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.

Identification payoff

Because the PRI is signed, dyadic, and traceable to discrete events, the same transformation captures unexpected escalations and reconciliations and can be replicated across bilateral histories.

Takeaway

The bilateral design turns geopolitical measurement into a comparative identification strategy.

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)** and **Cai et al. (2022):** broad news-based risk measures capture major geopolitical shocks, but are not naturally dyadic.
- **Yan (2010)** and **Du et al. (2017):** 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)**, **Montiel Olea and Plagborg-Møller (2021)**, and **Jordà and Taylor (2025):** local projections and lag augmentation support horizon-by-horizon inference under persistence.
- **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

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

What qualifies as a geopolitical turning point?

Definition

A turning point is a **sudden acceleration or deceleration** in bilateral relations—a surprise departure from the prevailing diplomatic path, rather than a slow-moving geopolitical level.

Unexpected

It changes the trajectory more sharply than information already priced by markets.

Event-driven

It can be linked to a diplomatic rupture, reconciliation, or policy reversal.

Hard to reverse

Its immediate geopolitical consequences cannot be unwound mechanically within the month.

Takeaway

The empirical design targets changes that are **unexpected, event-driven, and difficult to reverse immediately**.

Data and sample

- Monthly sample: **1990m1–2022m3**.
- **387 monthly observations**; $N = 384$ at $h = 0$ and $N = 336$ at $h = 48$.
- 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

$$PRI_t = \frac{\left(\frac{N-PRI_{t-1}}{N} EV^+ + \frac{N+PRI_{t-1}}{N} EV^-\right)}{5} + PRI_{t-1}, \qquad N = 9.$$

Interpretation

- EV^+ and EV^-: good and bad events
- Good events receive less weight near $+9$; bad events less weight near -9
- Division by five smooths event flows into a persistent stock
- Values are rounded to 0.1 and bounded in $[-9, +9]$

- The PRI is produced at Tsinghua University from Chinese sources such as *People's Daily* and the Ministry of Foreign Affairs.
- Its state-dependent weights prevent the index from moving without bound near the extremes, while retaining both improvements and deteriorations.
- Because the resulting stock is persistent and smoothed, identification focuses on **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.

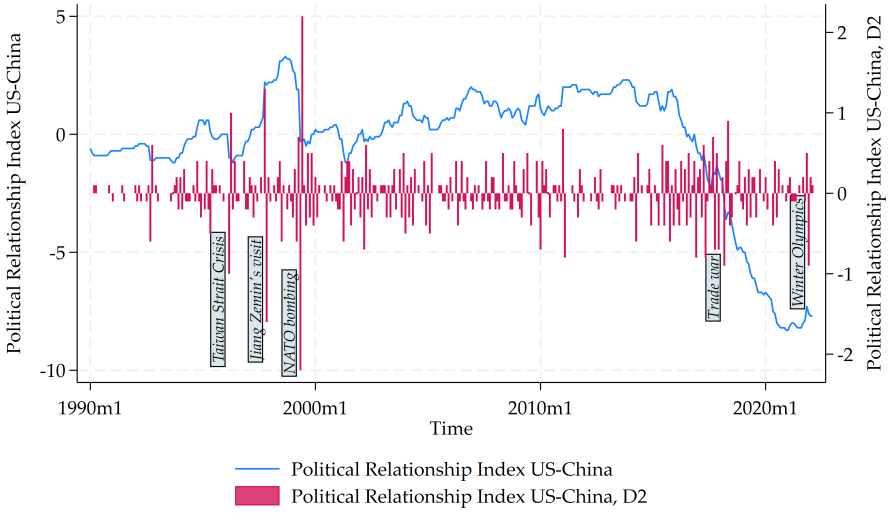
Event mapping used for face validity

Dyad	Event-driven inflections	Why they qualify
US–China	1996 Third Taiwan Strait Crisis; 1999 Belgrade embassy bombing; 2018 trade-war onset	Abrupt escalation, reversal, or change in diplomatic direction
Japan–China	2010 rare-earth export dispute; 2012 Senkaku nationalization	Discrete policy events with immediate bilateral consequences

Takeaway

The largest movements in $\Delta^2 PRI$ line up with named geopolitical events rather than smooth macroeconomic drift; not every dyad supplies enough such variation.

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.

A concrete example

The May 1999 Belgrade bombing generated an abrupt deterioration; stabilization in June was itself a turning point because the bilateral trajectory stopped worsening. The second difference separates the rupture from its persistence.

Takeaway

A turning point is a change in the diplomatic trajectory, not simply an adverse monthly observation.

Baseline IV local-projection specification

$$WTI_{t+h} = \alpha_h + \beta_h PRI_t + \sum_{j=1}^{2} X'_{t-j}\gamma_{h,j} + \sum_{g=1}^{3} \phi_{h,g} WTI_{t-g} + \sum_{k=1}^{2} \lambda_{h,k} PRI_{t-k} + u_{t+h},$$
$$h = 0, \ldots, 48.$$

- This is the tested equation: a **lag-augmented local projection**.
- 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.

Implementation in this application

The monthly specification is lag augmented: two lags of oil fundamentals and PRI, plus a third lag of WTI, with responses estimated from $h = 0$ to 48. This accommodates persistence and overlapping-horizon dependence.

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.

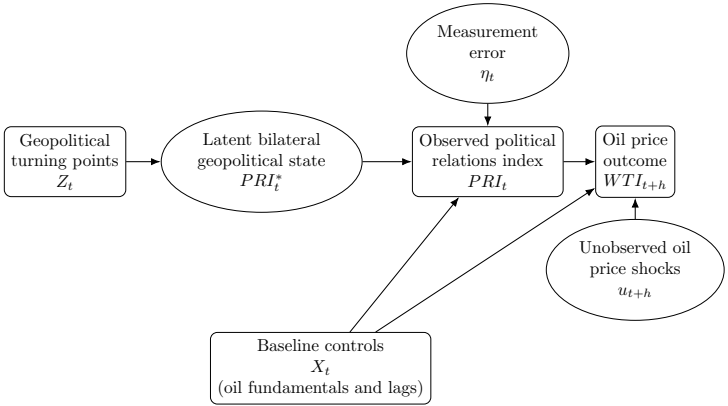
Non-anticipation and exclusion logic

- 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



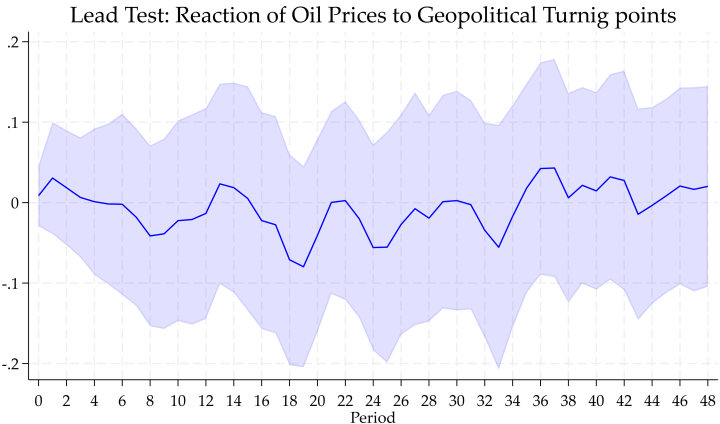
Exclusion restriction

$$E[u_{t+h} \mid Z_t, X_t] = 0.$$

- X_t conditions on oil fundamentals and lag dynamics.
- Turning points shift the **latent bilateral geopolitical state**.
- Conditional on X_t, there is no independent path from Z_t to oil prices.

Vector causal graph from the published identification framework. The observed PRI mediates the effect of the latent bilateral state on oil prices and is measured with error.

Non-anticipation: lead test



Lead coefficients remain close to 0 across horizons. The shaded band is constructed from heteroskedasticity-robust standard errors; the published caption does not state its nominal confidence level.

Why $\Delta^2 PRI$ is hard to anticipate

At T: level

A Trump–Xi meeting is announced for the following month. The current bilateral relationship level, PRI_T, can be assessed.

At $T+1$: change

The direction of ΔPRI_{T+1} may be partly forecast from the agenda, protocol, or communiqué.

At $T+2$: change of change

The acceleration or reversal after the meeting is much harder to forecast. That is the object isolated by $\Delta^2 PRI_{T+2}$.

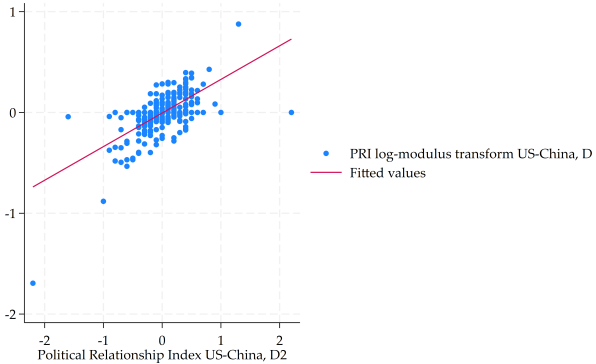
Many possible realizations

Failed talks, an unexpected concession, tariff threats, a Taiwan statement, or a surprisingly strong joint communiqué can each bend the diplomatic path in a different direction.

Takeaway

Markets may anticipate a level or first move; systematically anticipating the **acceleration or reversal** is more demanding.

Instrument relevance: graphical evidence



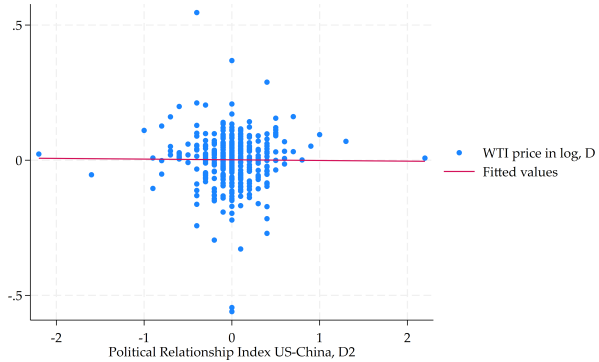
Interpretation

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.

A turning-point filter, not a measurement-error cure

What it is not

$$Z_t = \Delta^2 PRI_t = \Delta^2 PRI_t^* + \Delta^2 \eta_t.$$

Under classical contemporaneous measurement error, second differencing does **not** mechanically eliminate η_t.

What it is

$$\Delta^2 \eta_t = \eta_t - 2\eta_{t-1} + \eta_{t-2}.$$

Constant or locally linear contamination has zero second difference; slow-moving contamination produces a small one.

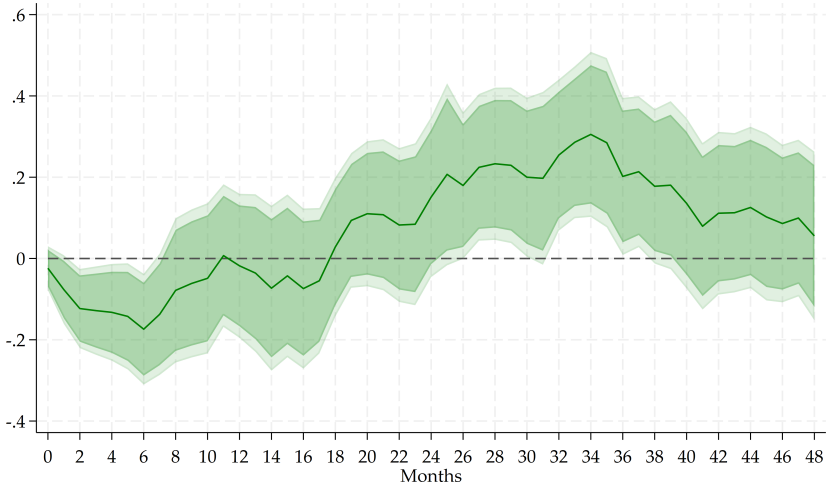
Identifying interpretation

The filter isolates abrupt geopolitical reversals and attenuates persistent low-frequency contamination. Identification still requires those abrupt turns to be plausibly orthogonal to contemporaneous monthly macroeconomic shocks.

Takeaway

Strong first-stage, orthogonality, lead, and C-test diagnostics support the design, but they do not replace the economic exclusion argument.

Baseline dynamic response for US–China



Positive unit PRI shock (an improvement in US–China relations); green and light-green bands are 90% and 95% confidence intervals, respectively.

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.

Transmission sequence

$$\text{Improved relations} \Rightarrow \text{lower escalation risk} \Rightarrow \text{less precautionary oil demand} \Rightarrow \text{price decline.}$$

The average response is about -0.2% after six months; at the lower oil-price quantile it remains below -0.2 for about nine months.

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.

Transmission sequence

Improved relations $\Rightarrow$ stronger trade and activity outlook $\Rightarrow$ higher expected energy demand $\Rightarrow$ price increase.

The average response reaches about 0.3% around month 32 and exceeds 0.2 near month 30 at the upper quantile.

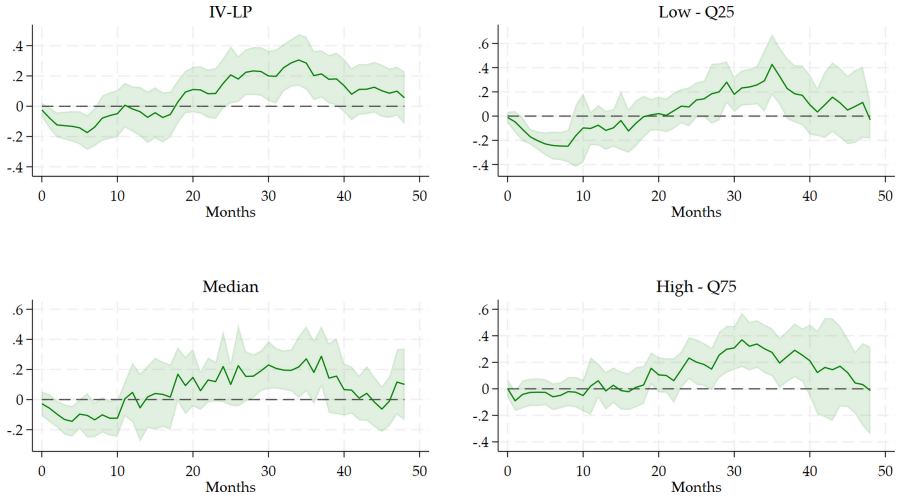
A simple synthesis of the dynamic pattern

Window	Empirical pattern	Economic interpretation
Months 0–9	About -0.2%; stronger at low quantiles	Risk-premium and precautionary-demand compression
Around months 30–35	About $+0.3\%$; stronger at high quantiles	Stronger global-activity and oil-demand expectations
Across quantiles	The tails amplify different phases	Heterogeneity in both magnitude and timing

Takeaway

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

Quantile IV local projections for US–China



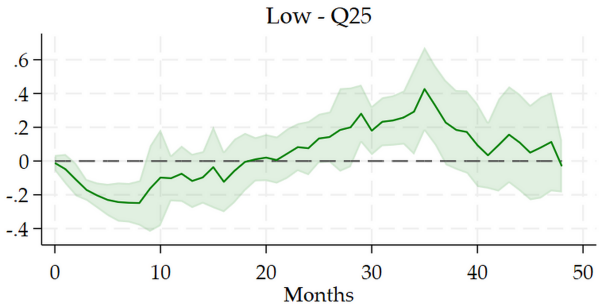
Positive unit PRI shock (an improvement in US–China relations); shaded bands are 90% confidence intervals. Panels report the average, low-quartile, median, and high-quartile responses.

Low-price states

- The short-run response is **more negative**.
- The decline remains below -0.2 for about nine months.
- Weak-price environments are especially sensitive to **risk relaxation**.

Interpretation

A diplomatic improvement removes a relatively large geopolitical-risk component, so risk compression dominates the first months.



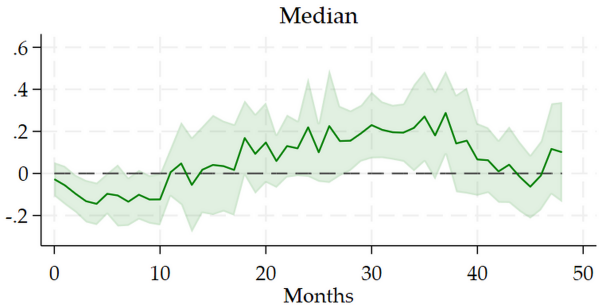
Low-quartile quantile IV-LP response; the shaded band is a 90% confidence interval.

Median response

- The median path sits between the two tails.
- It preserves the same broad sign reversal.
- Quantile estimation adds **heterogeneity** without overturning the central result.

Benchmark role

The sign reversal survives at the center of the distribution: the tails alter magnitude and timing rather than create the result.



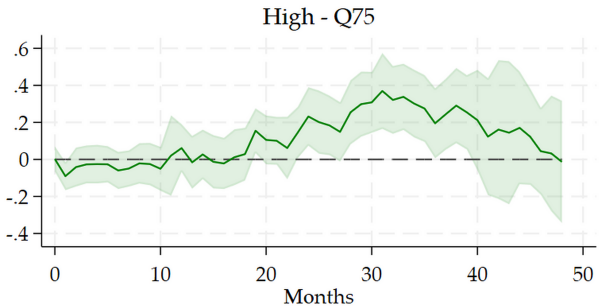
Median quantile IV-LP response; the shaded band is a 90% confidence interval.

High-price states

- 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.

Interpretation

When prices are already high, stronger activity and energy-demand expectations generate greater medium-run pressure.



High-quartile quantile IV-LP response; the shaded band is a 90% confidence interval.

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 **quantile 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.

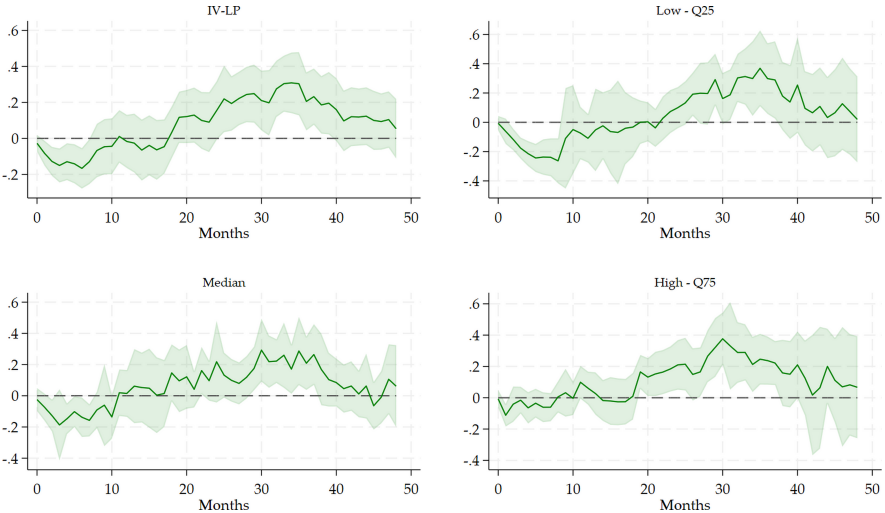
Implementation

A VAR(7) in changes points to particularly strong co-movement involving the United States, United Kingdom, South Korea, and Australia. The baseline is then re-estimated controlling for changes in China's relations with other major partners.

Takeaway

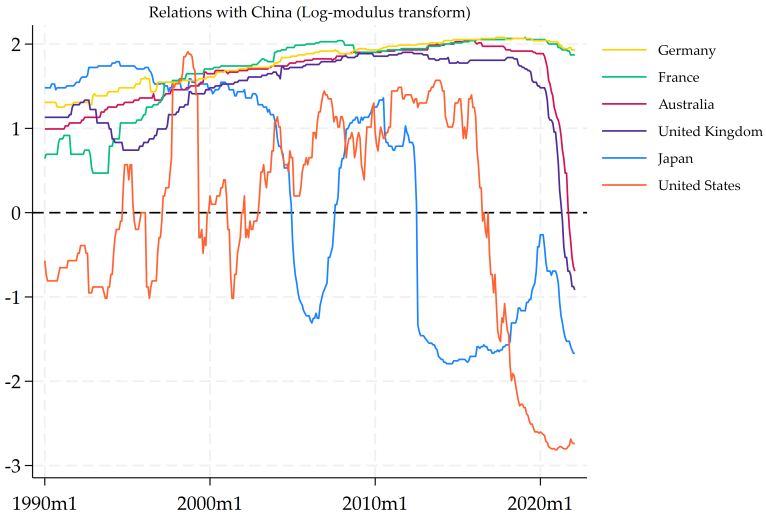
The main pattern is not driven by omitted co-movement in allied-country diplomacy.

US–China response after adding alignment controls



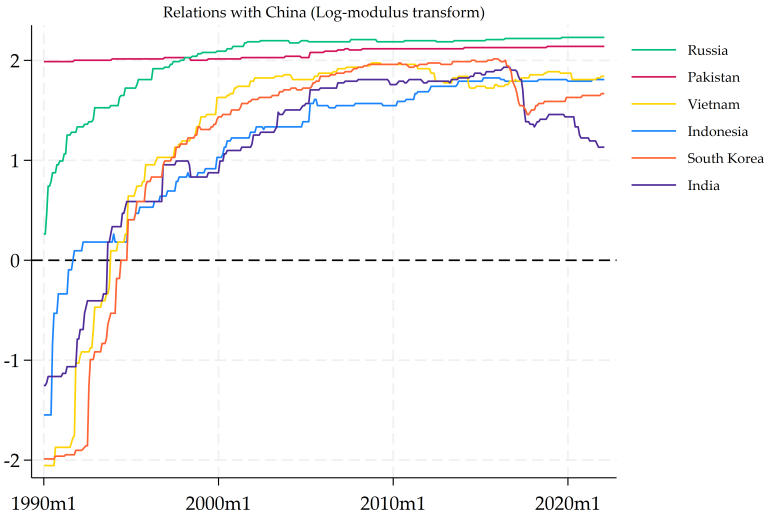
Positive unit US–China PRI shock, controlling for changes in China's relations with other major partners; shaded bands are 90% confidence intervals.

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?

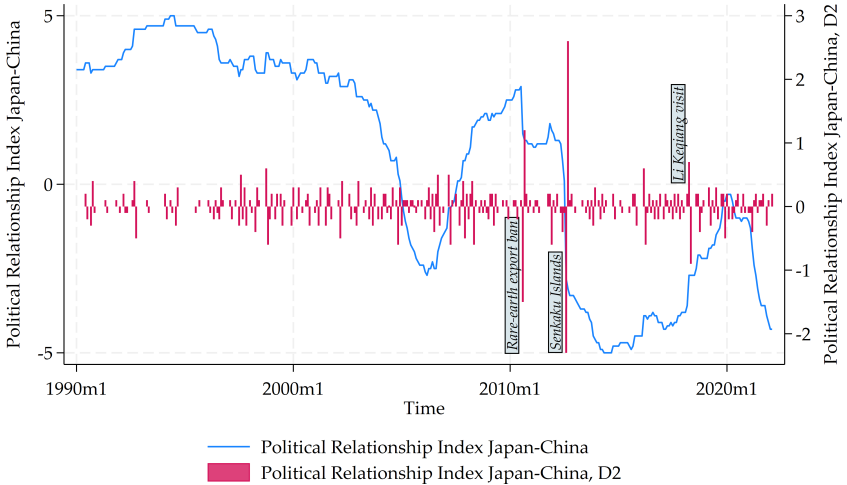
- It is another strategically relevant dyad with identifiable diplomatic shocks.
- It differs from US–China in historical content, so it is useful for **external validity**.
- If the sign pattern reappears, the framework looks more general than one special bilateral history.

Dyad	Source of variation	Signal characteristics
US–China	Long-run strategic rivalry	Frequent and abrupt turns
Japan–China	Maritime and historical disputes	More episodic, lower-variance turns

Takeaway

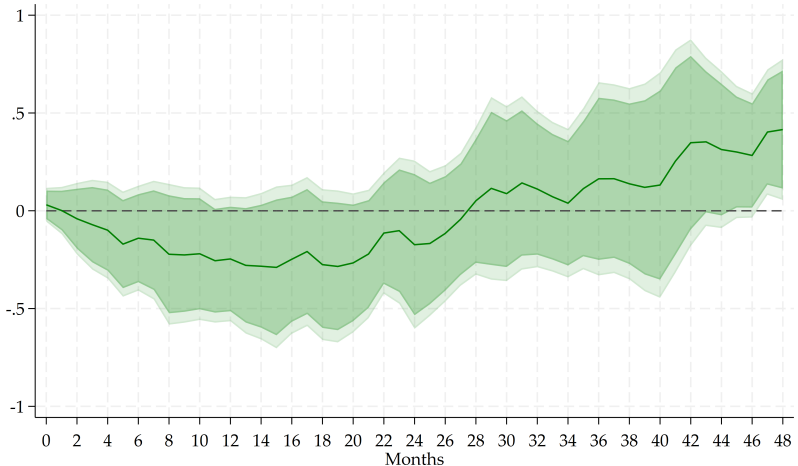
A common response across distinct geopolitical histories strengthens external validity.

Japan–China turning points



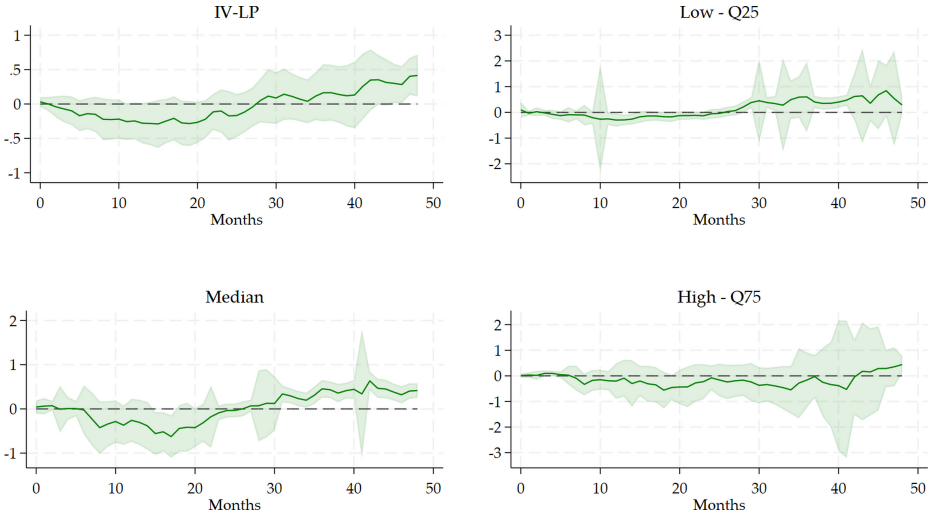
Major episodes include the 2010 rare-earth export dispute and the 2012 Senkaku nationalization. The design requires enough abrupt event-driven variation; not every China dyad provides it.

Baseline IV local projection for Japan–China



Positive unit PRI shock (an improvement in Japan–China relations); green and light-green bands are 90% and 95% confidence intervals, respectively.

Quantile IV local projections for Japan–China



Positive unit PRI shock (an improvement in Japan–China relations); shaded bands are 90% confidence intervals. Wider intervals reflect lower geopolitical variation in this dyad.

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.

First-stage replication

At every horizon $h = 0, \ldots, 48$, partial $R^2 > 0.8$ and the F-statistic exceeds 100. Wider response bands therefore reflect lower geopolitical variation rather than weak first-stage relevance.

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.

Central-bank implication

The same diplomatic improvement can first lower energy-price inflation and later rebuild it. The policy signal therefore depends jointly on the forecast horizon and the initial oil-price state.

Takeaway

Scenario analysis should distinguish immediate risk-premium relief from delayed demand-driven inflation pressure.

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.

Fiscal-policy implication

A short-run revenue loss can be followed by a medium-run gain. Fiscal frameworks should distinguish temporary geopolitical risk-premium movements from slower demand-driven oil-price effects.

Takeaway

Stabilization buffers should be calibrated to the horizon, not only to the contemporaneous oil-price move.

Broader macroeconomic implications

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

Bilateral turning point $\longrightarrow$ oil price $\longrightarrow$ terms of trade and trade balance
$\longrightarrow$ current account and capital flows $\longrightarrow$ real exchange rate

Who is especially exposed

Energy-dependent economies and countries vulnerable to strategic mineral supply chains face stronger transmission from geopolitical shocks.

Limits and future work

Boundaries

- Monthly, horizon-specific causal design
- Not a model of long-run geopolitical co-evolution
- Requires clear dyadic turning points and sufficient variation

Portable extensions

- Firm-level trade and aggregate trade balances
- Exchange rates and capital flows
- Sovereign spreads and broader financial risk

Takeaway

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

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Concluding remarks

1. **Identification**: $\Delta^2 PRI$ 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.

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