

Trade and Geoeconomics

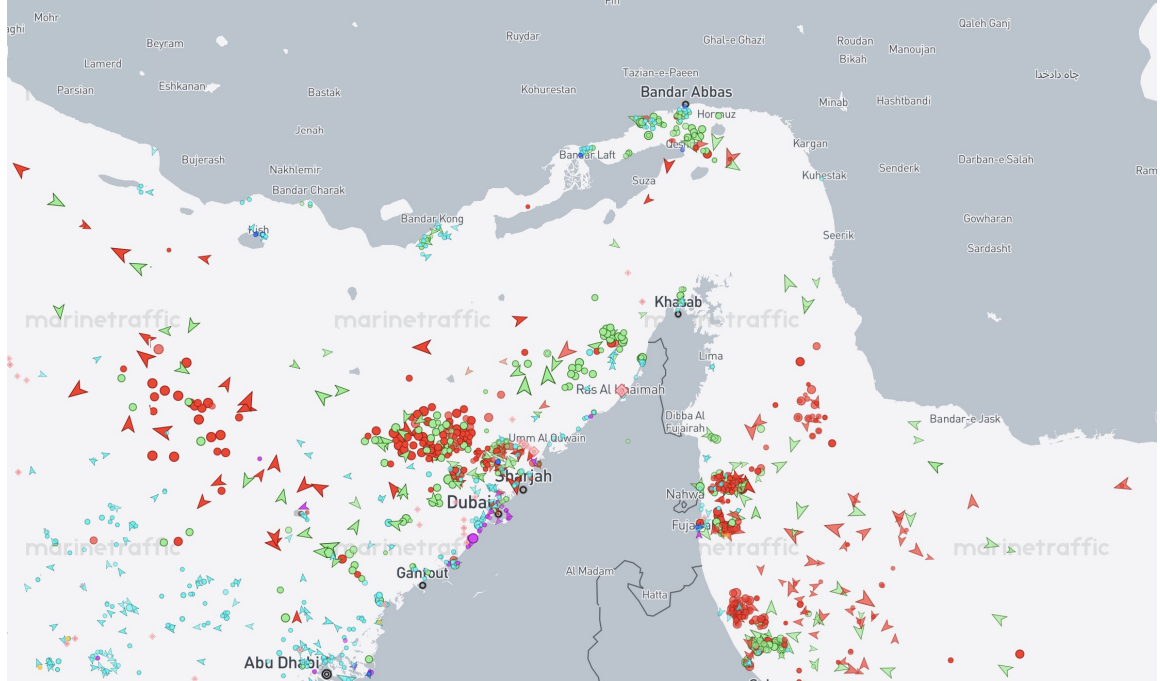
Best of Geoeconomics @ Kiel Institut — Next-Geo Program

Prof. Dr. Julian Hinz — Bielefeld University & Kiel Institute for the World Economy

April 9, 2026







Today's Lecture

Trade as weapon. Trade as casualty.

1. **Sanctions & Political Consequences**

Do sanctions affect domestic regime support?

2. **The KITE Model Framework**

A versatile tool for analyzing trade shocks in general equilibrium

3. **Input Bottlenecks & Energy Security**

How energy disruptions cascade into food prices

4. **Shipping Route Shocks**

The economics of maritime chokepoint disruptions

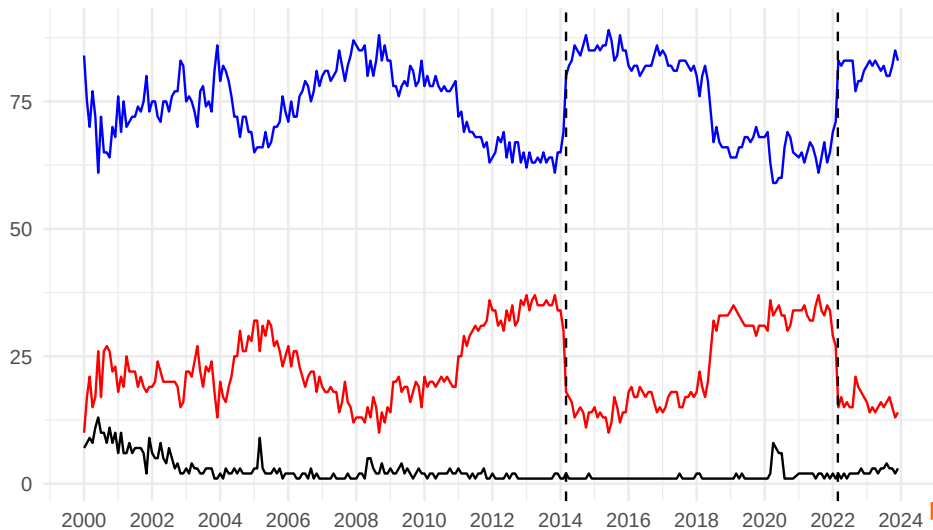
Sanctions & Political Consequences



The 2014 Russia Sanctions

- Feb 2014: Russia annexes Crimea
 - Mar–Jul 2014: Western sanctions imposed
 - Asset freezes & travel bans
 - Export restrictions (military, dual-use, oil equipment)
 - Financial sanctions on major banks
 - Russian retaliation: agricultural import embargo
 - Concurrent: oil price collapse, ruble depreciation
- Identification challenge: isolating sanctions from other shocks

The Puzzle: Putin's Approval Ratings



To Russia with Love? The Impact of Sanctions on Regime Support

Gold, Hinz, and Valsecchi (2024)

- **Question:** Do economic sanctions affect internal political support for the sanctioned regime?
- **Setting:** 2014 Western sanctions on Russia
- **Data:** Election results at rayon level ($\approx 3,000$ districts) for presidential and parliamentary elections (2007–2018)
- **Strategy:** Exploit regional variation in sanctions exposure using structural gravity counterfactuals

Methodology: The Craft of Identification

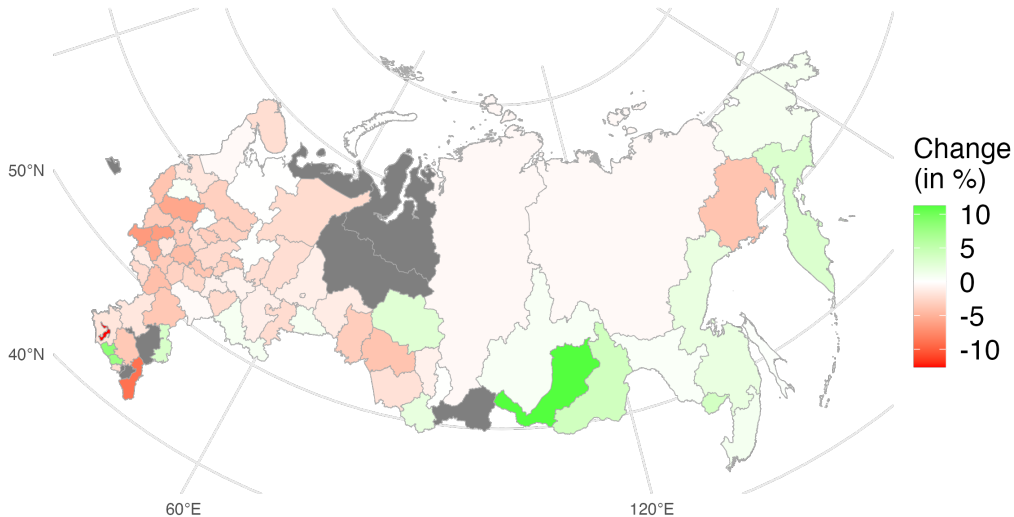
- **Challenge:** Sanctions coincide with oil price crash, ruble depreciation, geopolitical tensions
- **Solution:** Structural gravity model to construct *counterfactual* trade flows

$$X_{odt} = \frac{Y_{ot}}{\Omega_{ot}} \cdot \frac{X_{dt}}{\Phi_{dt}} \cdot \phi_{odt}$$

- Estimate on pre-sanctions data → predict what trade *would have been* without sanctions
- **Sanctions exposure** = gap between observed and counterfactual trade flows
→ Accounts for global developments unrelated to sanctions
- Difference-in-differences across $\approx 3,000$ districts:

$$\Delta y_{irt} = \alpha + \beta \text{ sanctions exposure}_{rt} + \Delta X'_{irt} \gamma + \epsilon_{irt}$$

Regional Variation in Sanctions Exposure

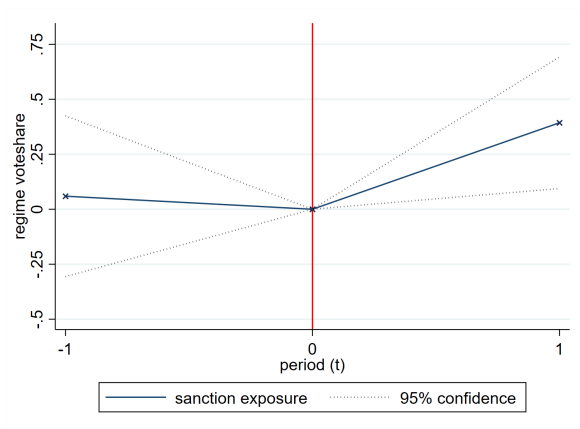


Trade losses from sanctions by Russian region (darker = more exposed)

Putin's Vote Share Across Russia (2018)



Main Result: Rally Around the Flag



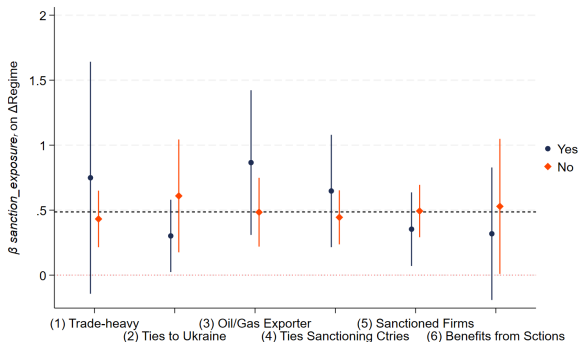
- 1 SD increase in sanctions exposure → **+1.4 pp** regime support
- For average district: **+13%** increase
- Sanctions explain $\approx$ **22%** of total increase in regime support
- No pre-trends (placebo period insignificant)

Political Realignment: Who Gained, Who Lost?

	(1)	(2)	(3)	(4)
Δ Regime (Putin/UR)	0.576** (0.229)	0.565** (0.214)	0.575*** (0.170)	0.486*** (0.103)
Δ Communists	-0.266*** (0.091)	-0.282*** (0.091)	-0.340*** (0.086)	-0.315*** (0.085)
Δ Nationalists	-0.050 (0.059)	-0.043 (0.053)	-0.117** (0.054)	-0.126** (0.057)
Δ Liberals	-0.028 (0.032)	-0.048* (0.025)	-0.056** (0.026)	-0.055** (0.026)
Δ Turnout	0.025 (0.153)	0.025 (0.145)	0.106 (0.164)	0.155 (0.159)
Controls	Baseline	+ labor	+ industry	+ political

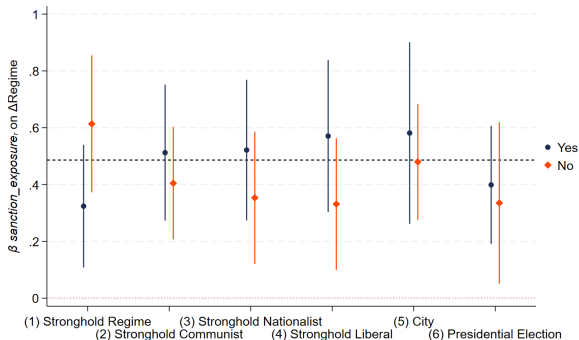
→ Voters with nationalist orientations switched from Communists to Putin

Heterogeneity: By Trade Patterns



Effect strongest in regions with ties to sanctioning countries and oil/gas exporters

Heterogeneity: By Political Composition



Effect driven by regions with strong Communist and Nationalist base — voters switched to Putin

Sanctions & Political Consequences: Takeaways

- Sanctions can **backfire politically** through rally-around-the-flag effects
- The Kremlin's narrative of hostile Western interference finds fertile ground precisely where sanctions bite hardest
- Validated with European Social Survey data (not just official election results)

Open research gaps:

- When do rally effects *decay*? (Long-run dynamics)
- Evidence from other sanctioned countries (Iran, North Korea, Myanmar)?
- Can information campaigns counteract regime narratives?
- Economic pain vs. political support in autocracies

The KITE Model

The KITE Model Suite

KITE = **K**iel **I**nstitute **T**rade Policy **E**valuation Model

- Quantitative GE trade model based on Caliendo & Parro (2015) and Baqaee & Farhi (2024)
- **160 countries, 65 sectors**, full input-output linkages
- Trade in final and intermediate goods, including production networks
- A **versatile framework** for analyzing:
 - Bilateral shocks (sanctions, tariffs)
 - Systemic shocks (route closures, pandemics)
 - Single-country shocks and their GE ripple effects

KITE: Base Model

- **Gravity structure:** Bilateral trade shares follow

$$\pi_s^{ij} = \frac{\left(c_s^i \cdot t_s^{ij} \cdot \tau_s^{ij}\right)^{-\theta_s}}{\sum_k \left(c_s^k \cdot t_s^{kj} \cdot \tau_s^{kj}\right)^{-\theta_s}}$$

- **Unit costs** with IO linkages (β = labor share, γ = intermediate shares):

$$c_d^j = \gamma_d^j \cdot w_d^{\beta_d^j} \cdot \left[\prod_k \left(p_d^k\right)^{\gamma_d^{k,j}} \right]^{1-\beta_d^j}$$

- **Exact hat algebra** (Dekle et al., 2007): solve in *changes* $\hat{x} = x'/x$
 - Avoids need for unobserved trade cost levels
 - Baqaee & Farhi (2024): differential exact-hat algebra for smooth solutions

KITE: Modular Extensions

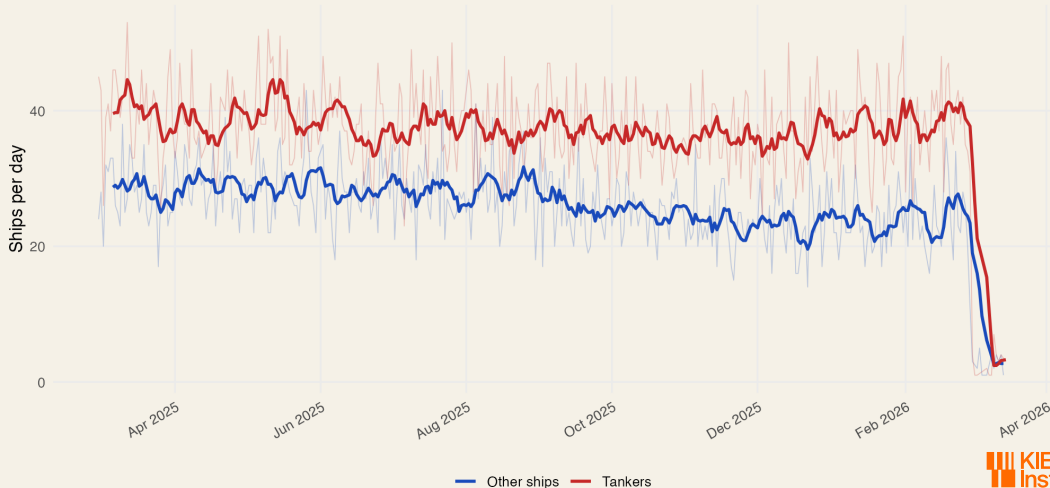
- Sanctions & burden-sharing (Chowdhry, Hinz, Mahlkow, Wanner 2024)
- Climate & carbon border adjustments (Mahlkow & Wanner 2023)
- Land as production factor
- Distributional consequences via labor categories
- Multinational production (à la Ramondo/Rodriguez-Clare)
- Regionalization (NUTS-2, federal states)
- ▶ **Input bottlenecks** (Hinz, Mahlkow, Sogalla 2026)
- ▶ **Endogenous transport costs** (Brockhaus, Hinz, Serfaty 2025)

Input Bottlenecks & Energy Security

The Strait of Hormuz: A Critical Chokepoint

Daily Ship Passages Through the Strait of Hormuz

7-day rolling average (bold) and daily count (faded)



Source: Kiel Institute Trade Indicator, based on Datalastic ship-tracking data.

The Strait of Hormuz: Beyond Oil

- 21% of global petroleum consumption
- 25% of world's LNG
- March 2026: tanker passages collapse
- Gulf exports go far beyond oil:
 - 73% of hydrocarbon derivatives
 - 17% of methanol
 - 14% of urea fertilizer

KITE Extension: Input Bottlenecks (Hinz, Mahlkow, Sogalla 2026)

- **Problem:** Cobb-Douglas cost functions assume smooth input substitutability
→ But: natural gas → fertilizers has *no short-run substitute* (Haber-Bosch)

- **Critical-input penalty** Λ_d^j amplifies unit costs:

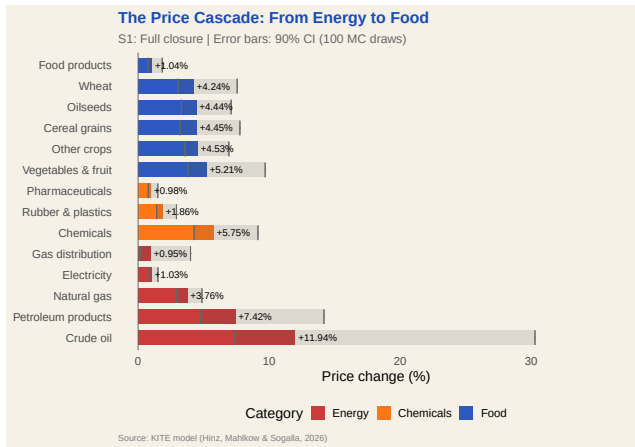
$$\hat{c}_d^j = \underbrace{\frac{1}{\hat{A}_d^j} \hat{w}_d^{\beta_d^j} \prod_k (\hat{p}_d^k)^{(1-\beta_d^j)\gamma_d^{k,j}}}_{\text{standard Caliendo-Parro}} \cdot (\Lambda_d^j)^{\phi^j}$$

- **Penalty:** $\Lambda_d^j = \max\left(1, \hat{B}_d^j / \hat{M}_d^j\right)$ where $\hat{B}$ = critical-input prices, $\hat{M}$ = general intermediate prices

→ **One-sided:** $\Lambda > 1$ when critical inputs rise faster; $\Lambda = 1$ otherwise

- Exposure $\phi^j = \min(1, \sum_k \omega^{k,j})$ controlled by **critical-input matrix** $\omega^{k,j}$

The Bottleneck Mechanism in Action



Energy → Chemicals → Food

Short-run price impacts:

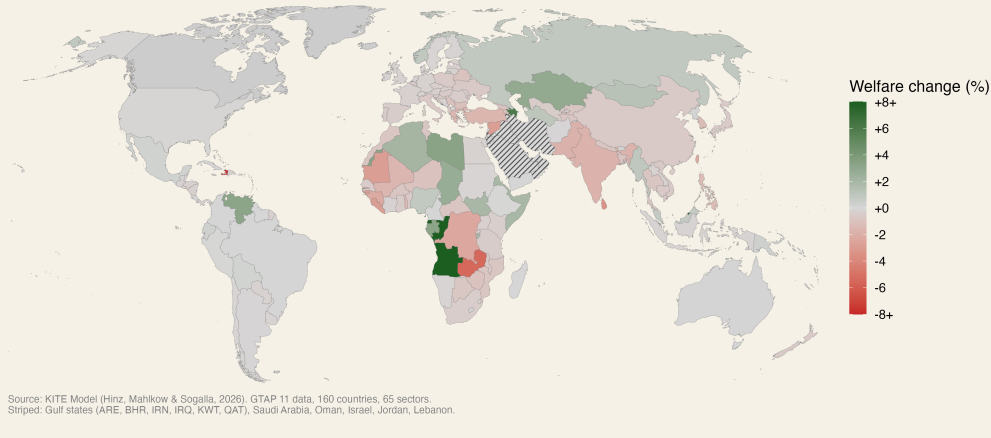
- Oil: **+12%**
- Gas: **+4%**
- Food: **+2.75%**

Standard models miss the non-substitutability of critical inputs.

Who Loses Most? Global Welfare Effects

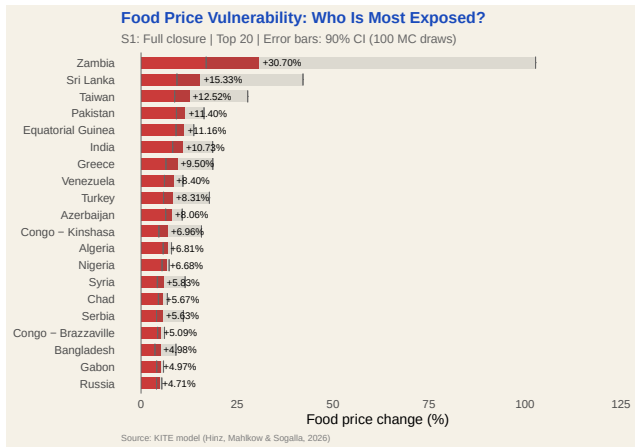
Global Welfare Impact of Full Strait of Hormuz Closure

S1: Full Closure, Short-Run | Striped countries directly affected by conflict



S. Korea: -1.4% | India: -1.8% | China: -0.6% | USA: -0.07% — Developing countries bear 10–20 $\times$ larger losses

Food Vulnerability: Who Faces the Largest Price Spikes?

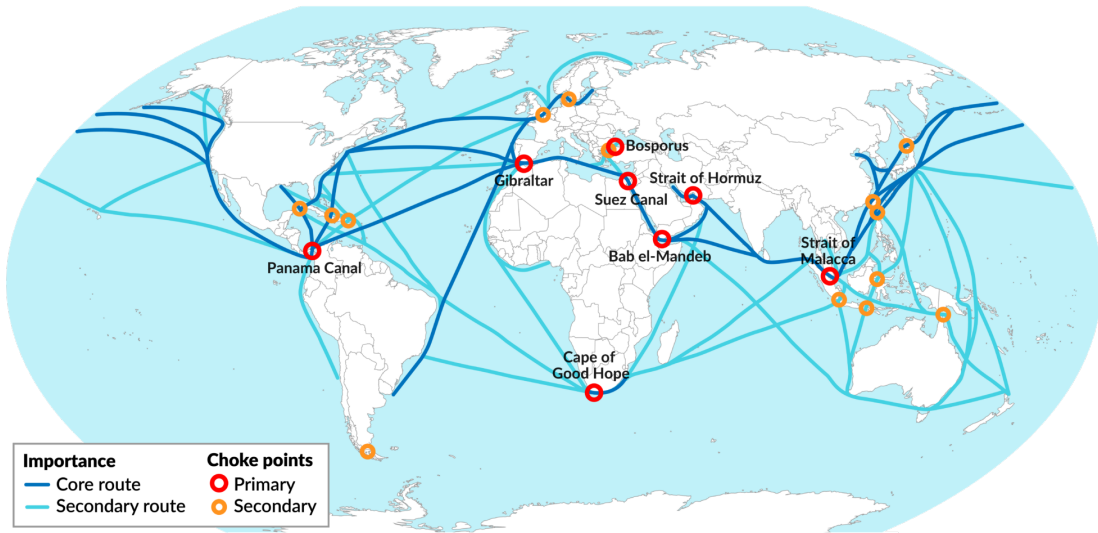


- Countries dependent on imported energy *and* fertilizers most exposed
- Zambia, Taiwan, Bangladesh
- Burden falls on the poorest

Input Bottlenecks: Open Questions

- **Firm-level adjustment:** How quickly can firms substitute away from bottleneck inputs? What are the real-world adjustment frictions beyond Cobb-Douglas?
- **Strategic reserves:** Can fertilizer stockpiles buffer food price shocks? What is the optimal reserve policy?
- **Political economy of food crises:** How do food price spikes in fragile states translate into political instability?
- **Other bottleneck chains:** Semiconductors, rare earths, medical supplies — where else does the mechanism apply?

Shipping Route Shocks



KITE Extension: Endogenous Transport Costs (Brockhaus, Hinz, Serfaty 2025)

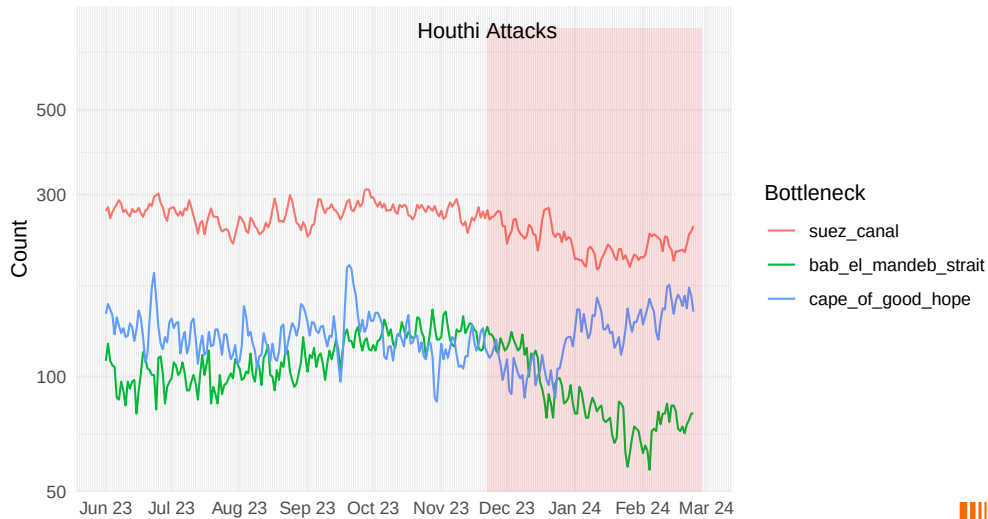
- **Problem:** Standard trade models treat bilateral trade costs as exogenous
- **Route-level iceberg costs** with three endogenous mechanisms:

$$d_{ij,sr} = \bar{d}_{ij,sr} \cdot \underbrace{\left(\frac{\Xi_r}{\Xi_r} \right)^{\lambda_s}}_{\text{route congestion}} \cdot \underbrace{\left(\frac{\Psi}{\Psi} \right)^{\gamma_s}}_{\text{global capacity}} \cdot \underbrace{\varphi_r}_{\text{monopoly}}$$

where $\Xi_r = \sum_{i,j,s} \delta_{ij,sr} X_{ij,sr}$ (route traffic) and $\Psi = \sum_{i,j,s,r} \delta_{ij,sr} X_{ij,sr}$ (global demand)

- **Route choice** via CES: $d_{ij,s} = \left[\sum_r d_{ij,sr}^{-\eta_s} \right]^{-1/\eta_s}$ replaces exogenous bilateral wedge
- **Monopoly:** $\varphi_r^* \in \arg \max \frac{\varphi_r - 1}{\varphi_r} \sum_{i,j,s} X_{ij,sr}$ — canal operators extract rents

The Red Sea Crisis



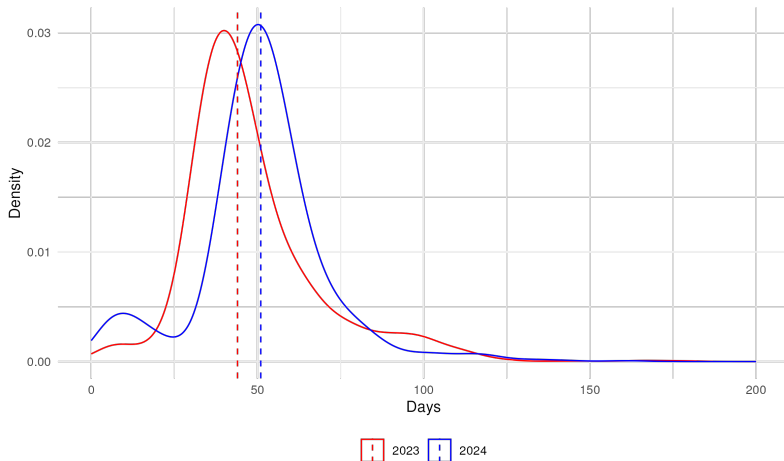
Consequences: Freight Rate Spike

Average freight rates from China to N. Europe and Global

Last update: 10/10/2024



Consequences: Travel Duration Shift



Rightward shift in China–Europe travel duration distributions — Cape routing adds 10–14 days

Shipping Shocks: Takeaways

- Maritime chokepoint disruptions create **global ripple effects** through congestion and capacity constraints
- Canal monopoly rents amplify costs and create redistributive effects
- Calibrated with ship-level AIS trajectories, firm-level customs data, and freight indices

Open research gaps:

- Mode substitution (air, rail, road) as adjustment margin
- Long-run fleet adjustment and shipbuilding response
- Security risk pricing in transport cost models
- Interaction with trade policy

Synthesis

What Connects These?

- **Trade shocks have complex consequences** — economic, political, distributional
- Sanctions can strengthen regimes. Energy disruptions cascade into food crises. Shipping blockades create global spillovers.
- Today's applications:
 - Sanctions → political consequences (reduced-form + structural gravity)
 - Input bottlenecks → energy-chemicals-food cascade (HMS extension)
 - Shipping route shocks → endogenous transport costs (BHS extension)

Good Geoeconomics Research Requires...

- **Credible identification** — structural models to isolate causal effects from confounding shocks
- **General equilibrium thinking** — input-output linkages, production networks, global capacity constraints
- **Policy relevance** — distributional consequences, food security, political economy
- **Versatile frameworks** — same core model, different extensions for different questions

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