

# MEASURING CLIMATE CHANGE THE ECONOMIC AND FINANCIAL DIMENSIONS



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Sustainable Finance  
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## Transboundary Climate- Related Risks

November 17-18, 2021

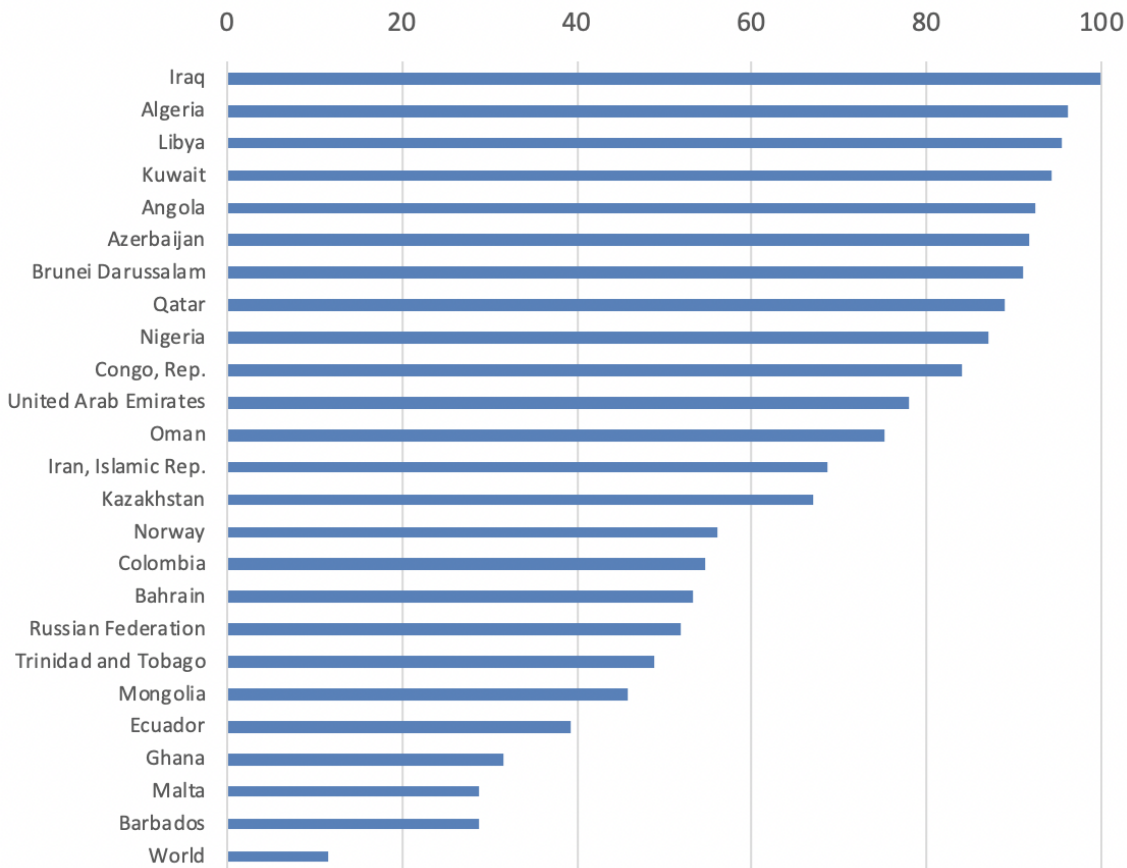
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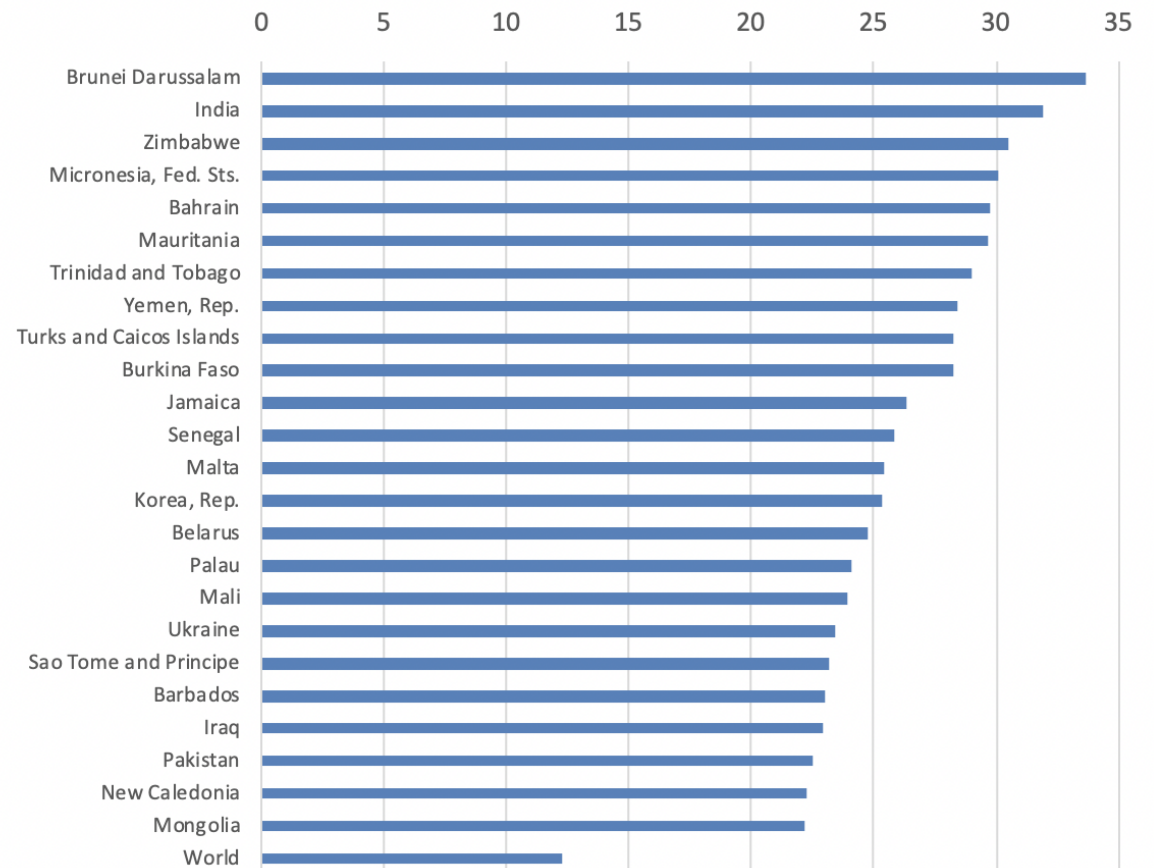
- To limit global warming to 1.5°C above pre-industrial levels, the world economy needs to decarbonise rapidly.
  - Even if the climate goals were not met, rapid technological change is already underway.
- What implications will a phasing out of fossil fuel consumption and a concomitant rise of renewable energy usage have on global trade flows?
- How will this affect international financial flows?
- What will be the transboundary wealth effects?
- What will be the impacts on international macroeconomic interdependencies and the international monetary system?
- What are the data limitations to analyse these effects?

# The 25 countries with the largest share in fuel exports/imports as share of total merchandise exports/imports

Fuel exports (% of merchandise exports)

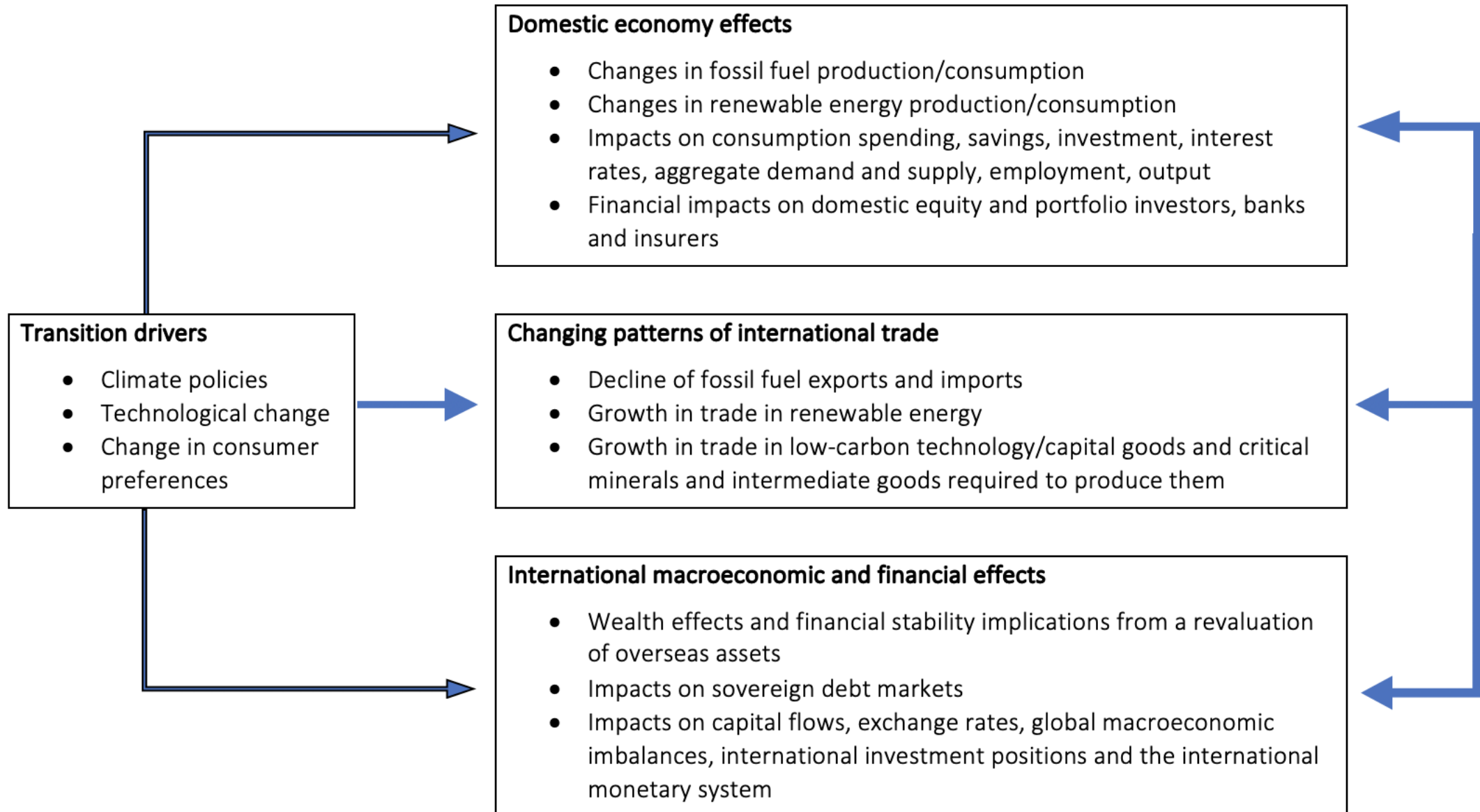


Fuel imports (% of merchandise imports)

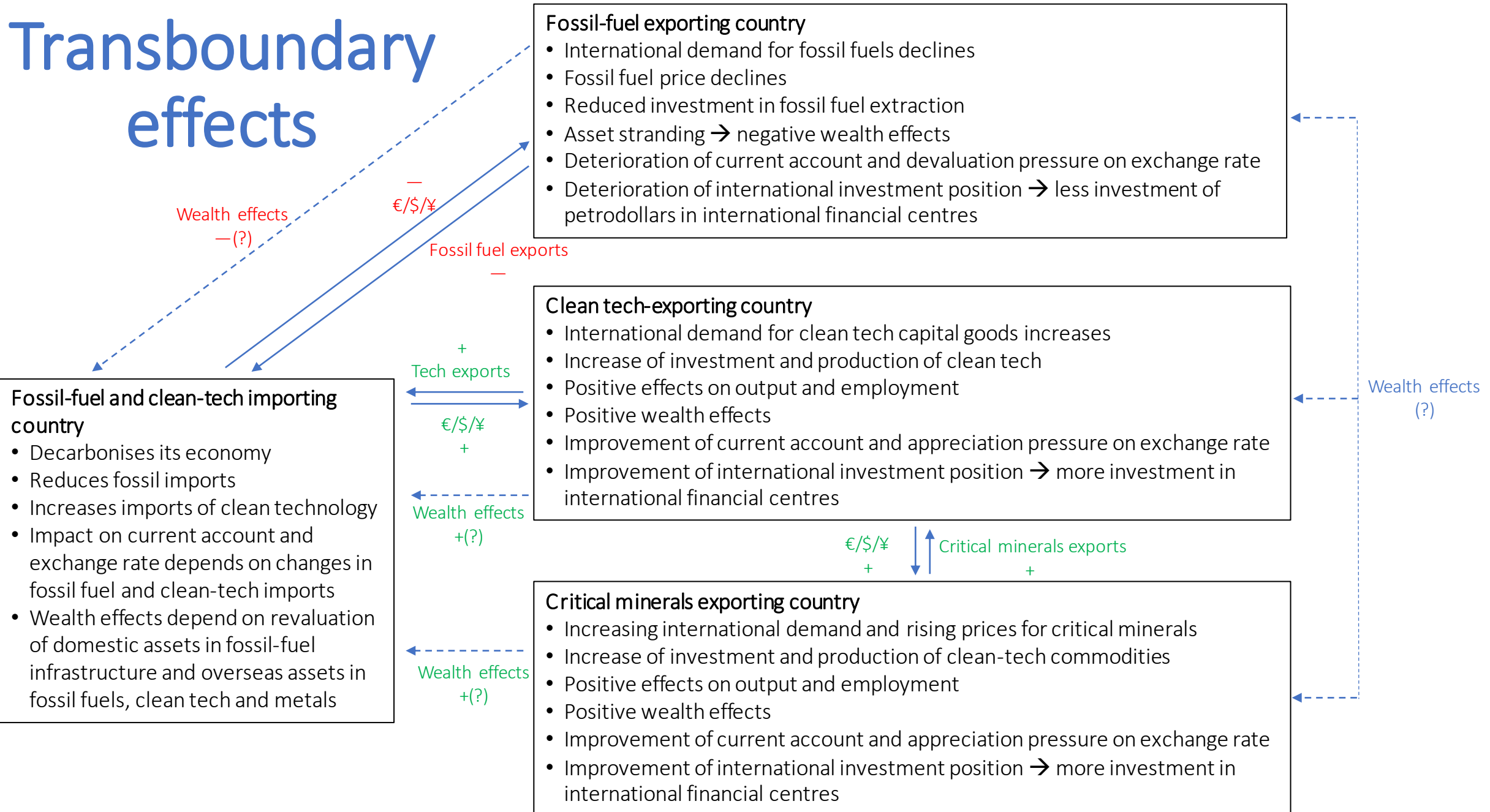


Note: Compiled with the World Bank's World Development Indicators, October 2021. Values are for the last available year.

# Overview of domestic and international effects of a decarbonisation of the world economy



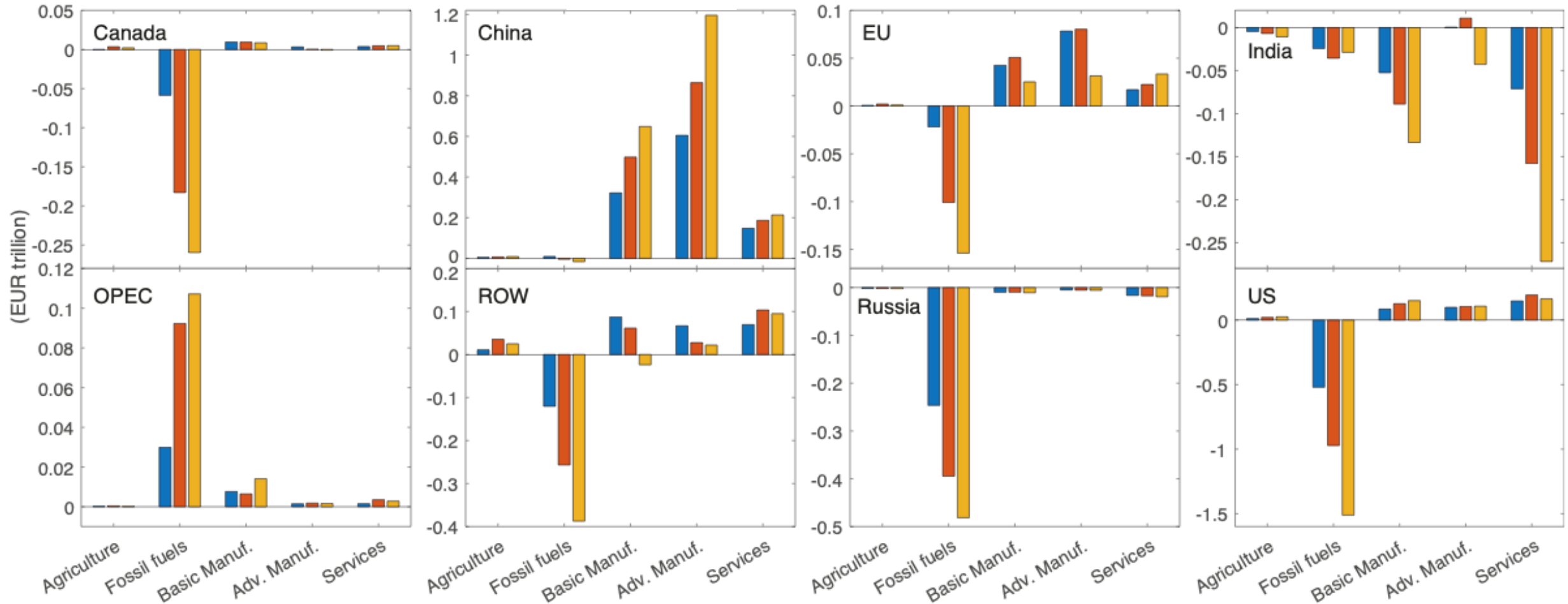
# Transboundary effects



# Modelling the impacts of a decarbonisation of the world economy on trade

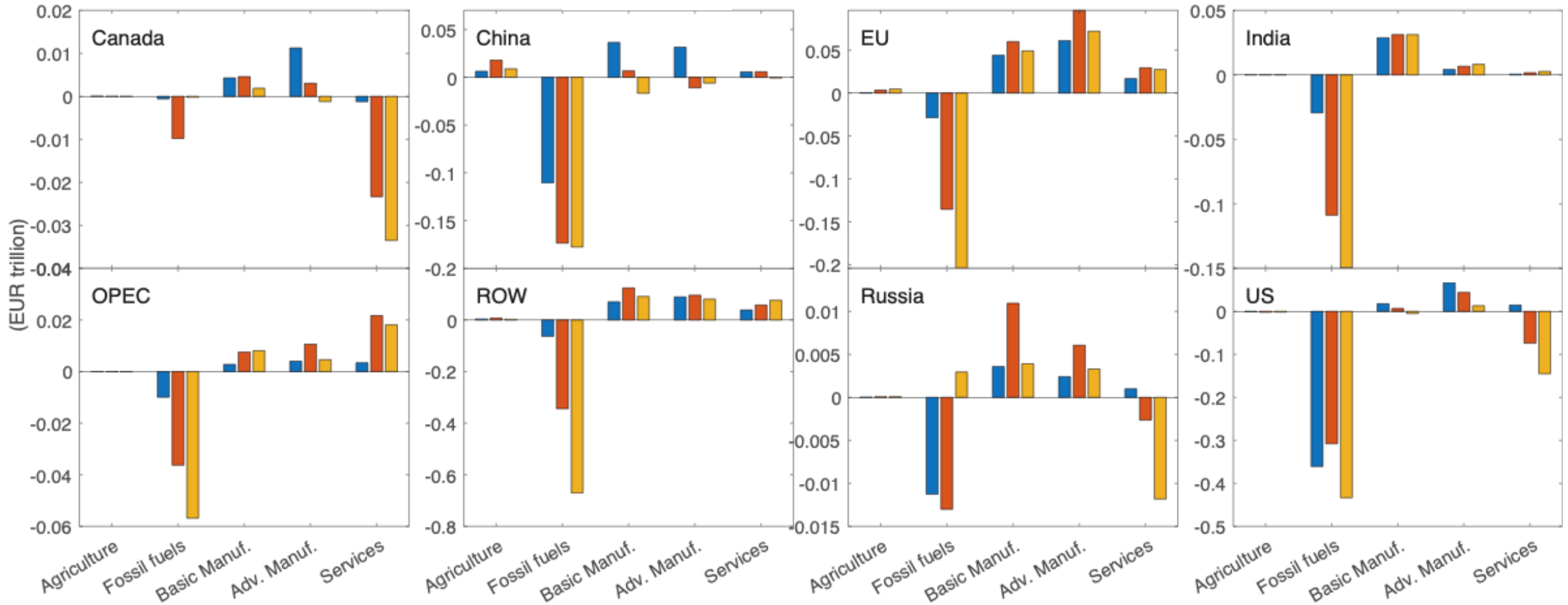
- We employ E3ME-FTT, a global macro-econometric model that integrates a range of social and environmental processes (Mercure et al., 2021).
  - A simulation-based integrated assessment model.
  - Covers 70 regions and 43 industrial sectors, with data starting in 1970.
  - The model estimates energy use for and trade in 12 widely traded fuels.
  - The model simulates on the basis of recent trends the diffusion of key technologies with a high level of granularity (power generation, transport, heating, steelmaking), covering over 80% of fossil fuel use across the economy.
  - The model incorporates a detailed representation of natural resources extraction, use and depletion, in renewables and fossil fuels, including data over 120,000 oil and gas assets worldwide, covering most existing resources and reserves.
- We estimate effects of a decarbonisation of global trade for different sectors for 2030, 2040 and 2050.

# Differences in exports by sector between the IEA and Net-Zero SO scenarios



Note: Three time points are shown in each sector, 2030 (blue), 2040 (red) and 2050 (yellow).

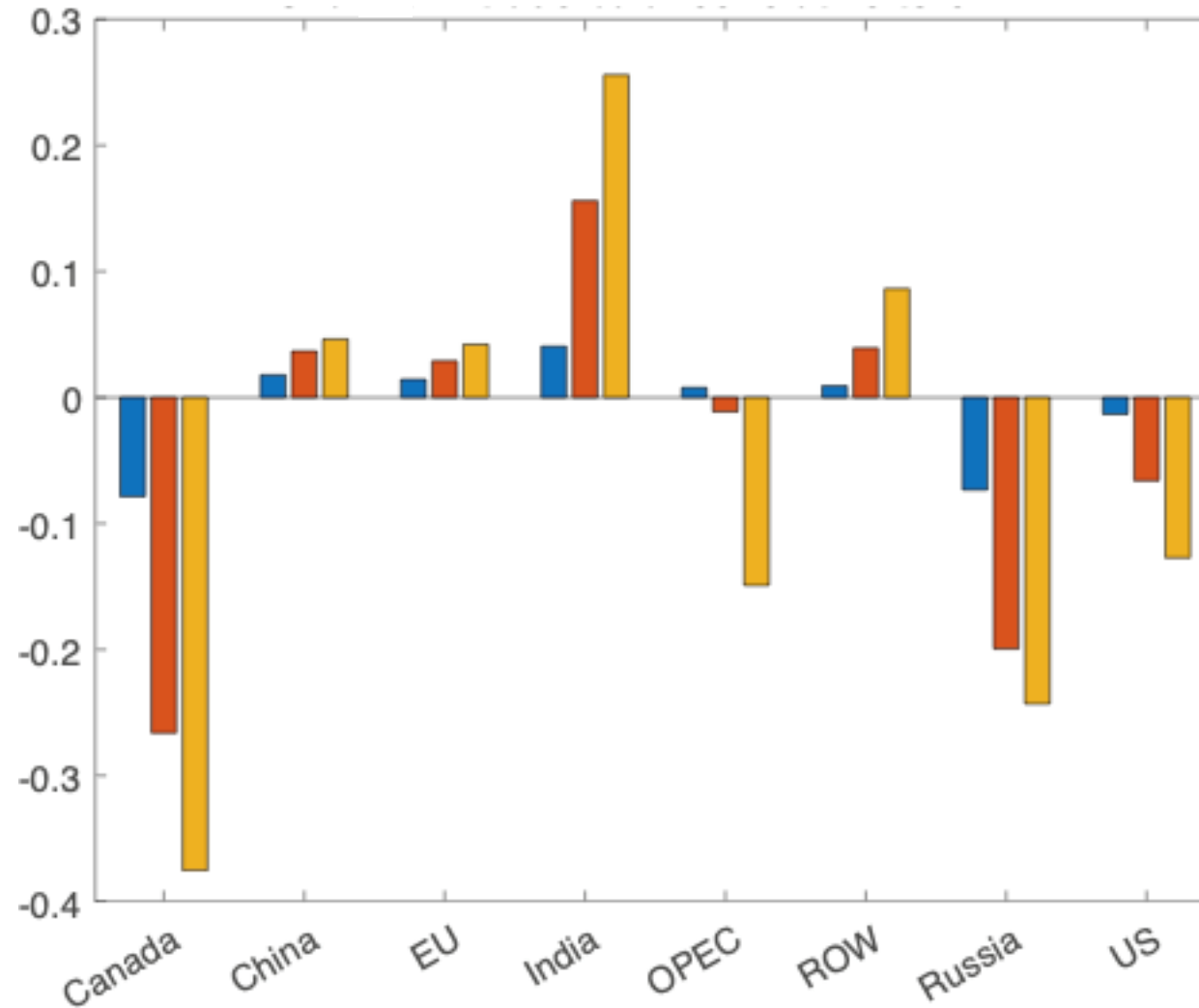
# Differences in imports by sector between the IEA and Net-Zero SO scenarios



Note: Three time points are shown in each sector, 2030 (blue), 2040 (red) and 2050 (yellow).

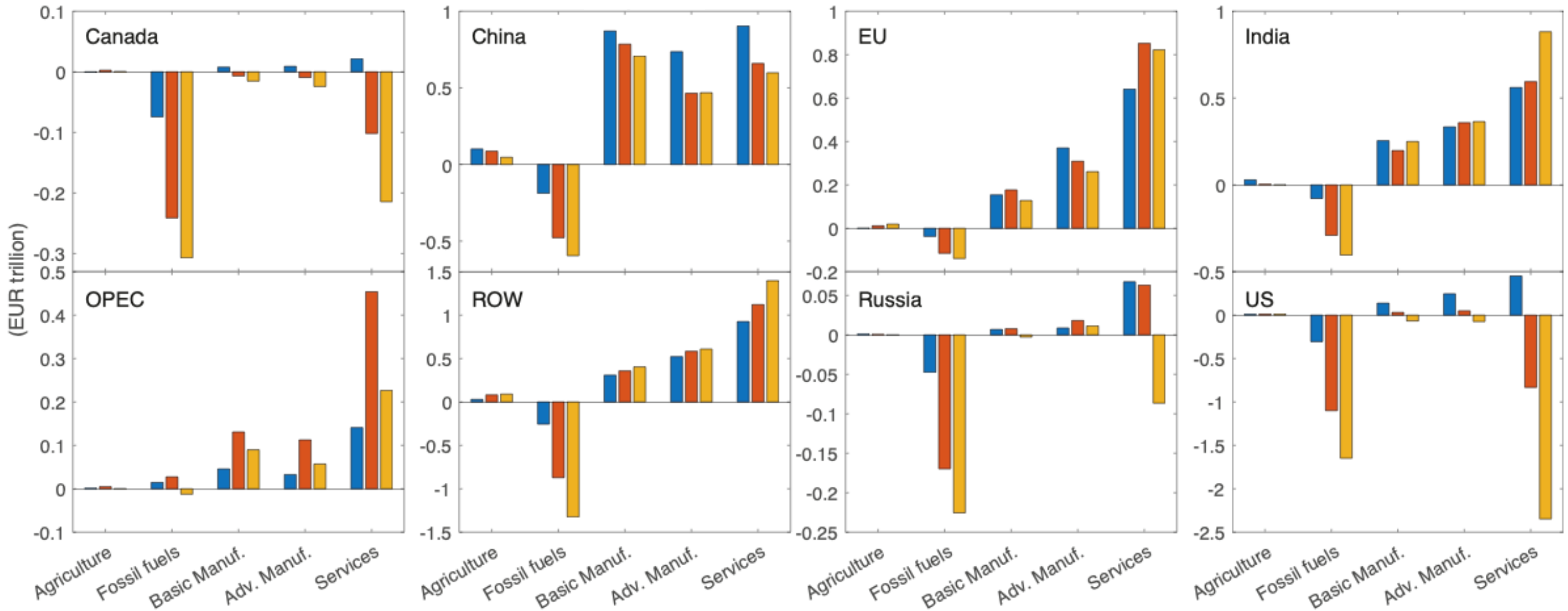


# Change in the trade balance relative to GDP



Note: Three time points are shown in each sector, 2030 (blue), 2040 (red) and 2050 (yellow).

# Differences in output by sector between the IEA and Net-Zero SO scenarios



Note: Three time points are shown in each sector, 2030 (blue), 2040 (red) and 2050 (yellow).

# Growth of alternative trade in RE, low-carbon technology and critical minerals

- Trade in low-carbon hydrogen is expected to develop over time.
  - Exports from gas and renewables-rich areas in the Middle East, Central and South America and Australia to demand centres in Asia and Europe.
- Growth of trade in low-carbon technology/capital goods.
- Increase in demand for critical minerals such as copper, lithium, nickel, cobalt and rare earth elements that are essential for many clean energy technologies.
- We are not yet able to model these trade flows due to a lack of data.
- The expected rise in trade in these areas may cause further, profound changes to international patterns of trade, with substantial impacts on the international macroeconomy.

# International macroeconomic and financial spillovers

- Stranding of fossil fuel related assets will have transboundary wealth effects and financial stability implications.
  - A significant share of ultimate asset owners is located in OECD countries.
  - Transboundary exposures redistribute losses towards the global centres of finance and the most wealthy countries.
  - Could contribute to a destabilisation of global financial markets.
- Governments facing high transition risks face sovereign rating downgrades and a higher cost of capital at a time when a deteriorating current account balance increase the need for and dependency on external finance.
  - Countries with a heavy dependency on the fossil fuel economy may experience a sovereign debt crisis, which itself could have contagious effects internationally.
- Changes in growth prospects and macro dynamics will affect international financial flows.
- Data limitations constrain analysis of these effects!

# Effects on countries' international investment positions & the global monetary system

- Changing patterns of global trade will have substantial effects on countries' balance of payments and international investment positions.
- These changes could have wider ramifications for international macroeconomic interdependencies and the international monetary system.
  - Historically, fossil fuel exporting countries have been among the biggest contributors to global macroeconomic imbalances.
  - A deterioration of the international investment position of fossil fuel exporting countries would put an end to large flows of investment of petrodollars into international financial centres, especially the US.
  - We may see new international investment flows from clean-tech and critical mineral exporters.
    - Whether these will go to the same destinations and use the same currencies as before is an open question and may also depend on geopolitical factors.
  - All this could also have wider implications for the international reserve system and the status of the dollar as the global lead currency.

# Conclusion

- The changing patterns of trade are expected to have significant impacts on the balance of payments of both exporting and importing countries and on international financial flows.
- The stranding of fossil fuel related assets can have trans-boundary effects on wealth and financial stability.
- All these may have potentially meaningful ramifications for the international financial and monetary order.
- We need to compile better data on financial flows and exposures that will enable us to quantify international financial spillovers.