Not All Energy Transitions Are Alike:

Disentangling the Effects of Demand- and Supply-Side Climate Policies on Future Oil Prices

Lukas Boer, Andrea Pescatori and Martin Stuermer
International Monetary Fund, Research Department

Abstract

We use structural scenario analysis to show that the climate policy mix -- supply-side versus demand-side policies -- leads to different oil price paths in a net-zero emissions scenario.

If emission reductions were only driven by demand-side climate policies, oil prices would decline to 25 USD per barrel by 2030, benefiting consuming countries.

Vice versa, if there were only supply-side climate policies to curb oil production, prices would increase to 130 USD per barrel, benefiting countries that keep on producing.

As policies are formulated at the country level and hard to predict, the transition raises uncertainty about the price outlook

Effect of Energy Transition on Oil Prices?

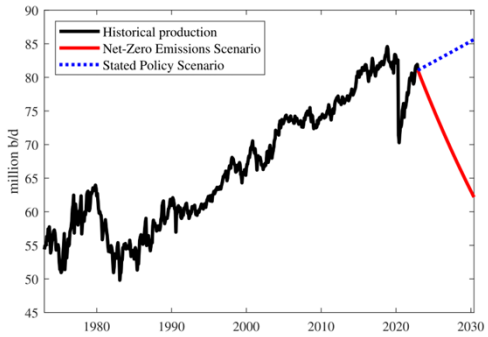

Figure 1: Global oil consumption declines 23% by 2030 in Net-Zero Emissions Scenario (red) (International Energy Agency (IEA), 2022).

- Typical assumption: Oil prices decline due to clean energy transition (e.g., -49% until 2030 (IEA, 2022).
- Implicit assumption: negative oil demand shocks (e.g., subsidies for EVs).
- However, there are also supply-side climate policies (drilling restrictions, ESG) that may put upside pressure on prices.

Structural VAR Scenario Analysis

- Baseline monthly oil-market VAR with three variables (1973-2022):
  1. Real economic activity index (Δ global industrial production)
  2. Global crude oil production (% change)
  3. Real oil price (log inflation adjusted WTI)
- Identify three structural shocks via traditional and narrative sign restrictions:
  1. Aggregate demand shock
  2. Oil supply shock
  3. Oil-specific demand shock
- Structural Scenario Analysis (Antolin-Diaz et al., 2021, JME).
  1. Sets oil output equal to consumption in IEA scenario (allowing uncertainty).
  2. Finds a series of oil-specific demand (OD) or oil supply (OS) shocks that incentivizes the IEA's oil production path in the net-zero scenario.
  3. All shocks except for OD or OS shock constrained to uncondit. distribution.

Contact:
Martin Stuermer
International Monetary Fund, Research Department
Email: mstuermer@imf.org
Website: https://sites.google.com/site/mstuermer1/

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Result 1: Policies Hit Oil Prices Differently

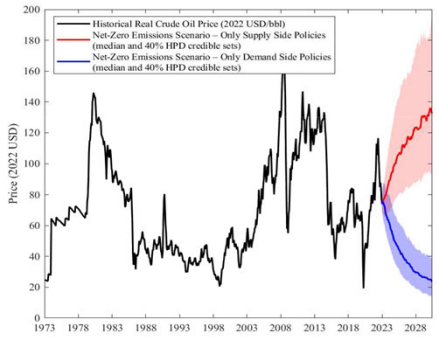

Figure 2: Oil prices in the supply (red) and demand-side (blue) climate policy scenarios (IEA net-zero emissions by 2050 scenario).

- If emission reductions were only driven by demand-side climate policies, prices would decline to 25 USD per barrel by 2030, benefiting consuming countries.
- If there were only supply-side climate policies to curb oil output, prices would increase to 130 USD per barrel, benefiting countries that keep on producing.

Result 2: Policy Mix Leads to Stable Prices

Figure 2: Oil prices with equally important supply- and demand-side climate policy scenario (IEA net-zero emissions by 2050 scenario).

- Reality likely a mix of demand- and a supply-side climate policies during the energy transition, as individual countries determine their policy mixes.
- Prices would increase slightly until 2030 but stay in the historical range of about $80 per barrel in inflation adjusted terms in this illustrative scenario.

Result 3: Higher Market Concentration

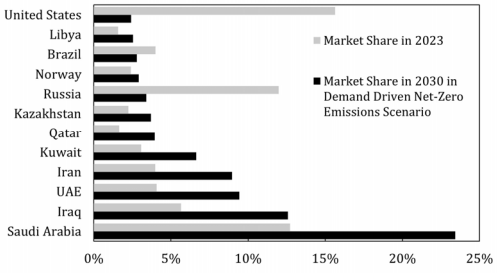

Figure 3: Market shares 2023 vs 2030 in the demand driven net-zero scenario.

- Demand-side policies driven scenario: Markets shares shift due to marginal production costs.
- Supply-side policies driven scenario: Market shares determined by output restrictions, environmental regulations, and access to capital.