

Geopolitical Turning Points and Macroeconomic Volatility

A bilateral identification strategy

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Why this paper

- ▶ Oil prices react to **geopolitical surprises**, not only to supply and demand fundamentals.
- ▶ Existing geopolitical indicators are often **global, persistent, and difficult to instrument** in a clean causal design.
- ▶ A bilateral framework makes it possible to connect the data to **named diplomatic events** and to a transparent timing structure.
- ▶ The paper asks whether **turning points in US–China relations** move oil prices dynamically and asymmetrically over horizons from 0 to 48 months.

Why this matters

If geopolitical relations co-evolve with trade, growth, financial conditions, and commodity prices, we need a design that is explicit about **which variation is used for identification** and why that variation is plausibly exogenous at the monthly frequency.

Takeaway

The key innovation is to isolate **unexpected inflection points** in bilateral diplomacy rather than broad geopolitical tension.

The question in one sentence

Research question

How do **bilateral geopolitical turning points** affect oil prices over horizons from 0 to 48 months, and do these effects differ across the oil-price distribution?

Short run

Improved relations should reduce precautionary demand and compress the geopolitical risk premium.

Medium run

Improved relations can strengthen the outlook for global activity and energy demand.

Across states

The response should be stronger in **tail regimes** of the oil-price distribution.

Roadmap

Part I

- ▶ Motivation and main message
- ▶ Positioning relative to the literature
- ▶ Data, PRI construction, and turning-point instrument

Part II

- ▶ Identification strategy and causal graph
- ▶ Diagnostics: lead test and first stage
- ▶ Baseline, quantile, Japan–China, and robustness results

Takeaway

The talk first explains the identification logic, then turns to the empirical results and external-validity exercises.

What is new here

Measurement

- ▶ Bilateral PRI
- ▶ New instrument: $\Delta^2 PRI$
- ▶ Event-based face validity

Method

- ▶ IV local projections
- ▶ Quantile IV local projections
- ▶ Lead and first-stage diagnostics

Finding

- ▶ Short-run oil-price decline
- ▶ Medium-run oil-price increase
- ▶ Strong state dependence

Takeaway

The contribution is not only a new oil-price result, but a **replicable identification framework** for bilateral geopolitical shocks.

Why a bilateral approach instead of a global index?

Limits of global geopolitical-risk measures

- ▶ They pool heterogeneous events.
- ▶ They are not naturally **dyadic**.
- ▶ They usually emphasize bad news rather than reconciliations.

What the bilateral PRI adds

- ▶ Signed information: relations can improve or deteriorate.
- ▶ Clear mapping from data to **named events**.
- ▶ Better suited to comparative identification.

Main result in advance

Headline result

A positive US–China geopolitical shock lowers oil prices by about **0.2% in the short run** and raises them by about **0.3% in the medium run**. The short-run decline is stronger at low oil-price quantiles, and the medium-run increase is stronger at high quantiles.

Shock	Immediate channel	Delayed channel
Improvement in relations	Lower geopolitical risk premium	Higher expected activity and oil demand

Where the paper sits in the literature

Geopolitics and oil

- ▶ **Kilian and Vega (2011):** oil reacts to macroeconomic news, which motivates careful attention to timing and identification.
- ▶ **Aastveit, Bjørnland, and Thorsrud (2015):** oil-price drivers differ across global states and country groups.
- ▶ **Mignon and Saadaoui (2024, 2025):** political tensions and China-related asymmetries matter for oil prices, but the current paper pushes the design toward explicit causal identification.

Measuring geopolitical risk

- ▶ **Caldara and Iacoviello (2022):** broad news-based GPR measures are highly influential, but they are global and mostly focused on adverse events.
- ▶ **Yan et al. / PRI tradition:** bilateral political relations can improve or deteriorate, allowing a **signed dyadic measure**.
- ▶ This paper exploits that bilateral structure to isolate **turning points** rather than broad geopolitical noise.

Dynamic causal inference

- ▶ **Jordà (2005):** local projections deliver horizon-by-horizon impulse responses.
- ▶ **Chernozhukov and Hansen (2006) and Kaplan and Sun (2017):** IV quantile methods make it possible to study distributional causal effects under endogeneity.
- ▶ The paper combines these strands in a **quantile IV-LP framework** for bilateral geopolitical shocks.

Relative to the closest studies

Relative to broad GPR work

This paper replaces a global risk proxy with a **signed bilateral measure** and uses **turning points** rather than broad geopolitical news counts.

Relative to oil-market papers using bilateral relations

The contribution is to move from the usual monthly-change design to an explicit **instrumented turning-point design**.

Relative to the local-projection literature

The paper combines **IV local projections** and **quantile IV local projections** to uncover state-dependent dynamic effects.

Conceptual framing

What markets observe

They observe a diplomatic path with persistent levels, trends, and occasional ruptures.

What should matter most

Inflection points: the moments when the bilateral trajectory changes abruptly.

Why this matters for identification

Inflection points are closer to **news shocks**. They are less likely to be generated by routine oil-market innovations at the monthly frequency.

Empirical object

$$Z_t = \Delta^2 PRI_t = PRI_t - 2PRI_{t-1} + PRI_{t-2}$$

Positioning relative to the literature

- ▶ The paper shows that **geopolitical shocks are not only about bad news**; improvements also carry macroeconomic information.
- ▶ It emphasizes the role of **bilateral strategic rivalry** as a transmission channel to commodity prices.
- ▶ It extends the oil literature by showing that the response is **dynamic and quantile specific**, not just average and contemporaneous.
- ▶ It adds a framework that can be exported to trade, exchange rates, spreads, and capital flows.

Data and sample

- ▶ Monthly sample: **1990m1–2022m3**.
- ▶ Main oil variable: real **WTI price in logs**.
- ▶ Controls: world industrial production and global oil production growth.
- ▶ Geopolitical variable: bilateral **PRI** for US–China and Japan–China.
- ▶ Horizon range: **0 to 48 months**.

Transformations

- ▶ PRI in **log-modulus form**
- ▶ Instrument: **second difference of raw PRI**
- ▶ Lag-augmented monthly specification

How the PRI is constructed

$$PRI_t = \frac{\left(\frac{N - PRI_{t-1}}{N} EV^+ + \frac{N + PRI_{t-1}}{N} EV^- \right)}{5} + PRI_{t-1}.$$

Interpretation

- ▶ EV^+ : good events
 - ▶ EV^- : bad events
 - ▶ N : half-range of the PRI scale
 - ▶ monthly updating rule with smoothing
- ▶ The PRI is produced at Tsinghua University from Chinese sources such as *People's Daily* and the Ministry of Foreign Affairs.
 - ▶ The index ranges from **-9 to 9** and records signed changes in bilateral relations, not only adverse events.
 - ▶ Because the raw index is persistent and smoothed, it is useful to isolate **turning points** rather than low-frequency drift.

Instrument construction: geopolitical turning points

$$Z_t = \Delta^2 PRI_t = PRI_t - 2PRI_{t-1} + PRI_{t-2}.$$

- ▶ This is a **curvature shock**: a change in the change of bilateral relations.
- ▶ It filters out smooth diplomatic evolution and highlights abrupt **inflection points**.
- ▶ Large values occur when deterioration suddenly intensifies, stops, or reverses.

Why the first stage is typically strong

The endogenous regressor is the current bilateral relationship state. The instrument is designed to isolate exactly the component of the raw PRI that **moves that state the most**: unexpected re-optimizations of diplomatic stance rather than routine monthly drift.

Takeaway

The second difference is not a cosmetic transformation. It is a filter that targets the economically relevant surprises in bilateral diplomacy.

US–China event mapping used for face validity

Episodes

- ▶ 1996 Third Taiwan Strait Crisis
- ▶ 1997–1998 Jiang Zemin state-visit episode
- ▶ 1999 Belgrade embassy bombing

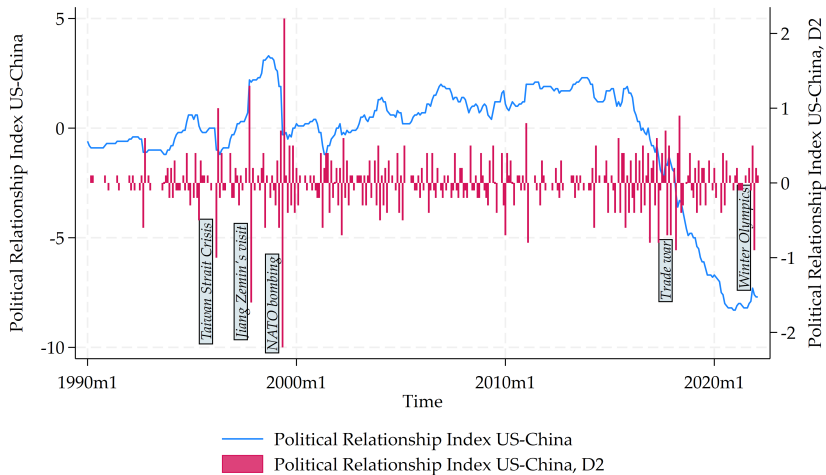
Episodes

- ▶ 2018 trade-war onset
- ▶ 2021 Winter Olympics boycott
- ▶ Other abrupt diplomatic inflections

Takeaway

The largest movements in Δ^2PRI line up with clearly identifiable geopolitical events rather than smooth macroeconomic drift.

US-China political relationship index and turning points



The line is the original PRI; the bars are the second difference used as the instrument.

How to read Figure 1

- ▶ The blue line is the slow-moving diplomatic path.
- ▶ The bars capture **abrupt curvature** in that path.
- ▶ The instrument is quiet most of the time and spikes only when the bilateral trajectory changes sharply.

Interpretation

A turning point can arise from a sharp deterioration, but also from the sudden **end of a deterioration**. Both cases are informative for markets.

Baseline IV local-projection specification

$$WTI_{t+h} = \alpha_h + \beta_h PRI_t + \sum_{j=1}^2 X'_{t-j} \gamma_{h,j} + \sum_{g=1}^3 \phi_{h,g} WTI_{t-g} + \sum_{k=1}^2 \lambda_{h,k} PRI_{t-k} + u_{t+h},$$

$$h = 0, \dots, 48.$$

- ▶ This is the **equation exactly as written in the paper**.
- ▶ In the implementation, PRI_t is the **endogenous log-modulus transform** of the bilateral relations index.
- ▶ The fitted first-stage regressor is \widehat{PRI}_t , obtained by instrumenting PRI_t with $Z_t = \Delta^2 PRI_t$.
- ▶ β_h is the dynamic causal effect at horizon h .

Why local projections are a good fit here

Advantages

- ▶ Direct impulse responses by horizon
- ▶ Flexible dynamics
- ▶ Natural extension to IV and quantiles

But

- ▶ LPs do **not** solve identification by themselves.
- ▶ A credible external source of variation is still required.
- ▶ The instrument is therefore central, not auxiliary.

Why this is a good instrument

Relevance

- ▶ $Z_t = \Delta^2 PRI_t$ is mechanically linked to abrupt reorientations of the bilateral relationship.
- ▶ The instrument is a **filter**: it removes smooth diplomatic drift and isolates the curvature innovations that move the relationship state the most.
- ▶ In the data, this delivers a very strong first stage because turning points are precisely the moments when the latent bilateral stance is being re-priced and re-optimized.

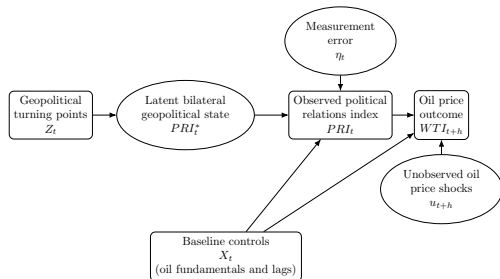
Non-anticipation and exclusion logic

- ▶ Markets may partly anticipate levels or first differences in relations, but they are much less able to forecast **changes in trajectory**.
- ▶ A violation would require routine monthly macro or financial news to generate systematic **U-turns** in China's diplomatic stance even after conditioning on oil fundamentals and lag dynamics.
- ▶ For oil, risk premia and demand expectations are not separate violations: they are the main **transmission mechanisms** through which the latent geopolitical state affects prices.

Takeaway

The design is credible because turning points are hard to forecast systematically and hard to rationalize as a mechanical consequence of routine monthly macroeconomic innovations.

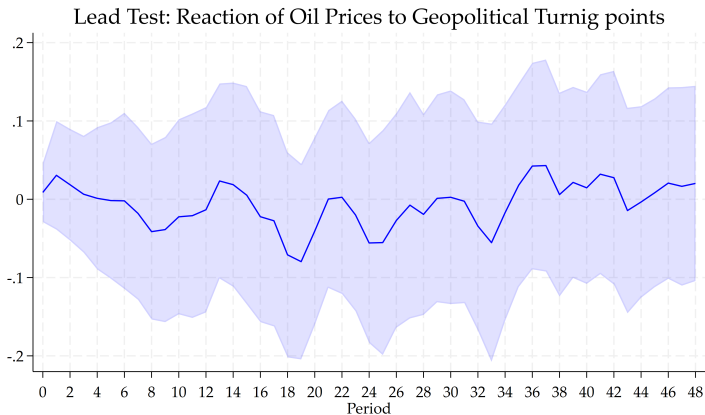
Causal identification channel



Notes. Exclusion restriction. The identifying assumption is that geopolitical turning points Z_t affect the oil-price outcome WTI_{t+h} only through their impact on the latent bilateral relationship state PRI_t^* (and hence through its observed proxy PRI_t), conditional on the baseline information set X_t (oil fundamentals and lags) and the included dynamics of the relationship index. Formally, for each horizon h , $\mathbb{E}[u_{t+h} | Z_t, X_t] = 0$, so that any correlation between Z_t and WTI_{t+h} operates via the $G_t \rightarrow PRI_t^* \rightarrow PRI_t \rightarrow Y_{t+h}$ channel. A violation would require that monthly macroeconomic or financial innovations systematically generate curvature shocks in China's diplomatic stance (i.e., abrupt accelerations/decelerations in PRI_t^* captured by $Z_t = \Delta^2 PRI_t$) and directly shift oil prices through an independent channel not captured by X_t . This joint requirement is implausible at monthly frequency given the nature of the turning points and is further mitigated by the no-anticipation evidence based on lead tests.

Causal graph for the IV strategy based on geopolitical turning points. The instrument shifts the latent bilateral geopolitical state and, conditional on controls, affects the outcome only through that state.

Non-anticipation: lead test



Lead coefficients remain close to 0 across horizons: future turning points do not predict today's oil-price responses, which supports the non-anticipation logic of the instrument.

Identification summary

Relevance

$\Delta^2 PRI$ isolates abrupt inflections in bilateral relations and delivers a strong first stage.

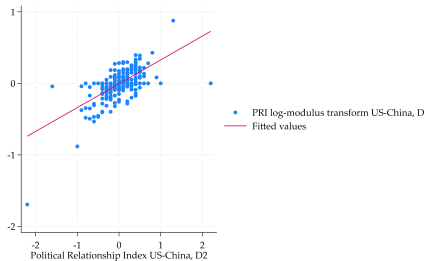
Orthogonality

The instrument is nearly uncorrelated with contemporaneous oil-price changes.

Timing

Lead tests do not reveal anticipatory oil-price movements.

Instrument relevance: graphical evidence



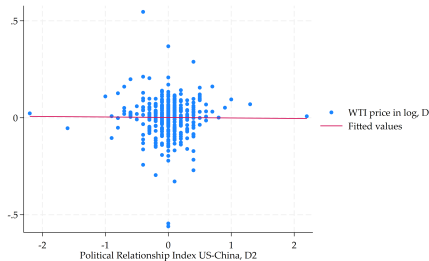
Interpretation

The transformed PRI and $\Delta^2 PRI$ are positively related.

Econometric meaning

The instrument is **relevant** for the endogenous geopolitical regressor.

Descriptive orthogonality with oil-price changes



Interpretation

The contemporaneous correlation with oil-price changes is close to zero.

Caution

This figure is descriptive, not a proof of exogeneity, but it points in the right direction.

First-stage strength across horizons

Main message

Across horizons 0 to 48, the first stage is very strong: partial R^2 is high and robust F-statistics are very large.

Horizon	Partial R^2	F-stat
0	0.825	236
24	0.860	345
36	0.874	374
48	0.900	552

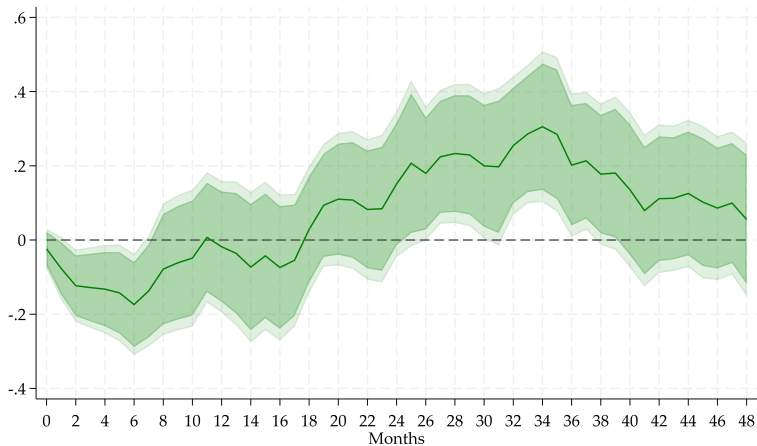
Takeaway

Weak identification is **not** the main concern in this application.

What the diagnostic evidence implies

- ▶ The instrument is strong in the first stage.
- ▶ Contemporaneous descriptive orthogonality looks reassuring.
- ▶ Placebo leads do not indicate anticipatory oil-price movements.
- ▶ Together, the diagnostics make the turning-point instrument **economically and econometrically plausible**.

Baseline dynamic response for US-China



IV local-projection response of oil prices to a positive unit shock to the US-China PRI.

How to read the baseline response

- ▶ A positive PRI shock means an **improvement** in US–China relations.
- ▶ In the **short run**, oil prices fall by roughly **0.2%**.
- ▶ In the **medium run**, oil prices rise by roughly **0.3%** around months 30 to 35.
- ▶ The path then gradually moderates.

Takeaway

The same diplomatic improvement lowers oil prices on impact but raises them later.

Short-run channel: risk compression

Mechanism

Better bilateral relations reduce the perceived probability of escalation, sanctions, or broader regional instability.

Oil-market implication

Lower uncertainty reduces **precautionary demand** and compresses the geopolitical risk premium in the first months after the shock.

Medium-run channel: demand expectations

Mechanism

Improved relations can strengthen the outlook for trade, industrial production, shipping, and broader global activity.

Oil-market implication

Expected energy demand rises, so the oil-price response turns positive in the medium run.

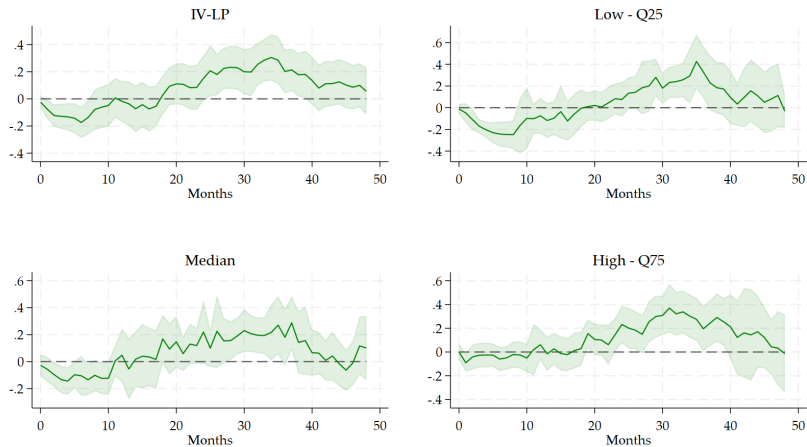
A simple synthesis of the dynamic pattern

Window	Dominant channel	Qualitative response
Months 0–10	Risk-premium compression	Oil prices decline
Months 18–40	Stronger demand expectations	Oil prices rise

Takeaway

A single average effect would miss the **timing structure** of geopolitical transmission.

Quantile IV local projections for US-China



Responses at the low quartile, median, and high quartile of the oil-price distribution.

Low-price states

- ▶ At the lower quantile, the short-run response is **more negative**.
- ▶ The oil-price decline remains below -0.2 for about nine months.
- ▶ Low-price environments appear especially sensitive to **risk relaxation**.

Median response

- ▶ The median path sits between the two tails, as expected.
- ▶ It preserves the same broad sign pattern.
- ▶ Quantile estimation therefore adds **heterogeneity** without overturning the central result.

High-price states

- ▶ At the upper quantile, the medium-run response is **more positive**.
- ▶ The elasticity rises above 0.2 around month 30.
- ▶ High-price regimes are more exposed to upward revisions in expected demand.

Why quantile heterogeneity matters

Substantive reason

Policy is often made in tail environments, not around the unconditional mean.

Methodological reason

Average responses can conceal the states in which geopolitics matters most.

Takeaway

The paper shows that geopolitical shocks are **state dependent**, not only time dependent.

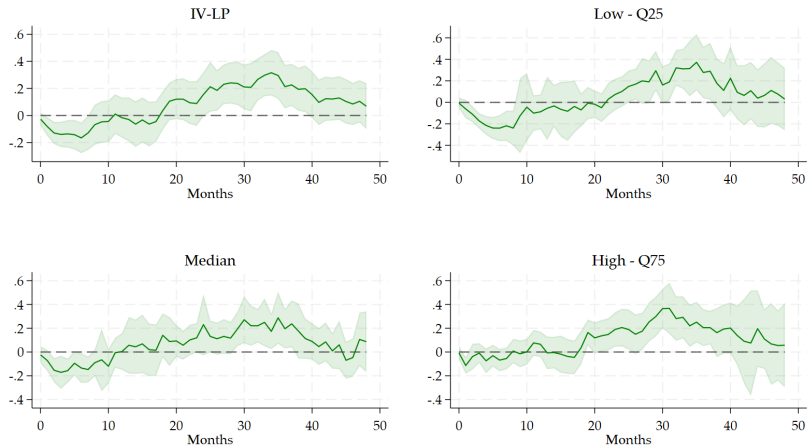
Robustness to China's relations with other partners

- ▶ Bilateral relations may co-move because of broader strategic alignments.
- ▶ The paper therefore controls for changes in China's relations with other major partners.
- ▶ The baseline US–China result remains qualitatively unchanged.

Takeaway

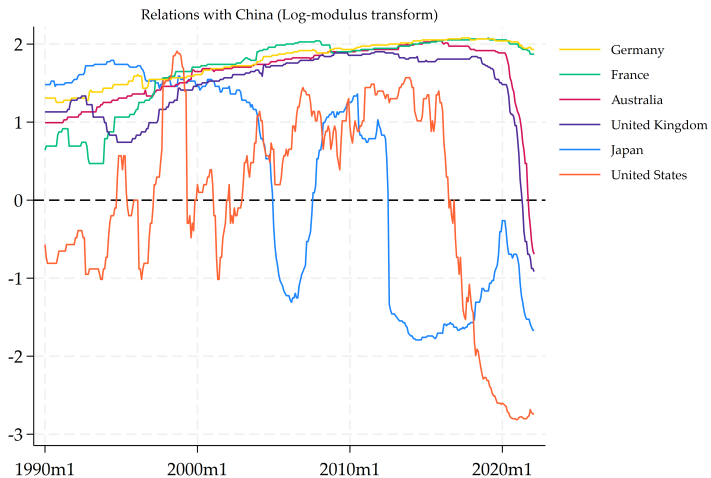
The main pattern is not driven by omitted co-movement in allied-country diplomacy.

US-China response after adding alignment controls



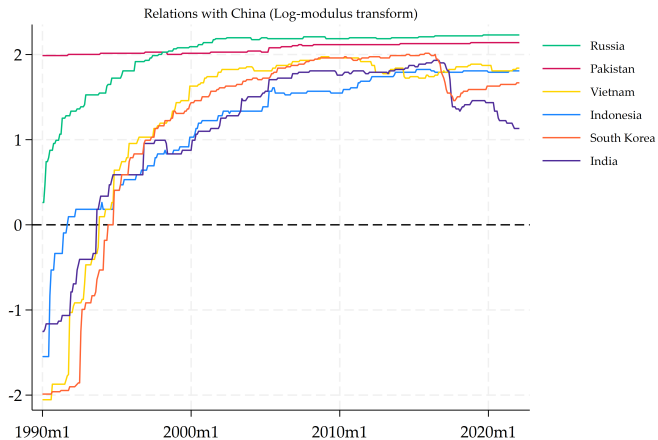
The short-run decline and medium-run increase remain visible after richer geopolitical controls.

Bilateral relations with China: advanced economies



Germany, France, Australia, the United Kingdom, Japan, and the United States.

Bilateral relations with China: emerging and strategic partners

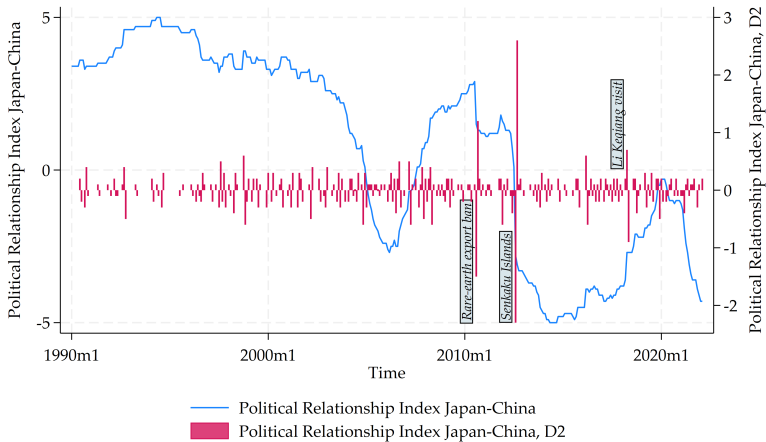


Russia, Pakistan, Vietnam, Indonesia, South Korea, and India.

Why use Japan–China as the validation case?

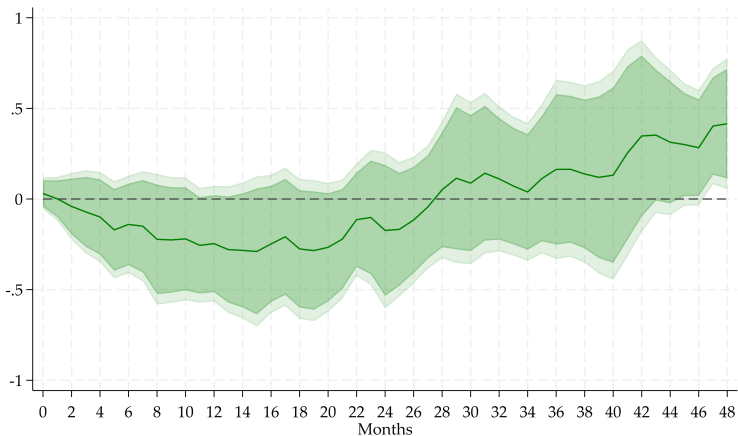
- ▶ It is another strategically relevant dyad with identifiable diplomatic shocks.
- ▶ It differs from US–China in historical content, so it is useful for **external validity**.
- ▶ If the sign pattern reappears, the framework looks more general than one special bilateral history.

Japan–China turning points



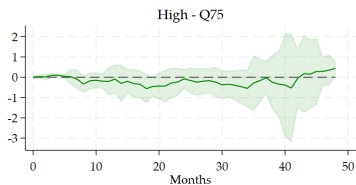
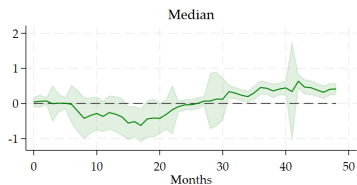
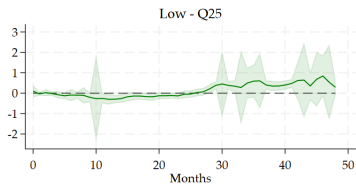
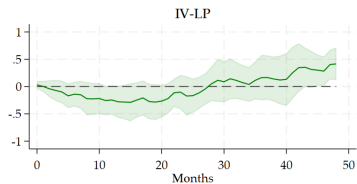
Major episodes include the rare-earth export dispute and the Senkaku nationalization episode.

Baseline IV local projection for Japan–China



The same qualitative pattern reappears: a short-run decline and a medium-run increase.

Quantile IV local projections for Japan–China



Confidence bands are wider, but the directional asymmetries remain consistent with US–China.

What the Japan–China exercise adds

- ▶ The instrument is not mechanically tied to one single bilateral history.
- ▶ The broader oil-price pattern survives in a dyad with different strategic content.
- ▶ Wider intervals are consistent with lower signal variance, not with a reversal of the mechanism.

Takeaway

The cross-dyad exercise strengthens the claim that **bilateral geopolitical turning points** have systematic oil-price effects.

Why this matters for oil-importing economies

- ▶ In the short run, better geopolitical relations can ease imported inflation pressure.
- ▶ In the medium run, the same shock can rebuild inflation pressure through stronger energy demand.
- ▶ Central banks therefore face a **timing problem**: relief today does not imply relief tomorrow.

Why this matters for oil-exporting economies

- ▶ Fiscal revenues can soften at first when geopolitical tensions ease.
- ▶ Yet stronger medium-run oil prices may later improve external and fiscal positions.
- ▶ Budget frameworks should therefore account for the **dynamic asymmetry** of geopolitical shocks.

Broader macroeconomic implications

- ▶ Oil prices are one transmission channel from geopolitics to inflation, current accounts, and real exchange rates.
- ▶ The same identification strategy could be used for capital flows, sovereign spreads, trade balances, and firm-level exports.
- ▶ The paper therefore contributes to international macroeconomics, not only to energy economics.

Limits and future work

- ▶ The design is built for **short-run causal inference at monthly frequency**, not for explaining the long-run co-evolution of geopolitics and macroeconomics.
- ▶ It is most informative for dyads that exhibit **clear turning points** and enough time variation in bilateral relations.
- ▶ The same framework can be extended to **trade, firm-level exports, exchange rates, capital flows, and sovereign spreads**.

Takeaway

The main value of the paper is a **portable identification strategy**: the oil application is the first use case, not the last one.

Concluding remarks

1. **Identification:** Δ^2PRI isolates bilateral geopolitical turning points.
2. **Dynamics:** US–China improvements lower oil prices in the short run and raise them in the medium run.
3. **Heterogeneity:** the response is stronger at the lower and upper tails of the oil-price distribution.
4. **Validation:** Japan–China evidence supports the broader framework.
5. **Policy relevance:** geopolitical shocks have timing- and state-dependent macroeconomic consequences.

Thank you — I look forward to the discussion.