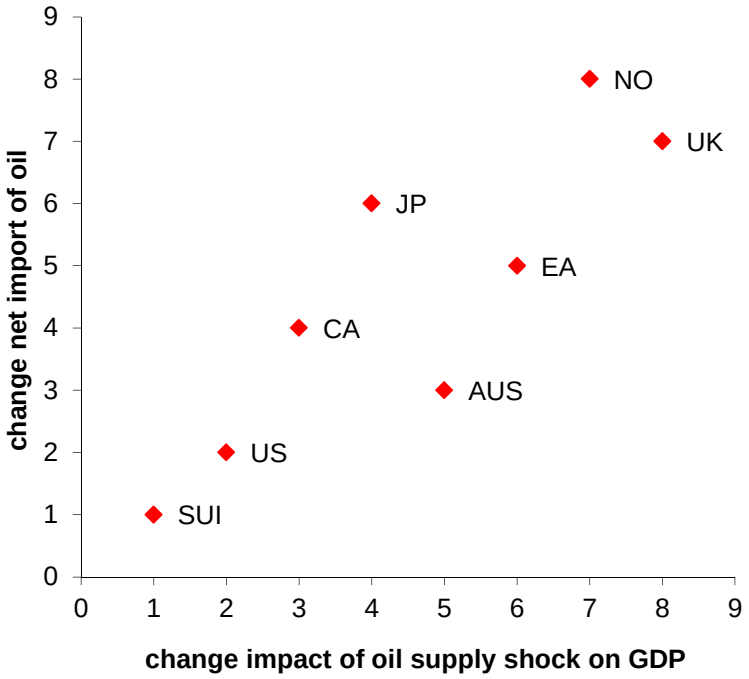
1986-2010 sample period

1970-1985 sample period

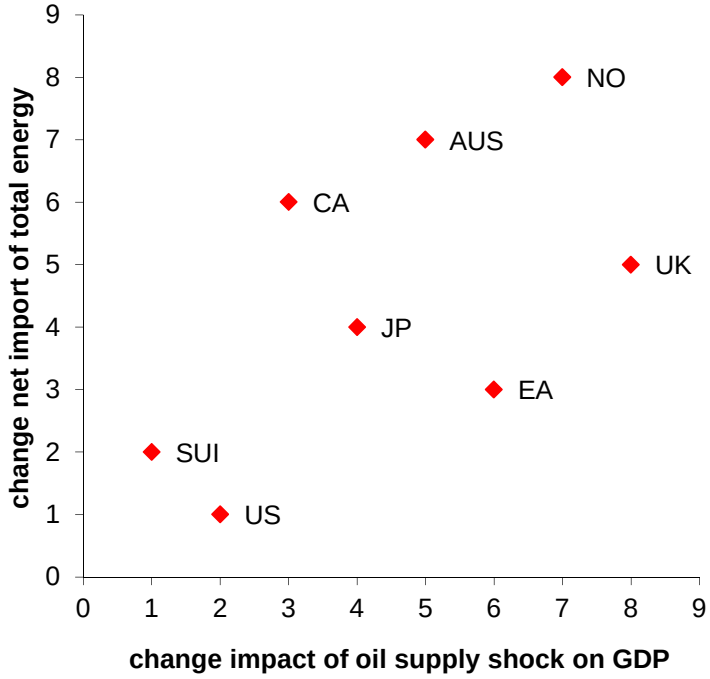
Relevance of oil/energy and time variation of effects

- Countries that improved their net oil and energy position the most over time, became less vulnerable to oil supply shocks relative to other countries

Change oil position and impact of oil supply shock



Change energy position and impact of oil supply shock



Conclusions

- Role of oil and non-oil energy matters to explain cross-country differences in the effects of oil supply shocks
  - Output decreases in oil and energy importing countries, whereas output increases (or constant) in oil and energy exporting countries
- Role does not matter for effects of oil demand shocks driven by economic activity or oil specific demand shocks
- Countries that improved their net oil and energy position the most over time, became less vulnerable to oil supply shocks relative to other countries
  - Not the case for demand shocks driven by economic activity or oil-specific demand shocks