The Geopolitical Determinants of Economic Growth, 1960–2019

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This paper establishes geopolitical relations as a first-order determinant of economic growth. We construct a novel event-based measure of bilateral geopolitical alignment by employing large language models with web search capabilities to analyze over 440,000 political events across 196 countries from 1960–2019. This comprehensive measure enables us to identify the precise timing and magnitude of geopolitical shifts within countries over time. Using local projections with country fixed effects, we find that a one-standard-deviation improvement in geopolitical relations increases GDP per capita by 9.6 log points over 25 years. These persistent effects operate through multiple reinforcing channels—enhanced political stability, increased investment, expanded trade, and productivity gains. Across our sample, geopolitical factors generate GDP variations ranging from −35% to +30%, with developing nations facing particularly severe penalties from international isolation. Our findings reveal how geopolitical alignment shapes economic prosperity in an increasingly fragmented global economy.

Keywords. Geopolitics, Economic growth, Political events, International relations, Development

JEL Classification. F50, F59, O11, O40, P16

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1. Introduction

Despite decades of research on economic growth determinants, substantial cross-country growth and income differences remain unexplained. Early contributions by Barro (1991) and Mankiw, Romer, and Weil (1992) established the foundations of growth empirics, identifying physical and human capital accumulation as key drivers. Subsequent work emphasized institutions, geography, culture, trade, and financial and legal systems as fundamental determinants. More recently, Acemoglu et al. (2019) provided causal evidence that democratization increases GDP per capita by approximately 20 percent in the long run. Yet Kremer, Willis, and You (2022)'s comprehensive meta-analysis reveals that much of the variation in growth rates and income levels across countries remains unexplained, suggesting the existence of important omitted determinants.

This paper argues that geopolitical alignment—the state of a country's diplomatic and strategic relationships with major powers—constitutes a first-order yet underexplored determinant of economic growth. While the growth literature has extensively studied domestic factors such as institutions and human capital, the role of international political relationships has received surprisingly little attention despite the obvious importance of global economic integration. We find that geopolitical factors account for a substantial portion of growth variation, with particularly large effects for developing economies where international relations can determine access to markets, technology, and investment.

To systematically investigate this geopolitical growth determinant, we develop a novel event-based measure of bilateral geopolitical relations that captures both the timing and intensity of diplomatic dynamics—a methodological innovation crucial for identifying causal effects in a cross-country panel setting. By employing large language models augmented with web search capabilities, we compile and analyze over 440,000 major political events between all country pairs involving 196 countries with 24 major nations from 1960–2019. For each bilateral relationship and year, we identify significant events—ranging from trade agreements and state visits to sanctions and diplomatic disputes—classify them using the Conflict and Mediation Event Observations (CAMEO) framework [1], and assign Goldstein scores [2] quantifying their cooperative or conflictual intensity. This granular approach overcomes fundamental limitations of existing measures based on UN voting patterns or binary indicators, enabling us to exploit within-country variation in the timing and magnitude of geopolitical changes. We aggregate these bilateral scores using GDP-weighted averages to construct country-year indices that reflect each nation's overall

[1] CAMEO (Conflict and Mediation Event Observations) is a framework for systematically coding international political events into cooperation-conflict categories. See Schrodt and Yilmaz (2012) and Online Appendix C for implementation details.

[2] The Goldstein Scale assigns numerical values from −10 (maximum conflict) to +10 (maximum cooperation) to quantify the intensity of international political actions. See Goldstein (1992) and Online Appendix C for scoring guidelines.

position in the global geopolitical landscape.

Our main empirical analysis employs local projection methods with country fixed effects to trace the dynamic effects of geopolitical alignment on economic growth. We find that the dynamic growth effects build gradually and persist for decades, with even transitory diplomatic improvements generating lasting economic benefits. A one-standard-deviation permanent improvement in geopolitical relations increases GDP per capita by approximately 9.6 log points over 25 years. To illustrate the economic magnitude: moving from hostile relations to strong cooperation, comparable to South Africa's post-apartheid transformation, raises long-run GDP by 75 log points. These effects operate through multiple reinforcing channels, including immediate improvements in domestic stability and investment, followed by gradual expansions in trade openness, productivity growth, and human capital accumulation.

We establish the causal interpretation of these results through multiple complementary approaches. First, our baseline estimates prove remarkably robust across diverse sources of variation: countries experience virtually identical growth benefits whether improving relations with the United States, Russia (Soviet Union), China, Western democracies, or non-Western powers. This symmetry across ideologically different partners suggests our estimates reflect the fundamental economic value of international cooperation rather than country-specific confounds. Second, extensive robustness tests controlling for alternative fixed effects specifications, time-varying covariates including trade openness and domestic unrest, and different lag structures yield consistent results. Third, we implement an instrumental variables strategy exploiting variation from non-economic mild conflicts—diplomatic disputes, border tensions, and cultural disagreements that affect bilateral relations without directly impacting economic activity. The convergence of IV and OLS estimates provides compelling evidence that geopolitical alignment causally drives growth rather than merely correlating with it.

Our analysis reveals that geopolitical alignment drives growth through multiple reinforcing channels. Domestic political stability improves immediately, with investment shares rising by 5 percentage points within the first year, driving capital accumulation that peaks at 20 log points after a decade. Total factor productivity shows sustained gains of 10 log points, while trade openness expands gradually to 15 percentage points of GDP as diplomatic alignment reduces commercial barriers. Human capital accumulates continuously over our 25-year horizon as international stability enables educational investments. Additional evidence in the appendix confirms these benefits extend broadly—market reforms respond positively, employment ratios increase persistently, and consumption tracks GDP gains—suggesting that geopolitical alignment generates inclusive rather than concentrated growth.

The relationship between democratization and geopolitical alignment reveals im-

portant development nuances. Democracy and geopolitics operate as complementary but distinct growth drivers: democracy's short-run effect operates primarily through improved Western relations, with bilateral scores rising by one standard deviation within five years of democratic transitions. However, democracy's long-run benefits persist even after controlling for geopolitical channels, reflecting additional gains from strengthened property rights and reduced expropriation risk. This decomposition reconciles the literature — short-run studies correctly emphasize international relations while long-run analyses appropriately highlight institutional quality. Crucially, non-democratic countries can achieve substantial growth through geopolitical alignment alone, though they forgo democracy's additional long-run benefits — a key finding for development strategies in an increasingly multipolar world.

Having established these dynamic causal effects, we conduct growth accounting exercises to quantify geopolitical contributions to both temporal growth variations and persistent cross-country income differences. Geopolitical factors explain GDP variations ranging from −35% to +30% across countries and time periods. During the Cold War, bipolar competition created stark divisions with corresponding economic costs, while the 1990–2010 globalization era generated widespread gains through improved international relations. The 2010s, however, witnessed renewed fragmentation, with the median country experiencing negative geopolitical growth contributions for the first time in our sample. Cross-sectionally, geopolitical alignment explains income differences comparable in magnitude to geography or institutions, with countries like Singapore benefiting from strategic positioning while others like Zimbabwe pay severe economic penalties for international isolation.

Our findings prove robust to alternative estimation methods and measurement approaches. Dynamic panel estimates exploiting the autoregressive structure confirm large steady-state effects, with permanent improvements in geopolitical relations doubling long-run GDP. Alternative measures based on unsmoothed geopolitical events yield similar long-run impacts once we account for their transitory nature. In contrast, measures based on UN voting patterns fail to generate any growth effects when subjected to the same empirical framework, highlighting the importance of our bilateral event-based approach. Even when compared to direct measures of economic coercion such as sanctions, our comprehensive geopolitical index subsumes their explanatory power while capturing additional growth-relevant variation.

Recent geopolitical upheavals underscore the urgency of understanding these dynamics. The escalating cascade of disruptions—from Brexit and the U.S.-China trade war to the Russia-Ukraine war triggering unprecedented Western sanctions, the Israel-Gaza conflict destabilizing the Middle East, and pandemic-driven reshoring—has fundamentally reoriented global economic flows along geopolitical lines. As great power competition

intensifies and the post-Cold War consensus fractures, countries face increasingly difficult choices about international alignment with profound economic consequences. Our analysis quantifies these stakes: geopolitical misalignment can cost developing countries 20–30% of GDP, undermining or even reversing potential gains from domestic reforms. Yet our finding that geopolitical relations with different major powers generate similar economic benefits offers hope that development need not become hostage to strategic rivalry. The challenge for policymakers is preserving the growth benefits of global integration while navigating an increasingly fragmented landscape where economic and strategic considerations are inseparable.

Literature Review. This paper contributes to three interconnected strands of literature: the measurement of geopolitical relations, determinants of economic growth, and the emerging field of geoeconomics.

Measuring Bilateral Geopolitical Relations. We develop a novel bilateral measure of geopolitical relations that overcomes fundamental limitations in existing approaches. The predominant method relies on UN General Assembly (UNGA) voting similarity (Signorino and Ritter 1999; Bailey, Strezhnev, and Voeten 2017), which captures multilateral positions rather than bilateral dynamics. Alternative categorical measures—including strategic rivalries (Thompson 2001; Aghion et al. 2019), sanctions (Ahn and Ludema 2020; Felbermayr et al. 2021), military alliances (Gibler 2008), and bilateral treaties (Broner et al. 2025)—provide discrete classifications but cannot capture the continuous evolution of international relationships. Our event-based approach creates a comprehensive measure that tracks both the timing and intensity of bilateral geopolitical dynamics, providing the within-country variation essential for causal identification in panel settings.

Machine Learning for Data Construction. Our methodology advances the rapidly expanding application of machine learning, particularly large language models, for systematic information extraction and data construction in economics (Dell 2025; Clayton et al. 2025; Lagakos, Michalopoulos, and Voth 2025). Building on recent progress in using textual analysis methods to measure economic and geopolitical risks (Baker, Bloom, and Davis 2016; Caldara and Iacoviello 2022; Hassan et al. 2019, 2024), we employ LLMs augmented with web search capabilities to analyze over 440,000 bilateral political events across six decades. This novel approach enables us to process vast amounts of unstructured historical information at scale, classify events using standardized frameworks (CAMEO), and assign intensity scores (Goldstein) with consistency impossible through manual coding. The marriage of conceptual innovation in measurement with computational methods for implementation represents a methodological contribution applicable beyond our specific application.

Economic Growth Determinants. Our empirical analysis extends the vast literature on

cross-country growth determinants (Barro 1996, 2003; Durlauf, Johnson, and Temple 2005; Johnson and Papageorgiou 2020; Kremer, Willis, and You 2022). While existing research has identified fundamental drivers including physical and human capital (Barro 1991; Mankiw, Romer, and Weil 1992), institutions (North 1990; Acemoglu, Johnson, and Robinson 2001; Dell 2010), culture (Guiso, Sapienza, and Zingales 2006; Tabellini 2010; Nunn 2008), geography (Sachs and Warner 1995; Diamond 1997; Hall and Jones 1999; Dell, Jones, and Olken 2012), trade (Frankel and Romer 1999; Alcala and Ciccone 2004; Feyrer 2019), and legal and financial systems (La Porta et al. 1997, 1998; Rajan and Zingales 1998), the role of geopolitical relationships remains underexplored. Building on Acemoglu et al. (2019)'s empirical framework, we employ local projection methods (Jordà 2005; Jordà and Taylor 2025) with country fixed effects to estimate dynamic responses. This approach traces the full impulse response function semi-parametrically, capturing both immediate impacts and persistent effects of geopolitical shocks without restrictive assumptions about the data-generating process.

Geoeconomics. Our research bridges classical economic statecraft (Hirschman 1945, 1958; Baldwin 1985) with contemporary geoeconomic analysis (Blackwill and Harris 2016; Aghion et al. 2019; Kleinman, Liu, and Redding 2024; Clayton, Maggiori, and Schreger 2023, 2024; Broner et al. 2025; Flynn et al. 2025; Gopinath et al. 2025). While theoretical foundations for understanding how states leverage economic tools for strategic purposes are well-established, empirical evidence on the growth consequences remains limited. We provide systematic measurement of bilateral geopolitical relations and demonstrate their causal effects across a comprehensive panel spanning six decades. Our findings contribute to the sanctions literature (Ahn and Ludema 2020; Felbermayr et al. 2021; Morgan, Syropoulos, and Yotov 2023) by embedding sanctions within a broader framework of geopolitical relations, revealing how the full spectrum of international political dynamics—from cooperation to conflict—shapes economic development.

Road Map. The remainder of the paper proceeds as follows. Section 2 develops our event-based measure of geopolitical relations, demonstrating how we leverage LLMs to systematically analyze bilateral political events and capture major historical transformations. Section 3 presents our main empirical results, establishing the causal effect of geopolitical alignment on long-run growth using local projections and instrumental variables. Section 4 unpacks the channels through which geopolitics affects growth—stability, investment, trade, and productivity—and disentangles the interplay between democracy and international alignment. Section 5 quantifies geopolitical contributions to growth through growth accounting exercises. Section 6 provides extensive robustness tests using alternative estimation methods and measurement approaches. Section 7 concludes.

2. Event-based Measure of Geopolitical Relations

To accurately measure the timing and intensity of geopolitical dynamics, we leverage a large language model augmented with search capabilities to compile and analyze over 440,000 major political events worldwide from 1960-2019. Our dataset covers bilateral interactions between all 196 countries, with particular focus on relationships involving 24 major economic and geopolitical nations (denoted as $\mathcal{N}$) [3]. Using these events, we construct a novel measure of bilateral geopolitical relations that varies by country pair and year, which we then aggregate to create country-year measures of average geopolitical relations. This section describes our data construction methodology.

2.1. LLM: Compile and Analyze Geopolitical Events

Major bilateral geopolitical events constitute a salient component of human knowledge and form a core element of training corpora for large language models (LLMs). These events are extensively documented across global digital repositories, including news archives, official government publications, and scholarly databases. We employ Gemini, an LLM equipped with web search capabilities, to systematically collect, verify, and analyze major bilateral geopolitical events according to a structured analytical framework implemented through prompt engineering. This approach leverages the LLM's capacity to process vast textual datasets while maintaining real-time access to credible online sources. Figure 1 illustrates our LLM-based analysis procedure, with complete analytical framework and prompt specifications provided in Appendix A.2.

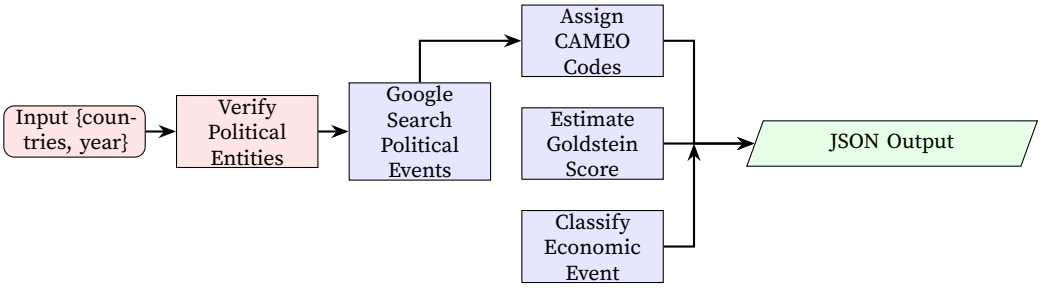


FIGURE 1. LLM Geopolitical Event Analysis Procedure

Our methodology instructs the LLM to perform five sequential tasks: (i) verify the historical political entities for each country pair and year, accounting for state succession (e.g., Soviet Union to Russian Federation); (ii) conduct systematic searches across its

[3]The 24 major nations are: Argentina, Australia, Belgium, Brazil, Canada, Switzerland, People's Republic of China, Germany, Denmark, Spain, France, United Kingdom, Indonesia, India, Italy, Japan, Republic of Korea, Mexico, Netherlands, Poland, Russian Federation (Soviet Union), Saudi Arabia, Turkey, and United States. Appendix A.1 provides the discussion on the choices. Collectively, these 24 nations account for 83–90 percent of global GDP over the study period, underscoring their dominant role in the world economy.

knowledge base and internet sources to identify major bilateral political events from authoritative sources; (iii) classify each event using the Conflict and Mediation Event Observations (CAMEO) framework into cooperation-conflict categories; (iv) assign Goldstein Scale scores ranging from −10 (maximum conflict) to +10 (maximum cooperation) based on event intensity; and (v) categorize economic content when applicable.

TABLE 1. Major U.S.-Russia Bilateral Events in 2019: LLM Analysis Results

Event Name	**Event Description**	**CAMEO Class.**	**Econ. Type**	**Goldstein Score**
US Withdrawal from INF Treaty	U.S. formally withdrew from Intermediate-Range Nuclear Forces Treaty on Aug. 2, citing Russian non-compliance. Russia also suspended treaty participation	Material Conflict (16-160)	Not econ.	−8.0
US Sanctions over Salisbury Attack	State Dept. announced sanctions on Aug. 2 under CBW Act, prohibiting US banks from Russian govt. non-ruble bonds and tightening dual-use export restrictions	Material Conflict (16-163)	Sanctions	−7.0
US Sanctions for Election Interference	US imposed sanctions on 33 Russian individuals/entities in Sept. for election interference, and sanctioned 'Evil Corp' cybercriminal organization in Dec.	Material Conflict (17-172)	Sanctions	−6.0
US Sanctions on Nord Stream 2	President Trump signed legislation on Dec. 20 imposing sanctions on companies involved in Nord Stream 2 construction to halt completion	Material Conflict (16-163)	Sanctions	−7.0
US-Russian Diplomatic Meetings	Officials held several diplomatic meetings: Hale-Ryabkov (July), Pompeo-Lavrov at UNGA (Sept.), Lavrov-Sullivan (Nov.) to discuss bilateral relations	Verbal Coop. (04-040)	Not econ.	+2.0

Table 1 demonstrates our methodology using U.S.-Russia bilateral events from 2019. The analysis captures the deterioration in bilateral relations through systematic classification: four of five major events represent material conflict with Goldstein scores ranging from −6.0 to −8.0. The most severe event—the INF Treaty withdrawal—scores −8.0, representing a fundamental breakdown in arms control architecture. Three distinct sanctions episodes target different aspects of Russian behavior: the Salisbury attack (−7.0), election interference (−6.0), and the Nord Stream 2 pipeline (−7.0). The sole cooperative event—routine diplomatic consultations—scores only +2.0, illustrating how our framework captures both intensity gradations within conflict categories and the stark asymmetry between conflictual and cooperative interactions. Table A1 in Appendix A.2 provides a contrasting example from the 1972 détente period, where all six major U.S.-Soviet events represent cooperation with Goldstein scores ranging from +5.0 to +8.0—demonstrating

our measure's ability to capture dramatic shifts in bilateral relations over time.

TABLE 2. Geopolitical Events Summary by Decade, 1960–2019

	1960s	1970s	1980s	1990s	2000s	2010s	Total
Cooperation Events	35,281	39,742	41,654	56,045	84,960	121,689	379,371
Conflict Events	8,606	8,546	9,565	9,455	11,040	15,722	62,934
Mean Goldstein Score	3.323	3.608	3.440	4.082	4.238	4.062	3.908

Notes: Cooperation events include verbal and material cooperation (CAMEO classes 1-2). Conflict events include verbal and material conflict (CAMEO classes 3-4). Goldstein Scale: −10 (most conflictual) to +10 (most cooperative).

Table 2 synthesizes patterns across our complete dataset of 442,305 events spanning 1960-2019. The data reveal three distinct phases in international relations: Cold War stability (1960-1990) with cooperation comprising 80-83% of interactions and mean Goldstein scores hovering around 3.3-3.6; the globalization era (1990-2010) witnessing cooperative events expand to 86-88% with scores peaking at 4.24; and recent tensions (2010-2019) where conflict events increase relatively faster than cooperation, despite cooperation remaining dominant at 89%, with mean scores declining to 4.06. This trajectory demonstrates our methodology's sensitivity to macro-level shifts while suggesting that contemporary tensions represent a deceleration rather than a reversal of globalization—a pattern consistent with recent empirical findings.[4]

Comparison with Existing Event Databases. Our geopolitical events compilation differs from existing global event databases such as GDELT (Leetaru and Schrodt 2013) and ICEWS (Boschee et al. 2015) in two key dimensions. First, we focus exclusively on major political events that define bilateral geopolitical relations between country pairs, enabling more precise measurement of relationship intensity.[5] This targeted approach prioritizes events with clear bilateral significance rather than attempting to synthesize the full spectrum of international interactions. Second, our compilation provides extended temporal coverage from 1960, aligning with the availability of economic data necessary for comprehensive panel analysis.[6]

[4]Our data aligns with Goldberg and Reed (2023)'s finding that recent trends reflect deceleration rather than reversal of globalization, as cooperative interactions continue to dominate despite rising conflict.

[5]GDELT and ICEWS collect comprehensive global events across all actors and issue areas, making it challenging to aggregate these events into meaningful measures of bilateral relationship intensity between specific country pairs.

[6]GDELT provides daily event data only from 1979 onward, while ICEWS covers 1995 to present. Both databases have limited historical depth compared to the timespan required for comprehensive economic analysis of geopolitical relationships.

2.2. Measuring Geopolitical Relations

Dynamic Bilateral Geopolitical Relations. We construct a measure of bilateral geopolitical relations based on major political events between country pairs. Let $\left\{s_{ij,t}^{n}\right\}_{n=1}^{\tilde{N}_{ij,t}}$ denote the Goldstein scores for the set of events between countries i and j in year t, where $\tilde{N}_{ij,t}$ is the total number of events. The average event score is:

$$\tilde{S}_{ij,t} = \frac{1}{\tilde{N}_{ij,t}} \sum_{n=1}^{\tilde{N}_{ij,t}} s_{ij,t}^{n}/10$$

We then construct a dynamic geopolitical score for each country pair as a weighted moving average:

$$S_{ij,t} = \left(1 - \phi_{ij,t}\right) \cdot S_{ij,t-1} + \phi_{ij,t} \cdot \tilde{S}_{ij,t} \tag{1}$$
$$\phi_{ij,t} = \tilde{N}_{ij,t}/N_{ij,t}, \quad N_{ij,t} = (1-\delta)\, N_{ij,t-1} + \tilde{N}_{ij,t}$$

where $\phi_{ij,t}$ represents the updating weight, $N_{ij,t}$ is the effective cumulative number of events, and δ is the depreciation rate for past observations. We set $\delta = 0.3$, which approximates a four-year moving average with greater weight on recent events.[7] The dynamic geopolitical score is normalized to range from −1 (maximum conflict) to +1 (maximum cooperation).

This event-based measure captures both the timing and intensity of bilateral geopolitical relations, enabling identification of economic responses to geopolitical changes within a panel structure with country fixed effects. As emphasized by Durlauf, Johnson, and Temple (2005) and Kremer, Willis, and You (2022), exploiting within-country variation presents challenges for identifying growth effects with precision, making accurate measurement particularly important.

Figure 2 plots our dynamic geopolitical score (blue line) between the United States and Russia from 1960 to 2019. The measure accurately captures major historical episodes: the Cuban Missile Crisis marking peak Cold War tensions, the Détente period (1968–1979), deterioration following the Soviet invasion of Afghanistan, improvement beginning with Gorbachev's reforms in the mid-1980s, the post-Soviet peak in 1992, and subsequent decline culminating in the Crimean Crisis. The 2015–2019 period represents a historical low, exceeded only by the peak Cold War years. In contrast, the Ideal Point Distance measure from UN voting data (green line) fails to capture both the Détente period and

[7] The four-year window corresponds to a typical electoral cycle. Our results are robust to alternative depreciation rates. In Section 6.2, we examine the case where $\delta = 1$, which corresponds to using unsmoothed event-based scores. While these event scores show rapid mean reversion and generate smaller immediate GDP effects, the cumulative long-run impact of permanent changes in event flows converges to our baseline estimates. This confirms that our smoothing procedure captures economically meaningful variation without biasing the fundamental relationship between geopolitics and growth.

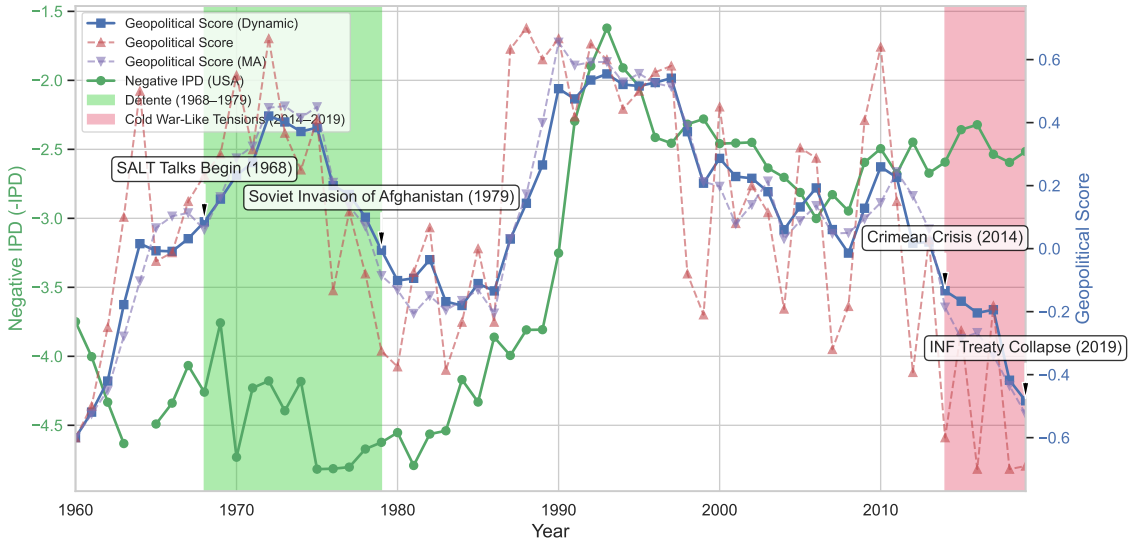


FIGURE 2. Geopolitical Scores Between United States and Russia (Soviet Union)

Time series comparison of geopolitical relationship measures between the United States and Russia, 1960–2019. The blue line shows our dynamic geopolitical score, the orange dashed line shows the yearly geopolitical score, the purple dashed line shows the four-year moving average, while the green line displays the negative Ideal Point Distance (−IPD) from UN voting data. Shaded regions highlight the Détente period (1968–1979, green) and recent Cold War-like tensions (2014–2019, red). Key geopolitical events are annotated on the dynamic score series.

the sharp deterioration following the Crimean Crisis. Additional validation is provided in Appendix A.

Advantages over Existing Measures. Our event-based approach offers three key advantages over existing measures of bilateral geopolitical relations: universal coverage across countries and time, precision in capturing the timing and intensity of bilateral dynamics, and a comprehensive scale from conflict to cooperation.

Existing literature predominantly relies on UN voting similarity to achieve broad coverage (Signorino and Ritter 1999; Bailey, Strezhnev, and Voeten 2017; Kleinman, Liu, and Redding 2024). However, UNGA voting primarily reflects positions on multilateral issues rather than bilateral dynamics, resulting in measures that are more stable and less responsive to bilateral relationship changes (Broner et al. 2025). Figure 2 illustrates this limitation: while the negative Ideal Point Distance (Bailey, Strezhnev, and Voeten 2017) broadly tracks our measure's trajectory, it misses critical inflection points including the Détente period and the post-Crimean deterioration.

Our measure also complements categorical approaches that classify relationships using discrete indicators such as *Strategic Rivalry* (Thompson 2001; Aghion et al. 2019), *Sanctions* (Ahn and Ludema 2020; Felbermayr et al. 2021), *Formal Alliance* (Gibler 2008), and *Treaties* (Broner et al. 2025). While these binary classifications capture important

institutional milestones, they necessarily focus on specific relationship thresholds rather than continuous evolution. Our framework incorporates these same landmark events—military rivalries, alliance formations, treaty signings—while situating them within a broader spectrum of bilateral interactions. Appendix A.3 provides additional comparisons, and Section 6.2 presents empirical tests.

Country-Level Geopolitical Relations. To capture a country's overall geopolitical stance, we aggregate bilateral geopolitical scores $S_{ij,t}$ into a country-level measure using a GDP-weighted average:

$$p_{it} = \sum_{j \in \mathcal{N}} S_{ij,t} \times \text{GDP share}_{jt} \tag{2}$$

Here, GDP share_{jt} denotes country j's share of world nominal GDP.[8] We interpret nominal GDP as a proxy for geopolitical influence, as it reflects both economic strength and military capacity. The resulting index p_{it} serves as our primary measure of a country's geopolitical position in subsequent analyses of growth outcomes. Values of p_{it} approaching −1 indicate strong global conflict, while values near +1 indicate strong alignment with the global order.

2.3. Landscape of Geopolitical Relations: 1960–2019

This section analyzes the evolution of global geopolitics from 1960 to 2019 using our dynamic measure of geopolitical relations. We illustrate key shifts in the geopolitical landscape through network visualizations and distributional analysis, further validating our measure's ability to capture major historical transformations.

Figure 3 illustrates the transformation from Cold War bipolarity to contemporary multipolarity. In 1980, the United States and Soviet Union anchor two distinct clusters, with extensive red lines between blocs indicating widespread hostility. Notably, China appears proximate to the United States, reflecting the Sino-American rapprochement following Nixon's opening and shared opposition to Soviet expansion.[9]

By 2019, this bipolar structure has transformed into a complex multipolar system. The United States remains central but now faces China as a major pole, with Russia maintaining a distinct cluster. The topology shows increased blue lines and decreased red lines, indicating more positive relationships despite rising tensions. Crucially, "connector" states like Turkey, India, and Brazil occupy more central positions, bridging different

[8] Nominal GDP is measured in current U.S. dollars, sourced from the World Bank.

[9] The U.S.-China alignment in 1980 represented a dramatic reversal from the 1960s, demonstrating how quickly geopolitical relations can shift when strategic interests align. Non-aligned states like India, Brazil, and Mexico occupy intermediate positions, though their placement reveals varying degrees of practical tilt beyond stated non-alignment policies.

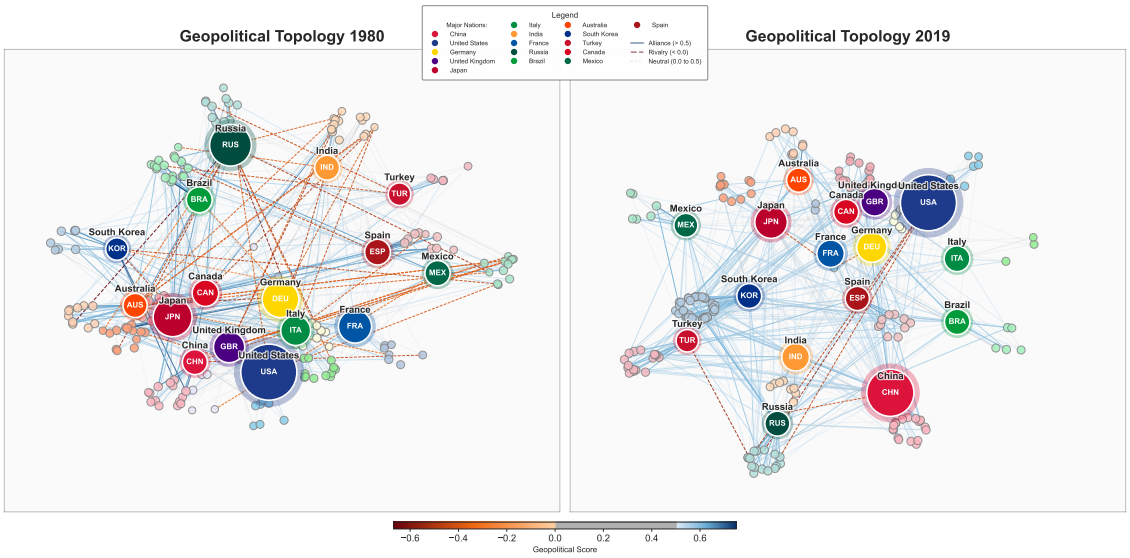


FIGURE 3. Geopolitical Relation Topology, 1980 and 2019

Geopolitical topology constructed using multidimensional scaling based on pairwise geopolitical scores between major nations. Distances between major nations reflect dissimilarity in their geopolitical relations with the rest of the world. Circle sizes indicate GDP shares. Smaller circles represent non-major countries, colored by strongest alignment and positioned near primary patron. Blue lines indicate alliances (scores > 0.5); red lines indicate hostile relations (scores < 0.0).

clusters and enabling continued economic integration amid strategic competition.[10] Appendix A.4 provides additional geographic detail in maps.

Figure 4 reveals fundamental shifts in the global distribution of geopolitical relations across six decades. During the Cold War intensification (1960–1980), the 5th percentile declined from −0.15 to −0.10 while upper percentiles remained stable, widening the distribution substantially. The 1970 and 1980 distributions exhibit clear bimodality—with peaks at 0.2 and −0.05 in 1970, and at 0.25 with substantial negative mass in 1980—capturing the division into opposing geopolitical camps.

The post-Cold War transformation (1980–2010) brought dramatic convergence: the 5th percentile improved from −0.10 to 0.10, the median rose from 0.25 to 0.32, and the distribution became strongly unimodal with its mode at 0.35. By 2010, virtually no mass remained below 0.1, reflecting the globalization era's widespread cooperation. The 2010–2019 period shows a modest reversal—the 5th percentile declined slightly to 0.10, variance increased, and some negative values reappeared—though the distribution remains predominantly positive with its mode unchanged at 0.35.[11]

[10]These nonaligned "connector" countries are rapidly gaining importance and serving as bridges between blocs, potentially undermining the effectiveness of policies aimed at economic decoupling.

[11]The percentile spread narrowed from approximately 0.55 (ranging from −0.10 to 0.45) during peak Cold War to 0.25 (0.10 to 0.35) by 2010, before widening again to 0.30 by 2019. This compression and re-expansion of the distribution aligns with the rise and partial retreat of economic globalization.

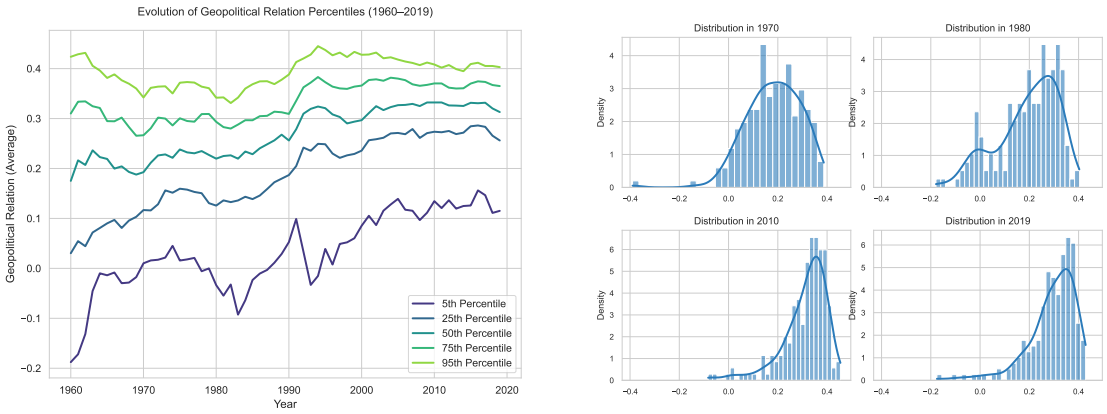


FIGURE 4. Evolution of Geopolitical Relation Distributions

Left panel shows the evolution of geopolitical relation percentiles from 1960–2019, with lines representing the 5th, 25th, 50th, 75th, and 95th percentiles. Right panels display kernel density estimates of the distribution of country-level average geopolitical relations for selected years (1970, 1980, 2010, 2019), highlighting the shift from Cold War bipolarity through post-Cold War convergence to contemporary re-polarization.

These distributional dynamics validate our measure's ability to capture macro-historical transformations through purely data-driven patterns that align with established historical periodization: Cold War intensification (widening percentile gaps through 1980), post-Cold War convergence (compression and rightward shift from 1990–2010), and contemporary re-differentiation (renewed dispersion with a persistent positive mode from 2010–2019). Table A3 in Appendix A.4 provides additional summary statistics by decade.

3. Dynamic Growth Effects of Geopolitics

Having developed a novel event-based measure of geopolitical relations, we now examine its economic implications by estimating the dynamic causal effects of geopolitical alignment on economic growth. This section presents our main empirical findings, demonstrating that improvements in international relations generate substantial and persistent economic gains.

3.1. Data and Preliminary Evidence

Economic Data. Our analysis employs a comprehensive panel dataset covering 196 countries from 1960 to 2019. The primary outcome variable is log GDP per capita in constant US dollars from the World Development Indicators, which provides broad country coverage and facilitates cross-country comparisons.[12] We build upon the dataset constructed by

[12]Section 3.4 presents robustness checks using alternative output measures from the Penn World Tables, confirming that our results are not sensitive to the choice of GDP measure.

Acemoglu et al. (2019), expanding coverage and incorporating additional variables from the Penn World Tables (Feenstra, Inklaar, and Timmer 2015) and Acemoglu et al. (2025).[13]

Beyond our main outcome, we examine key growth determinants spanning multiple categories: enhanced Solow fundamentals (physical capital, investment rates, population growth, education), institutional measures (democracy indices, governance quality), trade openness, and additional correlates identified in the growth literature. This comprehensive set of variables enables us to explore the channels through which geopolitical relations affect economic development.

Preliminary Evidence: Geopolitics and Growth across Decades. Before presenting our formal empirical analysis, we document the raw correlation between changes in geopolitical relations and subsequent economic growth. Figure 5 provides suggestive evidence by plotting decadal changes in geopolitical alignment against future growth performance.

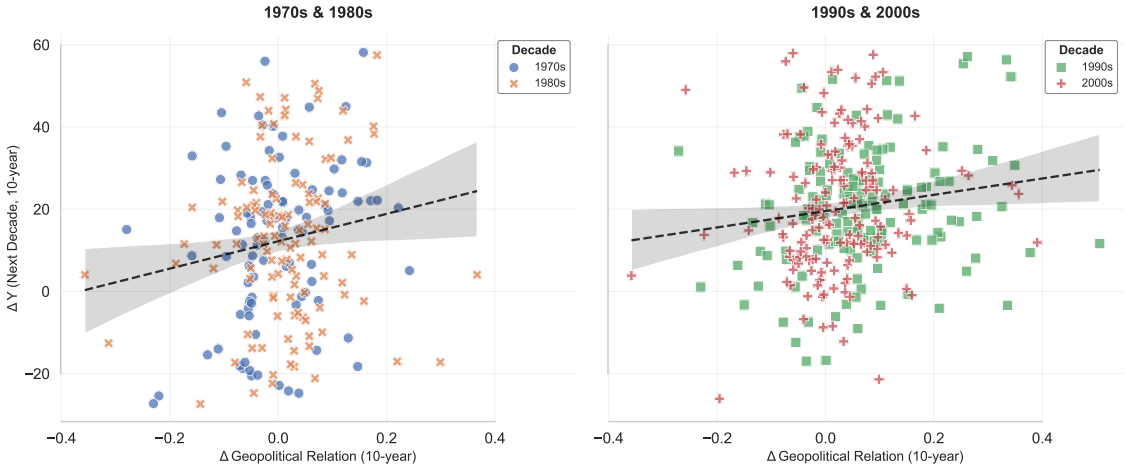


FIGURE 5. Geopolitical Relations and Subsequent Economic Growth by Decade

Each point represents a country-decade observation. The x-axis shows the average 10-year change in geopolitical relations during decade d, while the y-axis displays the average 10-year change in log GDP per capita during decade $d + 1$. To improve visualization, we exclude the top and bottom 2.5% of observations based on future growth rates. Dashed lines represent OLS regression fits with 95% confidence intervals shown in gray. The sample covers 1970–2010 for geopolitical changes, with growth outcomes measured through 2019.

Both panels reveal a positive association between improvements in geopolitical relations and subsequent economic performance. Countries experiencing diplomatic improvements in decade d tend to achieve higher growth rates in decade $d + 1$, with the relationship appearing stronger and more precise in the later period (1990s–2000s) compared to the Cold War era (1970s–1980s). This tightening of the relationship coincides with the acceleration of globalization and the increasing importance of international economic

[13]The panel is unbalanced, with coverage varying across countries and time periods. Table A5 in Appendix B.1 provides detailed information on country coverage and data availability for each variable.

integration.

While these correlations are suggestive, they cannot establish causality due to potential reverse causation and omitted variables. Countries with better growth prospects may attract more diplomatic attention, or unobserved factors might drive both geopolitical alignment and economic performance. We therefore turn to a more rigorous empirical framework that addresses these identification challenges through panel methods with rich controls and instrumental variable strategies.

3.2. Empirical Specification

We denote our measure of country-level geopolitical relations as p_{ct}. Rather than examining the sources of geopolitical dynamics, we take these relations as directly observed and identify their dynamic causal effects on economic outcomes. Specifically, we examine how a change in geopolitical relations at time t influences economic outcomes at future horizons relative to a baseline of no change. Formally, following Jordà and Taylor (2025), we define the impulse response function as:

$$\mathcal{R}_{p\to y}(h) \equiv E\left[y_{c,t+h} \mid p_{ct} = p_{c0} + 1; \mathbf{x}_{ct}\right] - E\left[y_{c,t+h} \mid p_{ct} = p_{c0}; \mathbf{x}_{ct}\right], \quad h = 0, 1, \ldots, H \tag{3}$$

where $y_{c,t+h}$ represents the economic outcome (log GDP per capita $\times$ 100) at horizon h, and $\mathbf{x}_{ct}$ is a vector of control variables.[14] The control vector includes:

$$\mathbf{x}_{ct} = \left\{\{y_{c,t-\ell}, p_{c,t-\ell}\}_{\ell=1}^{J}, \delta_c, \delta_{r(c)t}, \boldsymbol{m}_{ct}\right\}$$

where $y_{c,t-\ell}$ and $p_{c,t-\ell}$ are lagged values of GDP and geopolitical relations, respectively, δ_c denotes country fixed effects, $\delta_{r(c)t}$ represents region-time fixed effects, and $\boldsymbol{m}_{ct}$ includes time-varying country-specific controls employed in robustness checks.

To estimate the impulse responses, we employ the local projection (LP) method proposed by Jordà (2005) and extended to panel settings by Jordà, Schularick, and Taylor (2020) and Bilal and Känzig (2024):

$$y_{c,t+h} = \alpha_h^{\text{LP}} p_{ct} + \gamma_h' \mathbf{x}_{ct} + \mu_{c,t+h}, \quad h = 0, 1, \ldots, H \tag{4}$$

where each horizon h is estimated via a separate regression, providing a semiparametric approximation of the conditional expectation in equation (3). In our baseline specification, we include four lags ($J = 4$) of both GDP and geopolitical relations, consistent with Acemoglu et al. (2019), to capture growth dynamics while ensuring robust inference in the presence of serial correlation (Montiel Olea and Plagborg-Møller 2021).

[14] In our linear specification, this impulse response equals the marginal effect of geopolitical relations on GDP. The multiplication by 100 means coefficients are expressed in log points.

Country fixed effects δ_c account for time-invariant heterogeneity across countries, enabling identification from within-country variation—a stringent requirement in growth empirics (Durlauf, Johnson, and Temple 2005). Region-time fixed effects $\delta_{r(c)t}$ control for regional and global shocks, including shared temporal dynamics such as regional conflicts, financial crises, and globalization waves.[15] The accurate measurement of the timing and intensity of geopolitical relations is critical for empirical relevance in this demanding panel setting.

ASSUMPTION 1. *The structural shock to GDP satisfies* $\mathbb{E}\left[\mu_{c,t+h} \mid p_{ct}, \{\mathbf{x}_{c\tau}\}_{t_0 \leq \tau \leq t}\right] = 0$ *for all* $\{\mathbf{x}_{c\tau}\}_{t_0 \leq \tau \leq t}$*, all countries c, and all* $t \geq t_0$.

Assumption 1 ensures that, conditional on lagged GDP, lagged geopolitical relations, and other controls, geopolitical relations are orthogonal to contemporaneous and future shocks to GDP. This identification condition implies that $\mathcal{R}_{p \to y}(h) = \alpha_h^{\text{LP}}$ (Jordà 2005), allowing consistent estimation via ordinary least squares (OLS). Compared to vector autoregressions (VARs), local projections offer greater robustness to model misspecification, as they do not require a fully specified dynamic system to extrapolate responses across horizons (Montiel Olea and Plagborg-Møller 2021).

Economically, Assumption 1 requires that countries with different geopolitical relations exhibit similar potential GDP growth trends after conditioning on our controls. This is a strong assumption that warrants careful examination. We address potential concerns through three complementary approaches:

First, we argue that our rich set of controls—country fixed effects, lagged GDP, and lagged geopolitical relations—captures the primary determinants of both future growth and geopolitical dynamics. These include geographical endowments, historical legacies, institutional quality, and economic fundamentals. Supporting this identification assumption, Section 3.4.1 demonstrates remarkable robustness: countries experience virtually identical growth benefits whether improving relations with the United States or other major nations. This symmetry across ideologically and economically different partners, combined with stable linear effects across the entire distribution of geopolitical shocks, suggests our estimates reflect causal effects rather than country-specific time-varying confounds.

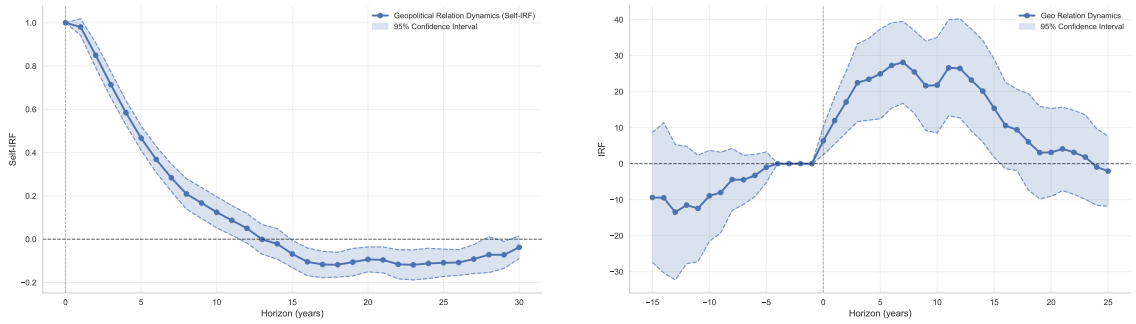
Second, we test the robustness of our identification assumption by incorporating additional time-varying controls in Section 3.4. These include lags of trade openness, domestic political stability, and other growth correlates. We also interact initial characteristics (political regime, development level) with year dummies to control for differential trends. The stability of our impulse response functions across these demanding specifications supports the validity of Assumption 1.

[15] Our estimates are robust to using only time fixed effects, as shown in Appendix 3.4.

Third, in Section 3.5, we implement an instrumental variables approach leveraging variation from non-economic mild conflicts—diplomatic disputes, border tensions, and cultural disagreements that affect bilateral relations without directly impacting economic activity. These conflicts, driven by political or symbolic considerations, provide plausibly exogenous variation in geopolitical relations. The convergence of IV and OLS estimates provides additional support for our identification strategy and reinforces the causal interpretation of our findings.

3.3. Baseline Results

We present our main empirical findings on the dynamic effects of geopolitical relations on economic growth. Figure 6 displays two central results: the persistence of geopolitical shocks and their dynamic impact on GDP per capita.



A. IRF of Geopolitical Relations B. IRF of GDP per Capita

FIGURE 6. Dynamic Responses to Geopolitical Relations Shock

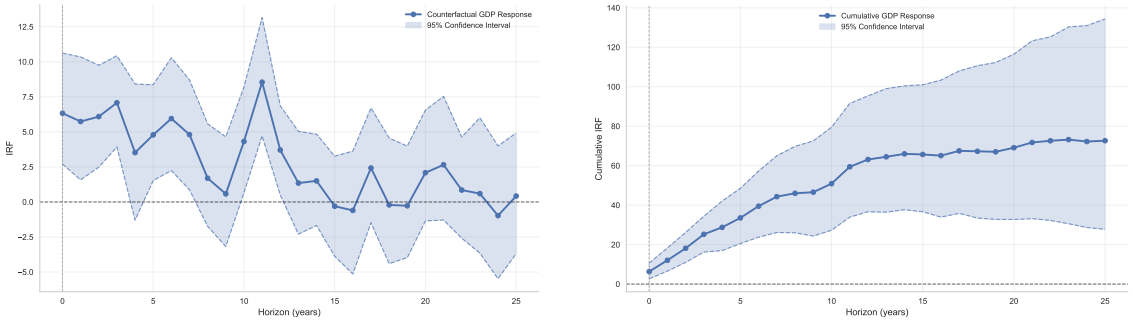
Panel (a) shows the impulse response of geopolitical relations to a unit shock. Panel (b) displays the impulse response of log GDP per capita (×100) to a unit improvement in geopolitical relations. Both panels estimate equation (4) with four lags of the dependent variable and geopolitical relations, country fixed effects, and region-year fixed effects. Shaded areas represent 95% confidence intervals based on Driscoll-Kraay standard errors. Horizons range from 0 to 30 years in panel (a) and −15 to 25 years in panel (b), where negative horizons test for pre-trends.

Dynamics of Geopolitical Relations and Economic Growth. Panel (a) of Figure 6 demonstrates that geopolitical relations exhibit substantial persistence following a shock. A unit improvement decays gradually—approximately 50% of the initial effect persists after five years, and 20% remains after ten years. Full dissipation occurs after approximately 15 years. This persistence drives the cumulative economic impact: the impulse response in panel (b) captures both the direct effect of the initial shock and the compounding influence of sustained improvements in geopolitical alignment.[16]

[16]The dynamics of geopolitical relations can be approximated by a mean-reverting AR(2) process with overshooting. Appendix A.5 provides additional analysis.

Panel (b) reveals three key patterns in the GDP response. First, the absence of pre-trends for horizons −15 to −1 validates our identification strategy, confirming no systematic relationship between future geopolitical changes and current economic outcomes.[17] Second, GDP rises gradually following the shock, increasing by approximately 30 log points after 10 years. Third, the response exhibits a hump shape, peaking between years 6 and 8 before declining as the underlying geopolitical impulse dissipates. Our inference employs Driscoll-Kraay standard errors to account for serial correlation and cross-sectional dependence (Driscoll and Kraay 1998; Montiel Olea and Plagborg-Møller 2021).[18]

Transitory versus Permanent Shocks. The impulse responses in Figure 6 capture the combined effect of an initial geopolitical shock and its subsequent dynamics. To isolate the impact of purely transitory changes, we follow Sims (1986) and Bilal and Känzig (2024) in constructing counterfactual impulse responses to shocks that increase by one unit on impact and immediately return to zero.[19]



A. Response to Transitory Shock

B. Cumulative Response to Permanent Shock

FIGURE 7. GDP Responses to Transitory and Permanent Geopolitical Shocks

Panel (a) shows the impulse response of log GDP per capita (×100) to a purely transitory unit shock in geopolitical relations (shock equals 1 at $h = 0$ and 0 thereafter). Panel (b) displays the cumulative response to a permanent unit shock. Both panels use the baseline specification with four lags of the dependent variable and geopolitical relations, country fixed effects, and region-year fixed effects. Shaded areas represent 95% confidence intervals based on 1,000 bootstrap iterations using country-block resampling.

Figure 7 decomposes the effects into responses to transitory and permanent shocks. Panel (a) reveals that even purely transitory improvements in geopolitical relations generate persistent economic gains. GDP per capita initially increases by approximately 6 log

[17] In Appendix 3.4.2, estimates using countries with comprehensive data coverage show point estimates close to zero for horizons −15 to −5.

[18] Appendix B.2 presents three robustness checks: (i) restricting to 136 countries with complete data yields virtually identical impulse responses; (ii) bootstrap inference accounting for estimation uncertainty in the geopolitical measure produces only marginally wider confidence intervals; (iii) alternative lag specifications confirm the stability of our results.

[19] While local projections semiparametrically estimate the empirical impulse response, constructing counterfactual responses requires the structural assumption that effects of a series of unanticipated shocks equal those of an anticipated path announced at time zero. Appendix B.3 details our methodology.

points, with subsequent fluctuations including a notable peak around year 11. The wide confidence intervals reflect substantial uncertainty in medium-term dynamics, consistent with the challenges of estimating long-horizon effects in cross-country panels.

Panel (b) demonstrates the cumulative gains from permanent improvements: GDP per capita rises steadily, reaching approximately 63 log points after 25 years. The trajectory stabilizes after year 20, suggesting convergence to a new steady state. While local projections provide robust estimates, they sacrifice statistical efficiency at long horizons. Section 6.1 presents complementary analysis using dynamic panel methods that exploit the autoregressive structure for more precise long-run estimates.

Economic Magnitude. The economic significance of our findings depends on the plausible range of geopolitical variation. The geopolitical relations index has a standard deviation of 0.128 and ranges from −0.42 (hostile relations) to 0.52 (strong cooperation), with a mean of 0.25.[20] A one-standard-deviation improvement in geopolitical relations generates a long-run GDP gain of approximately 9.6 log points (0.128×75). Moving from the 25th to 75th percentile—representing a shift from limited to moderate cooperation—increases GDP by 12 log points over 25 years.

More substantial improvements yield proportionally larger effects. Progressing from mild tensions (index value of 0) to the cooperation level observed among allied nations (0.40) generates a 30 log-point increase in GDP per capita. Distributed over 25 years, this represents an average annual growth contribution of 1.2 percentage points. For a country at the mean geopolitical relations level (0.25), achieving the highest observed cooperation (0.52) results in a cumulative GDP increase of 20.3 log points.

These gradual, compounding effects underscore the importance of long-horizon analysis. Contemporaneous regressions that examine only the immediate relationship between geopolitical relations and GDP capture less than one-third of the total dynamic impacts, substantially understating the economic returns to geopolitical alignment.

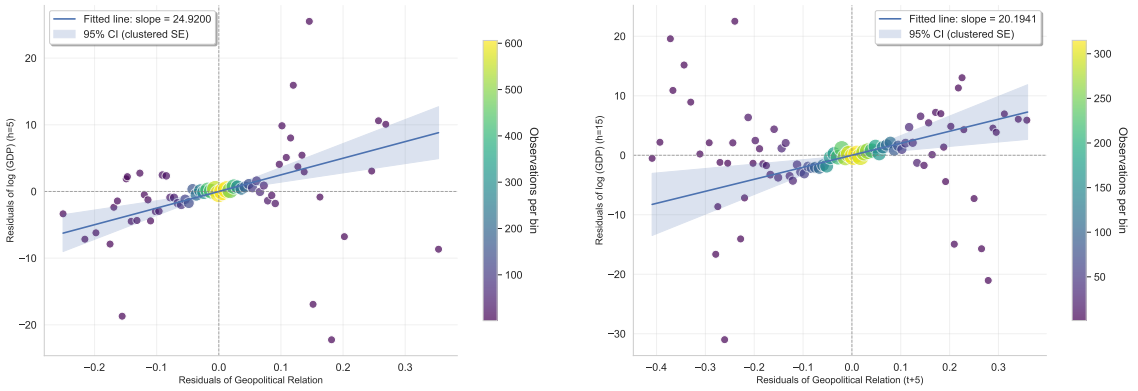
3.4. Robustness

In this section, we conduct a series of robustness checks to validate the causal interpretation of our main results. We examine two key dimensions: (i) whether the estimates are driven by outliers or specific sources of geopolitical variation, and (ii) whether results remain stable after controlling for additional sets of fixed effects and other time-varying country-level covariates.

[20] The 25th percentile is 0.18 and the 75th percentile is 0.34.

3.4.1. Sources of Variation

We first investigate whether our results are driven by outliers or depend critically on specific components of our geopolitical relations measure. The Frisch-Waugh-Lovell (FWL) theorem allows us to visualize the identifying variation by plotting the relationship between GDP and geopolitical relations after partialling out all controls and fixed effects.



A. GDP at $t + 5$ vs. Geo Relations at t

B. GDP at $t + 15$ vs. Geo Relations at $t + 5$

FIGURE 8. Binscatter Plots of Residualized GDP and Geopolitical Relations

Panel (a) displays the binscatter relationship between log GDP per capita at $t + 5$ and geopolitical relations at t after partialling out four lags of both variables, country fixed effects, and region-year fixed effects. Panel (b) shows the relationship between GDP at $t+15$ and forward geopolitical relations at $t+5$. Each dot represents the mean of approximately 100 observations within each bin, with size proportional to the number of observations. The fitted line and 95% confidence interval use Driscoll-Kraay standard errors.

Figure 8 reveals a robust positive relationship between geopolitical relations and future GDP growth. Panel (a) demonstrates that the relationship remains remarkably stable across the entire distribution of geopolitical shocks—from large negative changes (deteriorating relations) to large positive changes (improving relations). The approximately linear relationship indicates that both positive and negative changes in geopolitical relations generate symmetric economic responses, with no evidence of threshold effects or nonlinearities.

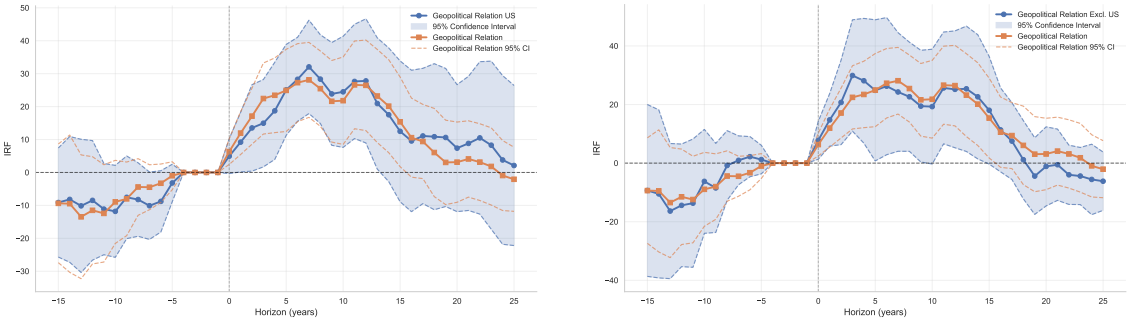
Panel (b) provides complementary evidence by examining GDP at $t + 15$ against cumulative geopolitical changes measured at $t + 5$. Using these forward geopolitical relations—which capture the accumulation of diplomatic changes over 5-year windows—yields consistent results with a slope of 20.2 compared to our baseline estimate at a 10-year horizon. The stability of the relationship at this extended horizon, combined with consistency across different measures (contemporaneous versus cumulative changes), reinforces that our findings reflect a fundamental economic relationship rather than the influence of outliers or extreme events.[21]

[21]Appendix B.4 presents additional binscatter plots for the 10-year horizon, as well as raw scatter plots. The

Next, we examine whether our results depend on geopolitical relations with the United States specifically or reflect broader patterns of international alignment. We decompose our geopolitical relations measure into relations with the US (p_{ct}^{US}) and relations with all other major nations ($p_{ct}^{\text{Excl.US}}$), then jointly estimate their effects:

$$y_{c,t+h} = \alpha_h^{\text{US}} p_{ct}^{\text{US}} + \alpha_h^{\text{Excl.US}} p_{ct}^{\text{Excl.US}} + \boldsymbol{\gamma}_h' \mathbf{x}_{ct} + \delta_c + \delta_{r(c)t} + \varepsilon_{c,t+h}, \quad h = -15, \ldots, 25 \tag{5}$$

where $\mathbf{x}_{ct}$ includes four lags of GDP, geopolitical relations with the US, and geopolitical relations excluding the US.



A. Geopolitical Relations with US

B. Geopolitical Relations Excluding US

FIGURE 9. Decomposing Geopolitical Relations: US versus Other Major Nations

This figure shows impulse responses of log GDP per capita (×100) to unit improvements in geopolitical relations with the US (panel a) and with other major nations excluding the US (panel b). Blue lines with shaded areas show the decomposed effects from joint estimation, while orange lines display the baseline aggregate effect for comparison. Both specifications include four lags of all variables, country fixed effects, and region-year fixed effects. Shaded areas represent 95% confidence intervals based on Driscoll-Kraay standard errors.

Figure 9 presents striking evidence that both components generate nearly identical dynamic responses. The impulse response to improved relations with the US (panel a) closely mirrors that from improved relations with other major nations (panel b), with both peaking around 30 log points after 6–8 years. The overlapping confidence intervals and similar trajectory to our baseline aggregate measure (shown in orange) demonstrate that our results capture a general phenomenon rather than US-specific dynamics.[22]

The remarkable stability of our estimates across different sources of variation strengthens the causal interpretation. Geopolitical relations with the US and with other major nations are driven by distinct political and economic forces—Section 4.3 shows that democratization is associated with improved relations with Western countries but not with Russia, China, or India. That these distinct components produce virtually identical growth effects suggests our estimates reflect the fundamental economic value of international

conditional covariance between GDP and geopolitical relations remains stable across all horizons.

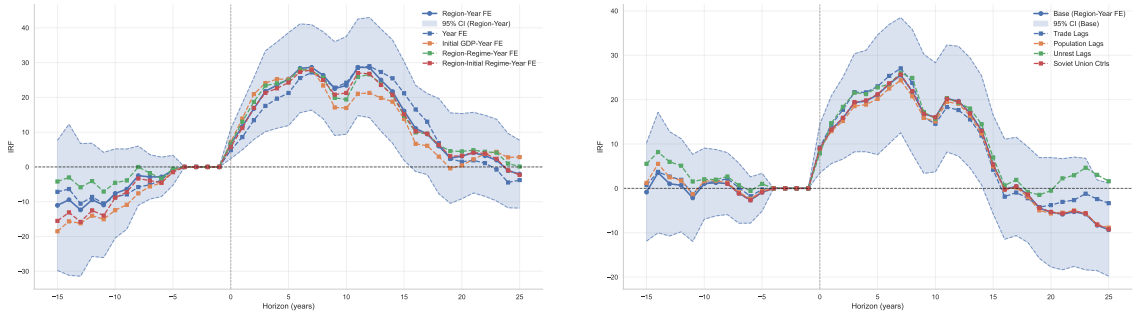
[22]This finding also validates our use of nominal GDP shares to aggregate bilateral geopolitical relations, as the weighting scheme accurately captures the economic importance of different bilateral relationships.

cooperation rather than country-specific confounds. This robustness, combined with the absence of pre-trends and the linearity of effects across the distribution, provides compelling evidence that improvements in geopolitical alignment causally drive economic growth. Appendix B.4 further demonstrates that decomposing relations into Western versus non-Western countries yields similarly robust results.

3.4.2. Additional Controls

To further validate our main findings, we examine the robustness of our results to alternative fixed effects specifications and additional time-varying controls. These tests address potential concerns about omitted variables that might simultaneously affect geopolitical relations and economic growth. Following our approach in Appendix B.2, we focus on a balanced panel of countries with at least 30 years of GDP data to ensure consistent sample composition across specifications.

Alternative Fixed Effects Specifications. We first investigate whether our results are robust to different assumptions about unobserved heterogeneity. For these tests, we restrict our analysis to 149 countries with complete GDP coverage across all horizons, ensuring that compositional changes do not drive differences across specifications.



A. Alternative Fixed Effects

B. Additional Economic Controls

FIGURE 10. Robustness to Alternative Specifications

Panel (a) compares impulse responses under alternative fixed effects specifications. The baseline specification (solid blue line with 95% confidence interval) includes region-year fixed effects. Alternative specifications shown as dashed lines include: year fixed effects only, initial GDP quintile-year fixed effects, region-regime-year fixed effects, and region-initial regime-year fixed effects. Panel (b) presents robustness to additional economic controls, with the baseline specification compared to models including four lags of trade openness, population demographics, domestic unrest, and Soviet transition controls. All specifications include four lags of GDP and geopolitical relations with Driscoll-Kraay standard errors.

Panel (a) of Figure 10 demonstrates remarkable stability across alternative fixed effects specifications. First, replacing region-year fixed effects with only year fixed effects yields virtually identical results, confirming that our findings are not driven by controlling for

region-specific shocks. The impulse response peaks at approximately 28 log points after 7 years, compared to 30 log points in our baseline specification.

Second, we control for initial development levels by interacting GDP per capita quintiles in 1960 with year fixed effects.[23] This specification identifies the effect of geopolitical relations by comparing countries with similar initial economic development. The results remain robust, with the peak effect reaching 26 log points.

Third, recognizing that both geopolitical relations and economic performance may be influenced by political institutions, we control for region-initial regime-year fixed effects. This specification compares countries within the same geographic region that shared similar political characteristics (democracy or non-democracy) at the start of our sample. The impulse response remains virtually unchanged, providing confidence that our results capture the effect of geopolitical alignment rather than correlated political transitions.

Finally, controlling for region-current regime-year fixed effects to account for contemporaneous democratization yields similar results, though with slightly attenuated long-run effects. This modest reduction suggests that while democratization and geopolitical alignment may be complementary, they represent distinct channels for economic development. Section 4.3 disentangles the dynamic effects of democracy and geopolitics.

Time-Varying Economic and Political Controls. We next examine robustness to additional time-varying controls that address specific historical events and potential confounding economic factors. For these specifications, we restrict our sample to 120 countries with complete data coverage for all control variables, ensuring comparability across estimates.

Panel (b) of Figure 10 presents these results. First, we address the possibility that geopolitical relations proxy for trade integration by including four lags of trade openness (imports plus exports over GDP). While the long-run effects are slightly attenuated—consistent with trade being one channel through which geopolitical relations affect growth—the impulse response remains economically and statistically significant, peaking at 25 log points.

Second, we verify that our results are not artifacts of the Soviet Union's collapse. We include interactions between indicators for Soviet and satellite countries with year dummies for 1989–1991 and post-1992. These controls have minimal impact, with the impulse response trajectory remaining virtually identical to our baseline specification. This stability is particularly noteworthy given the dramatic geopolitical realignments following the Cold War's end.

Third, recognizing that domestic political instability could simultaneously affect international relations and economic performance, we control for four lags of domestic

[23] Following Acemoglu et al. (2019), we rank countries using Angus Maddison's GDP estimates for 1960, which are available for 149 countries, to maximize sample coverage.

unrest.[24] The results remain robust, suggesting that our estimates capture the benefits of international cooperation beyond the costs of domestic conflict.

Finally, we address potential demographic confounds by including four lags of log population, the share of population below age 16, and the share above age 64. These controls account for the possibility that demographic transitions might influence both diplomatic priorities and growth potential. The stability of our results indicates that geopolitical effects operate independently of demographic channels.

The remarkable consistency across these diverse specifications reinforces our main finding: geopolitical alignment with major powers generates substantial and persistent economic gains. The peak effects range from 25 to 30 log points across all specifications, occurring 6–8 years after improvements in geopolitical relations. This robustness across different fixed effects structures, historical episodes, and potential confounding factors strengthens the causal interpretation of our results and underscores the first-order importance of geopolitical relations for economic development.

3.5. Instrumental Variables Estimates

The preceding analyses have established robust correlations between geopolitical relations and economic growth, controlling for an extensive set of fixed effects and time-varying covariates. However, concerns about reverse causality and omitted variables remain. Countries experiencing rapid economic growth may attract greater diplomatic attention from major powers, or unobserved factors might simultaneously drive both geopolitical alignment and economic performance. To address these endogeneity concerns and strengthen our causal interpretation, we implement an instrumental variables strategy that exploits plausibly exogenous variation in geopolitical relations.

3.5.1. Identification Strategy

Our identification strategy leverages variation from a specific subset of geopolitical events: non-economic mild conflicts. These events—including diplomatic disputes, border tensions, ideological disagreements, and symbolic political gestures—affect bilateral relations but are unlikely to directly influence economic growth or correlate with other economic factors. Appendix A.6 provides a comprehensive analysis of these 38,227 events spanning 1960–2019.[25]

Non-economic mild conflicts arise from four distinct sources that systematically affect bilateral relations while remaining orthogonal to economic fundamentals. First, *politi-*

[24]The unrest measure captures strikes, demonstrations, and political violence from the Cross-National Time-Series Data Archive.

[25]The economic/non-economic classification is detailed in Appendix C.2. We focus on CAMEO root codes 9–18, which represent mild conflicts ranging from diplomatic investigations to coercive actions short of conventional warfare.

cal and institutional factors encompass governance disputes, democratization pressures, sovereignty conflicts, human rights violations, and ideological incompatibilities between political systems. Second, *security and strategic concerns* include territorial disputes, military posturing, alliance formations perceived as threatening, and cybersecurity incidents. Third, *social and cultural dimensions* involve ethnic and religious tensions, immigration policy disputes, cultural preservation conflicts, and historical grievances. Finally, *legal and normative disputes* stem from divergent interpretations of international law, treaty compliance disagreements, and jurisdictional conflicts over non-economic matters.

These conflicts generate identifying variation through predictable escalation patterns—from diplomatic investigations and formal protests to public condemnations and symbolic retaliation—that deteriorate bilateral relations (mean Goldstein score of −4.35) without directly affecting economic activity. The predominance of verbal conflicts (67.0%) and diplomatic actions such as "Disapprove" events (45.4%) and "Reduce Relations" (15.9%) confirms their mild nature. The substantial temporal variation, with events increasing from approximately 450 annually in the 1960s to over 1,000 by 2018, provides rich identifying variation across both time and country pairs.

3.5.2. Empirical Implementation

We construct our instrument by isolating the component of geopolitical relations driven by non-economic mild conflicts:

$$z_{ct} = \sum_{j \in \mathcal{N}} \left(\frac{1}{N^{\mathcal{Q}}_{cj,t}} \sum_{n \in \mathcal{Q}} s^{n}_{cj,t}/10 \right) \times \text{GDP share}_{jt}$$

where $\mathcal{Q}$ denotes the set of non-economic mild conflict events, $N^{\mathcal{Q}}_{cj,t}$ is the count of such events between countries c and j in year t, and $s^{n}_{cj,t}$ represents the Goldstein score of event n. This construction parallels our main geopolitical relations measure but uses only the arguably exogenous subset of events.

We estimate impulse responses using the local projection instrumental variables (LP-IV) method introduced by Jordà, Schularick, and Taylor (2015). Let $\tilde{\mathbf{x}}_{ct} = \left\{ \{z_{c,t-\ell}\}_{\ell=1}^{4}, \mathbf{x}_{ct} \right\}$ denote our extended control vector including four lags of the instrument. The LP-IV estimator proceeds in two stages. First, we estimate the reduced-form projection:

$$y_{c,t+h} = \alpha^{\text{RF}}_{h} z_{ct} + \gamma'_{h} \tilde{\mathbf{x}}_{ct} + \mu^{\text{RF}}_{c,t+h}$$

and the first-stage relationship:

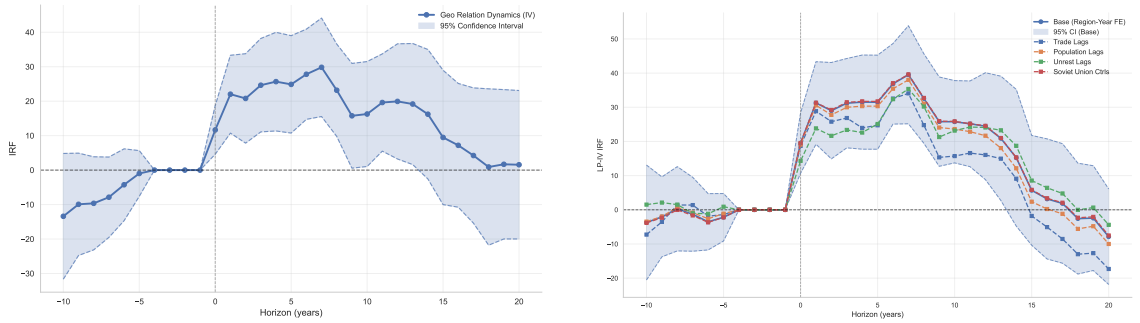
$$p_{ct} = \alpha^{\text{FS}} z_{ct} + \gamma' \tilde{\mathbf{x}}_{ct} + \mu^{\text{FS}}_{ct}$$

The LP-IV estimate of the impulse response is then $\hat{\alpha}_h^{\text{LP-IV}} = \hat{\alpha}_h^{\text{RF}} / \hat{\alpha}^{\text{FS}}$. Following Plagborg-Møller and Wolf (2021), this approach requires the following exclusion restriction:

ASSUMPTION 2 (LP-IV Exclusion Restriction). $\mathbb{E}\left[\mu_{c,t+h} z_{ct} \mid \{\tilde{\mathbf{x}}_{c\tau}\}_{t_0 \le \tau \le t}\right] = 0$ *for all countries* c*, all* $t \ge t_0$*, and all horizons* h*.*

This assumption requires that non-economic mild conflicts affect future GDP only through their impact on overall geopolitical relations, conditional on our controls [26]. The plausibility of this exclusion restriction rests on the nature of these events—diplomatic protests over human rights violations, cultural misunderstandings leading to ambassador recalls, and symbolic political gestures—which, while deteriorating bilateral relations, have no direct economic content or immediate growth implications.

3.5.3. Results and Interpretation



A. LP-IV Estimates

B. Robustness to Additional Controls

FIGURE 11. Instrumental Variables Estimates of Geopolitical Effects on Growth

Panel (a) shows the LP-IV impulse response of log GDP per capita (×100) to a unit improvement in geopolitical relations, instrumenting with non-economic mild conflicts. The specification includes four lags of GDP, geopolitical relations, and the instrument, plus country and region-year fixed effects. Shaded areas represent 95% confidence intervals based on Driscoll-Kraay standard errors. Panel (b) demonstrates robustness across specifications with additional controls: trade openness (4 lags), population demographics (log population and age distribution, 4 lags each), domestic unrest (4 lags), and Soviet transition indicators (contemporaneous). All alternative specifications maintain the same fixed effects structure and lag orders for core variables. The baseline specification is shown with confidence intervals; alternative specifications are presented as point estimates only for clarity.

Figure 11 presents our LP-IV estimates, revealing a striking finding: the IV impulse responses closely match our baseline OLS results. Panel (a) shows that GDP per capita increases by approximately 30 log points ten years after a geopolitical improvement—virtually identical to our baseline estimate. The IV confidence intervals, while wider due to the

[26] The assumption requires that, once we control for all lagged data, the instrument is not contaminated by other structural shocks or by lags of the shock of interest. It is equivalent to estimating a VAR with the instrument ordered first (Plagborg-Møller and Wolf 2021).

efficiency loss from instrumentation, maintain statistical significance through horizon 15. Crucially, the absence of pre-trends further validates our exclusion restriction, confirming that future non-economic conflicts do not predict current economic outcomes.

Panel (b) demonstrates that this convergence of IV and OLS estimates persists across demanding robustness tests. Whether we control for trade openness, demographic transitions, domestic unrest, or Soviet-era dynamics, the LP-IV impulse responses remain remarkably similar to the OLS results. This stability has important implications for our causal interpretation: it validates Assumption 1 in our baseline specification, suggesting that conditional on our controls, geopolitical relations are not systematically correlated with unobserved contemporaneous growth determinants.

The mechanism operates through a cascade effect: non-economic conflicts deteriorate bilateral relations, which subsequently affect economic outcomes through multiple channels identified in Section 4—reduced trade and investment flows, limited technology transfer, and decreased market access. By isolating variation from these plausibly exogenous diplomatic tensions, our IV strategy confirms that geopolitical alignment causally drives economic growth. The convergence of multiple identification strategies—OLS with rich controls, alternative fixed effects specifications, and IV estimation—provides compelling evidence that improvements in geopolitical relations generate substantial and persistent economic gains. This finding underscores the first-order importance of international alignment for economic development, particularly for countries whose growth trajectories depend critically on access to global markets and technology. Appendix B.5 provides detailed first-stage dynamics and demonstrates that our IV results remain robust across alternative fixed effects specifications, further strengthening our causal interpretation.

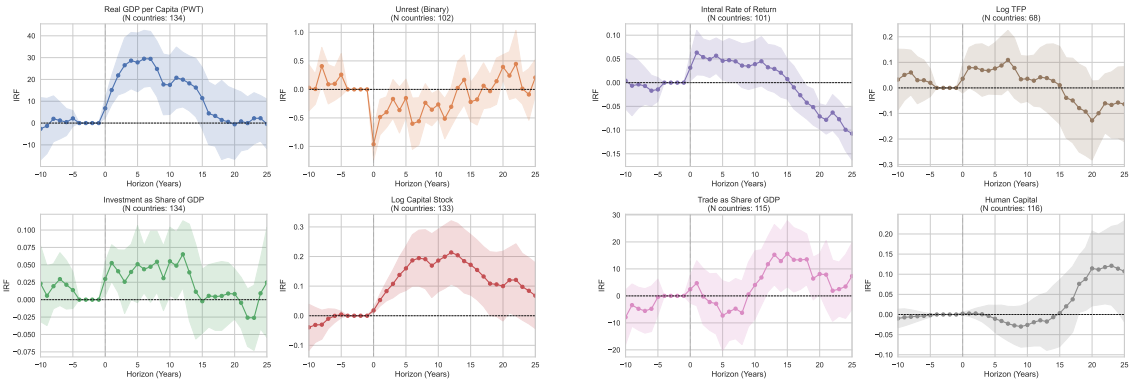
4. Geopolitics and Correlates of Growth

Having established the dynamic causal effect of geopolitical relations on GDP per capita, we now examine how these relationships influence the fundamental determinants of economic growth. Understanding these channels provides insights into the mechanisms through which international alignment translates into economic prosperity.

4.1. Alternative Output Measures

Our main analysis employs GDP per capita from the World Bank to maximize country and temporal coverage. To verify that our results are not sensitive to this choice, we first examine the response using real GDP per capita from the Penn World Tables. Panel (a) of Figure 12 shows that the impulse response is virtually identical to our baseline estimates, with output increasing by approximately 30 log points after 10 years. This convergence

across data sources reinforces the robustness of our core finding.[27]



A. Output and Stability B. Growth Fundamentals

FIGURE 12. Dynamic Effects of Geopolitical Relations on Growth Correlates

This figure displays impulse responses of various economic outcomes to a unit improvement in geopolitical relations. Panel (a) shows responses for real GDP per capita (Penn World Tables), domestic unrest, investment share, and capital stock. Panel (b) presents internal rate of return, total factor productivity, trade openness, and human capital. All specifications follow equation (6) with four lags of the dependent variable, GDP, and geopolitical relations, plus country and region-year fixed effects. The sample is restricted to countries with complete data for each variable across all horizons to ensure compositional stability. Numbers in parentheses indicate the country count for each balanced panel. Shaded areas represent 95% confidence intervals based on Driscoll-Kraay standard errors.

4.2. Mechanisms and Growth Fundamentals

To identify the channels through which geopolitical alignment translates into economic prosperity, we examine its dynamic effects on key growth determinants:

$$m_{c,t+h} = \alpha_h^m p_{ct} + \sum_{\ell=1}^{4} \beta_\ell y_{c,t-\ell} + \sum_{\ell=1}^{4} \gamma_\ell p_{c,t-\ell} + \sum_{\ell=1}^{4} \lambda_\ell m_{c,t-\ell} + \delta_c + \delta_{r(c)t} + \mu_{c,t+h}^m \tag{6}$$

where $m_{c,t+h}$ represents various growth correlates at horizon h. We include four lags of the outcome variable alongside our standard controls.

Figure 12 reveals how geopolitical alignment triggers cascading effects across growth fundamentals. The responses exhibit distinct temporal patterns that illuminate the underlying mechanisms. Domestic political stability responds immediately—the unrest indicator declines significantly on impact and remains suppressed for several years. This rapid pacification likely reflects both enhanced regime legitimacy from international recognition and concrete external support that helps manage internal tensions, consistent with Rodrik (1998)'s evidence on openness as a buffer against political volatility.

[27]The Penn World Tables measure covers 134 countries in our balanced panel, compared to 149 in our baseline World Bank specification. The slight differences in magnitudes reflect measurement variations rather than substantive economic differences.

Physical capital responds with similar speed. Investment rises by 5 percentage points within the first year, driving capital stock accumulation that peaks at 20 log points after a decade. The internal rate of return initially increases—signaling improved opportunities—before declining as capital deepening proceeds, matching neoclassical predictions. Notably, total factor productivity shows sustained gains of 10 log points throughout our horizon, suggesting that geopolitical alignment enables persistent improvements through technology transfer, better resource allocation, or institutional spillovers.

The responses of trade and human capital unfold more gradually, reflecting inherent adjustment costs. Trade openness expands steadily to reach 15 percentage points of GDP after 15 years as diplomatic alignment dismantles both formal barriers and informal frictions to commerce. This pattern corroborates Frankel and Romer (1999)'s findings on the growth impact of trade integration. Human capital accumulation proceeds even more slowly, rising continuously over 25 years—a trajectory reflecting both the time required for educational investments to mature and the sustained conditions for human development that international stability provides.

Appendix B.6 analysis extends these findings across additional dimensions of economic development. Market reforms show an interesting dynamic: the reform index jumps 8 points within five years but then partially reverses, suggesting that initial liberalization momentum faces implementation challenges without sustained external pressure. Educational responses display clear sequencing—primary enrollment improves gradually by 15 log points while secondary enrollment shows delayed but larger gains of 30 log points, reflecting both cohort progression and the higher resource requirements that become feasible as prosperity increases. Labor market adjustments reveal distributional dynamics: employment ratios rise persistently by 2 percentage points, indicating job creation at the extensive margin, while labor's income share remains flat initially before rising markedly after year 15, suggesting workers eventually capture productivity gains that initially accrue to capital. Both consumption measures—real consumption and domestic absorption per capita—closely track GDP responses, confirming that growth translates into broad welfare improvements.

This multi-channel propagation reveals why geopolitical relations exert such powerful growth effects. Alignment simultaneously relaxes constraints across multiple margins: reducing political risk to unlock investment, facilitating technology transfer to boost productivity, expanding market access through trade, and enabling human capital investments that compound over generations. The temporal sequencing—from immediate stabilization effects through medium-term capital deepening to long-run human development—explains both the magnitude and persistence of our baseline results. Conversely, geopolitical misalignment likely triggers the reverse cascade: political instability deters investment, isolation blocks technology diffusion, trade barriers limit specializa-

tion gains, and uncertainty undermines educational investments.[28] For policymakers in developing countries, these findings underscore that international alignment functions as a master switch governing access to all major growth channels simultaneously.

4.3. Democracy and Geopolitical Alignment

The relationship between political institutions and economic growth has been extensively studied, with Acemoglu, Johnson, and Robinson (2001) and Acemoglu et al. (2019) providing evidence for the causal effect of democratic institutions on development. Parallel literature examines how regime type shapes international relations, with democratic peace theory suggesting that democracies form more stable alliances (Maoz and Russett 1993; Leeds 2003). Recent work by Park (2024) bridges these literatures, arguing that democracy's growth effects operate primarily through reduced economic sanctions—themselves a manifestation of geopolitical relations.[29] This section examines how democracy and geopolitical alignment jointly influence economic growth, disentangling their relative contributions.

4.3.1. Democracy and Differential Geopolitical Associations

We first examine the conditional correlation between democratization and bilateral relations with different major powers. Using the democracy measure from Acemoglu et al. (2019) (henceforth ANRR), we estimate local projections of country-specific geopolitical scores following democratization episodes:

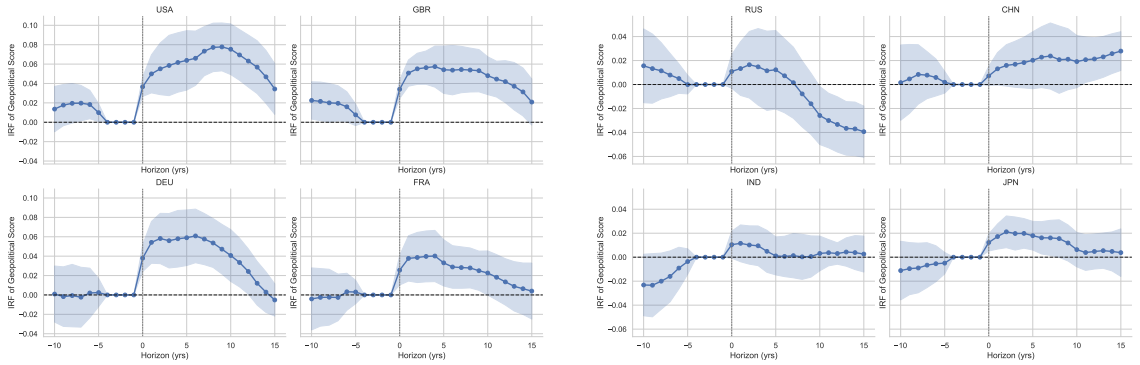
$$S_{cj,t+h} = \beta_h^j D_{ct}^{\text{ANRR}} + \sum_{\ell=1}^{4} \gamma_\ell S_{cj,t-\ell} + \delta_c + \delta_t + \varepsilon_{cjt+h} \tag{7}$$

where $S_{cj,t}$ represents the bilateral geopolitical score between country c and major power j, and D_{ct}^{ANRR} is the democracy indicator. These estimates capture the systematic association between democratic transitions and subsequent bilateral relations, conditional on past relationship dynamics and time-invariant country characteristics.

Figure 13 reveals striking heterogeneity in how bilateral relations with major powers evolve following democratization. Panel (a) shows that relations with Western democracies—the United States, United Kingdom, Germany, and France—are positively associated with democratic transitions. The association is strongest for the US, where bilateral scores increase by 0.08 within five years of democratization. These improvements persist for over a decade, suggesting sustained alignment between countries that share similar political institutions.

[28] Section 3.4.1 confirms symmetric effects for both positive and negative geopolitical changes.

[29] In our framework, sanctions constitute negative geopolitical events that lower bilateral Goldstein scores, directly contributing to our measure of geopolitical relations.



A. Western Democracies B. Non-Western Powers

FIGURE 13. Bilateral Geopolitical Responses to Democratization

This figure shows impulse responses of bilateral geopolitical scores with major powers to a democratization shock. Panel (a) displays responses for Western democracies (USA, GBR, DEU, FRA), while panel (b) shows non-Western powers (RUS, CHN, IND, JPN). Specifications follow equation (7) with four lags of the bilateral score, country fixed effects, and year fixed effects. The horizons span -10 to +15 years, with negative values testing for pre-trends. Shaded areas represent 95% confidence intervals based on Driscoll-Kraay standard errors.

In contrast, panel (b) demonstrates markedly different patterns for non-Western powers. Democratization is associated with deteriorating relations with Russia, with bilateral scores declining by 0.04 points—consistent with geopolitical tensions that often accompany political realignment. China shows minimal initial association but modest positive correlation over longer horizons. India and Japan display near-zero associations, suggesting that their bilateral relations are less sensitive to partner countries' regime types. These differential patterns indicate that democratization is associated with a reorientation of international relations toward Western democracies rather than a uniform improvement in global diplomatic standing.

4.3.2. Disentangling Democracy and Geopolitical Channels

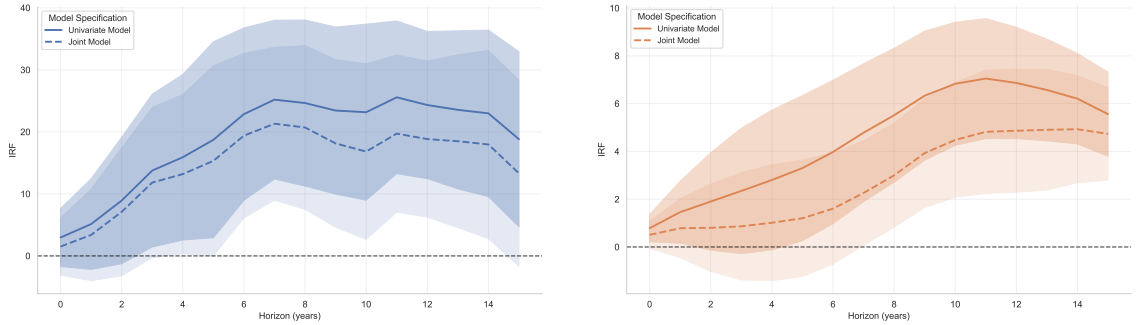
To assess the relative importance of democracy versus geopolitical alignment for growth, we estimate a horse-race specification:

$$y_{c,t+h} = \alpha_h^{\text{Geo}} p_{ct} + \alpha_h^{\text{Dem}} D_{ct}^{\text{ANRR}} + \boldsymbol{\gamma}_h' \mathbf{x}_{ct} + \delta_c + \delta_t + \mu_{c,t+h} \tag{8}$$

where both geopolitical relations (p_{ct}) and democracy enter jointly. Following ANRR, we use year fixed effects rather than region-year effects to avoid absorbing variation from regional democratization waves.[30]

[30] Regional democratization waves—such as those in Latin America (1980s), Eastern Europe (1990s), and the Arab Spring (2010s)—create strong regional correlation in democratic transitions. Region-year fixed effects would absorb this variation, potentially understating democracy's effects.

Figure 14 presents the results. Panel (a) shows that geopolitical relations maintain strong growth effects even after controlling for democracy. The joint specification (dashed line) yields an impulse response only slightly attenuated relative to the univariate model (solid line), with GDP increasing by approximately 20 log points after 10 years—compared to 25 log points without democracy controls. This modest 20% reduction suggests that while some of the long-run benefits of geopolitical alignment operate through associated democratic transitions, the vast majority of geopolitical effects on growth are independent of regime type.



A. Geopolitical Relations B. Democracy

FIGURE 14. Horse-Race: Democracy versus Geopolitical Channels

This figure compares univariate and joint specifications for geopolitical relations and democracy effects on GDP. Panel (a) shows the impulse response of geopolitical relations, comparing the univariate model (solid line) with the joint specification controlling for democracy (dashed line). Panel (b) presents democracy's effects, contrasting the univariate specification without geopolitical controls (solid line) against the joint model (dashed line). Both panels use year fixed effects following ANRR, with four lags of GDP. The geopolitical specifications include four lags of geopolitical relations; the democracy univariate model excludes these lags to match ANRR's approach. Coefficients represent log-point changes in GDP per capita (×100).

Panel (b) reveals a striking temporal pattern in how geopolitical relations mediate democracy's growth effects. The short-run impact of democratization is almost entirely eliminated when controlling for geopolitical relations: the effect at horizons 0-5 years falls from approximately 3.0 log points in the univariate specification to near zero in the joint model. This dramatic attenuation—consistent with Park (2024)'s findings on sanctions—indicates that democracy's immediate growth benefits operate primarily through improved international relations, particularly the removal of economic restrictions and enhanced access to Western markets.

However, democracy's long-run effects tell a different story. While the peak effect at horizon 10 declines from 7.2 to 4.8 log points when controlling for geopolitics—a reduction of about one-third—the majority of democracy's long-run impact persists. By horizon 15, democracy continues to generate approximately 5 log points of additional GDP growth even after accounting for geopolitical channels. This persistence suggests that democratic institutions create growth benefits through domestic mechanisms—such as improved

property rights, political stability, reduced expropriation risk, and enhanced human capital investment—that operate independently of international alignment and materialize gradually over time.[31]

These results provide a nuanced decomposition of how political institutions and international relations jointly determine economic development. The evidence reveals a clear temporal structure: democracy's short-run growth effects (within 5 years) operate almost exclusively through the geopolitical channel, as democratic transitions trigger improved relations with Western powers, reduced sanctions, and enhanced market access. In contrast, democracy's long-run effects reflect both sustained geopolitical benefits and additional gains from domestic institutional improvements that unfold more gradually. This temporal decomposition helps reconcile conflicting findings in the literature—studies focusing on short-run impacts correctly identify international relations as the primary channel, while analyses of long-run effects appropriately emphasize domestic institutional quality.

The heterogeneous associations between democratization and bilateral relations across major powers highlight the complex trade-offs facing developing countries in an increasingly multipolar world. While democratization systematically improves relations with Western democracies and delivers immediate economic benefits through this channel, it may strain ties with certain authoritarian powers. The net growth effect remains positive, reflecting both the continued economic dominance of democratic countries in global networks and the domestic institutional benefits that emerge over time. For policymakers, these findings emphasize that while the geopolitical dividends of democratization materialize quickly, sustaining long-run growth requires the patient cultivation of domestic institutions. Conversely, our broader results demonstrate that non-democratic countries can achieve substantial growth through geopolitical alignment alone, though they may forgo the additional long-run benefits that democratic institutions provide.

5. Geopolitical Growth Accounting

Building on our empirical estimates of GDP impulse responses to geopolitical relations, we conduct two complementary growth accounting exercises to quantify the economic importance of international alignment. First, we measure the growth contributions arising from temporal changes in geopolitical relations—both improvements and deteriorations—across six decades, revealing how the transition from Cold War bipolarity to contemporary multipolarity has shaped economic trajectories. Second, we examine how persistent cross-country differences in geopolitical positioning explain income disparities, isolating the

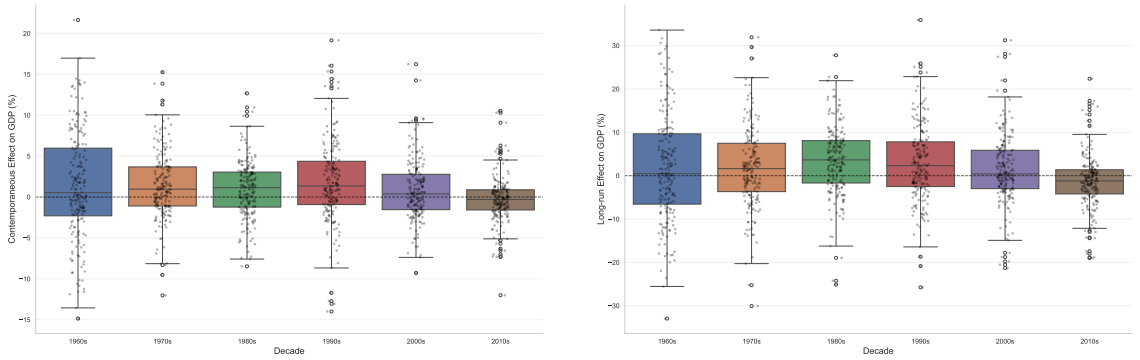
[31]Appendix B.7 shows that using our baseline region-year fixed effects yields similar patterns with tighter confidence intervals, confirming the robustness of these findings.

contribution of international relations to global economic inequality. These analyses demonstrate that geopolitical factors account for GDP variations ranging from −35% to +30% across countries and time periods, establishing international alignment as a first-order determinant of economic development.

5.1. Growth Effects of Geopolitical Relation Changes

Section 2.3 documented fundamental shifts in the global distribution of geopolitical relations across six decades—from Cold War bipolarity through post-Cold War convergence to contemporary re-polarization. We now quantify the economic implications of these geopolitical transformations.

For each country-decade pair, we calculate the change in geopolitical relations from the beginning to the end of the decade and apply the relevant impulse response function to obtain growth effects.[32] This approach captures both the immediate economic impact within each decade (contemporaneous effect) and the projected long-term consequences (long-run effect).



A. Contemporaneous Effects

B. Long-run Effects

FIGURE 15. Distribution of Growth Effects from Geopolitical Relation Changes by Decade

This figure displays the distribution of GDP effects from within-decade changes in geopolitical relations. Panel (a) shows contemporaneous effects—the cumulative GDP impact realized within each decade. Panel (b) presents long-run effects—the projected 25-year GDP impact of geopolitical changes. Each boxplot represents the distribution across countries, with boxes indicating interquartile ranges, whiskers extending to the 5th and 95th percentiles, and individual country observations shown as gray points. The horizontal dashed line marks zero effect. The sample includes all countries with complete geopolitical and GDP data for the respective decade.

Figure 15 presents the distribution of growth effects across countries for each decade from 1960 to 2019. Panel (a) displays contemporaneous effects—the cumulative GDP im-

[32] Specifically, for contemporaneous effects, we calculate $\sum_{t=0}^{9} \alpha_t^{\text{transitory}} \Delta p_{c,\tau+t}$, where $\alpha_t^{\text{transitory}}$ is the transitory IRF at horizon t and $\Delta p_{c,\tau+t}$ represents the year-on-year change in geopolitical relations. For long-run effects, we use $\alpha_{25}^{\text{permanent}} \times (p_{c,\tau+9} - p_{c,\tau})$, where $\alpha_{25}^{\text{permanent}}$ is the permanent IRF at the 25-year horizon.

pact realized within each decade. The distributions reveal predominantly positive effects through 2010, with median values ranging from 0.5% to 2.5%. The substantial dispersion, with interquartile ranges spanning approximately 5 percentage points, reflects heterogeneous country experiences. The 1990s and 2000s exhibit the highest median effects and tightest distributions, consistent with the peak globalization era.

Panel (b) presents long-run effects—the projected 25-year GDP impact of within-decade geopolitical changes. The patterns amplify those observed for contemporaneous effects: median long-run gains reach 3–4% during the 1970s–1990s, with individual countries experiencing effects ranging from −20% to +30%. Strikingly, the 2010s mark the first reversal to negative median effects in our sample. The widening distribution in recent decades, evidenced by more extreme outliers in both directions, suggests increasing polarization in geopolitical outcomes.

These results quantify the substantial economic stakes of geopolitical alignment. The cumulative improvements in international relations from 1960 to 2010 generated median long-run GDP gains of approximately 15–20% across countries—comparable to major institutional reforms or technological revolutions. Conversely, the deterioration observed in the 2010s threatens to reverse decades of geopolitically driven growth, with particular implications for countries navigating between competing powers. The persistence of these effects, evidenced by the amplification from contemporaneous to long-run impacts, underscores that geopolitical choices cast long economic shadows.

5.2. Cross-Country Differences in Geopolitical Growth

Having examined temporal variation in geopolitical effects, we now investigate how cross-country differences in geopolitical relations shape growth disparities. While our empirical estimates leverage within-country variation for identification, we apply these estimates to understand cross-sectional patterns in economic development.[33]

To quantify the contribution of geopolitical relations to cross-country income differences, we construct counterfactual GDP paths. For each year t, we calculate the median geopolitical relation across countries, p_t^{median}, and compute a counterfactual scenario where each country maintains this median level. The difference between actual and counterfactual GDP paths reveals how geopolitical positioning contributes to relative economic performance.[34]

[33] This extrapolation assumes that the within-country effects we identify apply across countries. This assumption is reasonable given the stability of our estimates across diverse specifications and country subsamples.

[34] Formally, the geopolitical contribution to country i's GDP in year t is: $\Delta y_{i,t}^{\text{geo}} = \sum_{s=\max(1960,t-25)}^{t} \alpha_{t-s}^{\text{transitory}} \times (p_{i,s} - p_s^{\text{median}})$, where $\alpha_h^{\text{transitory}}$ is the transitory IRF at horizon h.

Case Studies: Divergent Geopolitical Trajectories. Figure 16 illustrates how geopolitical relations shape growth trajectories for four countries with distinct experiences. Argentina demonstrates the costs of geopolitical volatility: improved relations through the 1990s contributed positively to growth, but subsequent deterioration—particularly during the 2001–2002 crisis and recent populist periods—imposed a cumulative GDP penalty exceeding 10%. South Africa reveals even more dramatic effects: international isolation during apartheid created an increasing economic burden that reached −30% by 1990, while post-apartheid reintegration generated one of the largest positive geopolitical dividends in our sample.

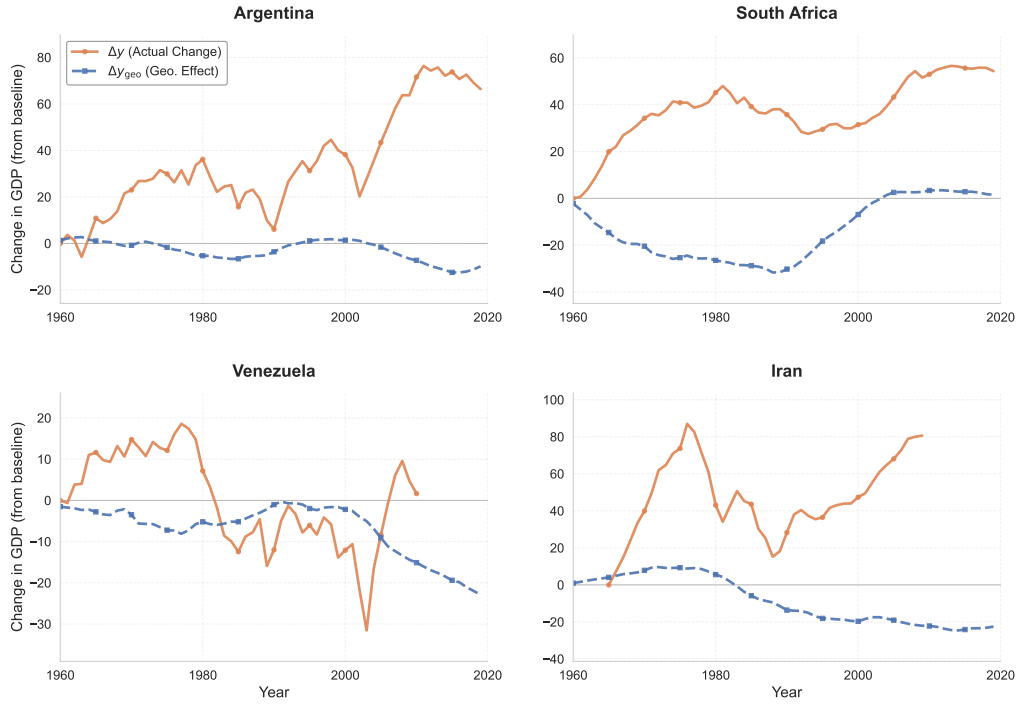


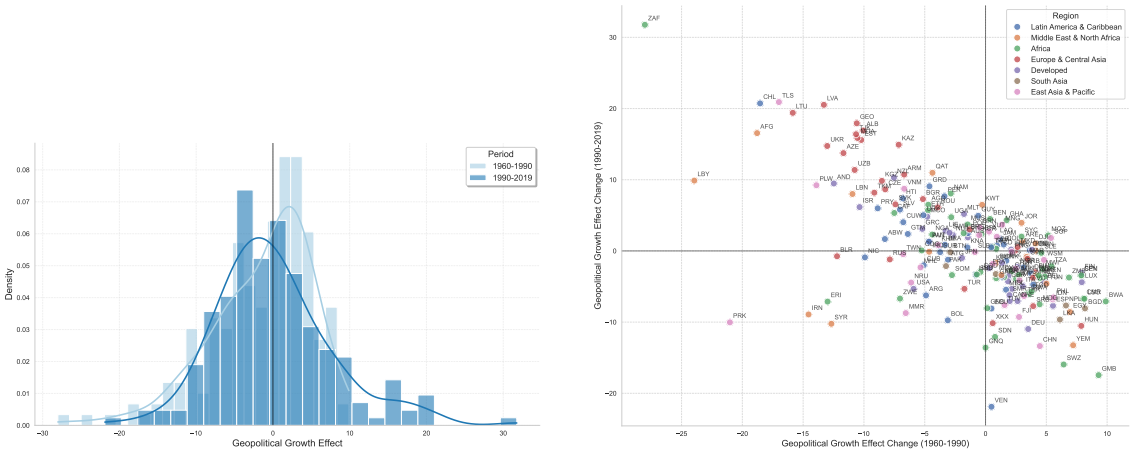
FIGURE 16. Geopolitical Contributions to GDP: Argentina, South Africa, Venezuela, and Iran

This figure displays actual GDP changes from baseline (Δy, orange line) and the contribution of geopolitical relations to GDP (Δy_{geo}, blue dashed line) for four countries. The geopolitical contribution represents the cumulative effect of deviations from median global geopolitical relations. Negative values indicate that below-median geopolitical relations have reduced GDP relative to the counterfactual path.

Venezuela and Iran exemplify how resource wealth cannot insulate economies from geopolitical misalignment. Venezuela maintained relatively stable geopolitical effects until the Chávez administration, after which deteriorating relations with Western powers imposed increasing economic costs, reaching −20% by 2019. Iran's experience is dominated by the 1979 revolution and subsequent sanctions regimes: geopolitical isolation has reduced GDP by an estimated 20% relative to the counterfactual of median align-

ment. These cases underscore the limits of resource endowments in compensating for international isolation. Appendix B.8 presents additional country case studies.

Geopolitical Contributions Across Periods. The end of the Cold War represents a structural break in the global geopolitical landscape, warranting separate analysis of different eras. Figure 17 examines how geopolitical factors shaped growth during 1960–1990 (Cold War) versus 1990–2019 (post-Cold War).



A. Distribution of Geopolitical Growth Effects B. Period Comparison by Country

FIGURE 17. Geopolitical Growth Effects: Cold War versus Post-Cold War Periods

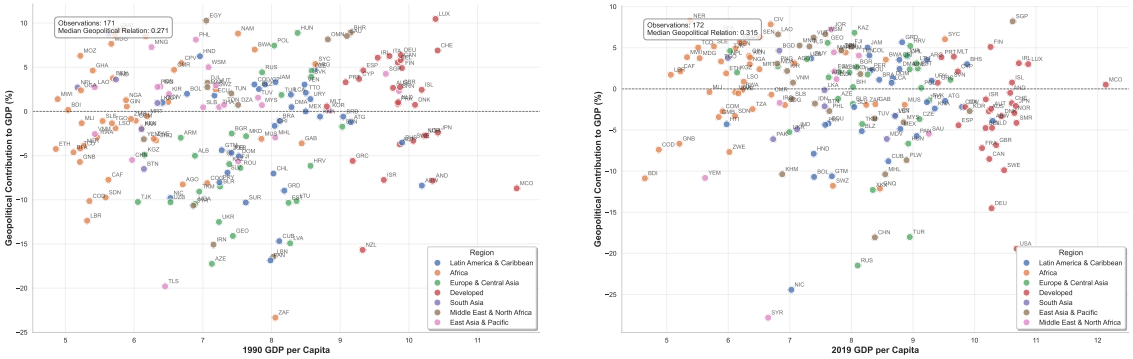
Panel (a) shows kernel density estimates of geopolitical contributions to growth for 1960–1990 and 1990–2019. Panel (b) plots country-specific effects across both periods, with colors indicating regions. Countries above the diagonal experienced more positive geopolitical effects in the recent period.

Panel (a) reveals a rightward shift in the distribution of geopolitical effects between periods. During the Cold War, the distribution was approximately symmetric around zero, reflecting bipolar division between competing blocs. The post-Cold War distribution shows both higher mean effects and greater dispersion, with a pronounced right tail representing countries that successfully integrated into the liberal international order. However, the emergence of a left tail—absent in the earlier period—indicates that some countries experienced unprecedented geopolitical isolation in the contemporary era.

Panel (b) provides country-level detail on this transition. The scatter plot reveals substantial reallocation in geopolitical fortunes: many countries (particularly in Eastern Europe and Asia) benefited from improved post-Cold War alignment, while others experienced deterioration. Notable gainers include the Baltic states, Poland, and Vietnam, which transitioned from Soviet influence to Western integration. In contrast, countries like Venezuela, Syria, and Zimbabwe moved from relative neutrality to confrontation with the international order. The clustering of African countries near the origin in both periods suggests persistent marginalization from great power competition—neither benefiting

from Cold War patronage nor achieving meaningful post-Cold War integration.

Geopolitics and Cross-Country Income Differences. To assess how geopolitical relations contribute to global inequality, Figure 18 examines the relationship between GDP per capita and geopolitical contributions for 1990 and 2019.[35]



A. 1990 Cross-Section

B. 2019 Cross-Section

FIGURE 18. Geopolitical Contributions to Cross-Country Income Differences

These scatter plots show the relationship between GDP per capita (log scale) and the percentage contribution of geopolitical relations to GDP. Each point represents a country, colored by region. The horizontal dashed line marks zero contribution. Countries above (below) the line have above-median (below-median) geopolitical relations that increase (decrease) their GDP relative to the counterfactual.

Two key patterns emerge. First, the range of geopolitical effects has remained stable but shifted: while contributions spanned −25% to +10% in 1990, they continue to span a similar range in 2019, with greater density in the extremes. This pattern reflects both the opportunities created by globalization and the costs of exclusion. Second, geopolitical contributions show no systematic correlation with income levels. Rich countries are nearly as likely as poor countries to suffer from geopolitical misalignment, while some of the largest positive contributions appear among middle-income nations.

This orthogonality between geopolitical alignment and income levels has important implications. It suggests that geopolitical relations constitute an independent dimension of development policy—neither a substitute for nor an automatic consequence of economic advancement. Singapore and Switzerland derive substantial benefits from strategic positioning and economic openness, while geopolitically isolated countries sacrifice potential prosperity regardless of their development level. Among developing countries, those maintaining constructive relations with major powers (e.g., Morocco, Jordan) significantly outperform those in confrontation (e.g., Syria, Zimbabwe), independent of initial income.

[35]The geopolitical contribution is calculated as the percentage difference between actual GDP and the counterfactual GDP under median geopolitical relations: $100 \times \left[\exp(\Delta y_{i,t}^{\text{geo}}) - 1\right]$.

The magnitude of these effects—ranging from −25% to +10% of GDP—establishes geopolitical alignment as a first-order determinant of economic development, comparable to institutions, geography, or human capital. For policymakers, these findings highlight both opportunities and constraints: while domestic reforms remain essential, their effectiveness depends critically on the geopolitical environment. In an era of renewed great power competition, the ability to navigate complex international relationships may increasingly determine national prosperity.

6. Additional Robustness Results

6.1. Dynamic Panel Estimates

The local projection estimates in Section 3.3 provide robust inference but sacrifice statistical efficiency, particularly at long horizons. We complement our analysis with a dynamic panel model that exploits the autoregressive structure to extrapolate long-run effects more precisely (Olea et al. 2024):

$$y_{ct} = \alpha p_{ct} + \sum_{\ell=1}^{J} \beta_\ell y_{c,t-\ell} + \sum_{\ell=1}^{J} \gamma_\ell p_{c,t-\ell} + \delta_c + \delta_{r(c)t} + \mu_{ct} \tag{9}$$

where y_{ct} denotes log GDP per capita, p_{ct} represents geopolitical relations, and δ_c and $\delta_{r(c)t}$ capture country and region-year fixed effects. We set $J = 4$ to match our baseline specification.

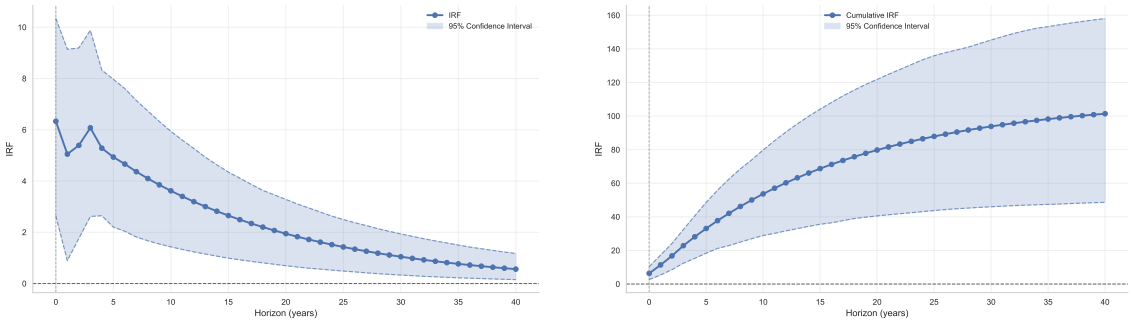
Under Assumption 1, the impulse response function is:

$$\phi_0 = \alpha, \quad \phi_k = \sum_{j=1}^{\min(k,J)} \beta_j \phi_{k-j} + \sum_{j=1}^{\min(k,J)} \gamma_j \text{ for } k \geq 1, \quad \phi_\infty = \frac{\alpha + \sum_{\ell=0}^{J} \gamma_\ell}{1 - \sum_{\ell=1}^{J} \beta_\ell} \tag{10}$$

This formulation yields identical population impulse responses to our local projection approach (Plagborg-Møller and Wolf 2021) while offering improved small-sample precision through parametric structure.

Figure 19 presents the dynamic panel estimates. Panel (a) shows the response to a purely transitory shock: the initial 6.5 log-point impact closely matches our local projection estimate, validating cross-method consistency. The response exhibits persistence with a secondary peak around year 3, remaining statistically significant for approximately 25 years. Even temporary diplomatic improvements generate long-lasting economic benefits.

Panel (b) reveals cumulative gains from permanent improvement in geopolitical relations. GDP per capita rises steadily, reaching 100 log points after 35 years and stabilizing



A. Response to Transitory Shock

B. Cumulative Response to Permanent Shock

FIGURE 19. Dynamic Panel Estimates: GDP Responses to Transitory and Permanent Geopolitical Shocks

Panel (a) shows the impulse response of log GDP per capita (×100) to a purely transitory unit shock in geopolitical relations. Panel (b) displays the cumulative response to a permanent unit shock. Specifications include four lags of both variables, country fixed effects, and region-year fixed effects. Shaded areas represent 95% confidence intervals from 1,000 bootstrap iterations using country-block resampling.

around 105 log points.[36] The steady-state multiplier implies that a one-standard-deviation improvement (0.128 units) generates a long-run GDP gain of 13.4 log points. Moving from hostile relations (−0.42) to strong cooperation (0.52)—a 0.94-unit shift—would raise GDP per capita by 98.7 log points, effectively doubling economic output.

These complementary methods—robust local projections and efficient dynamic panels—deliver remarkably consistent results. Despite different estimation approaches and robustness-efficiency properties, both methods yield similar impulse response patterns, with transitory shocks generating persistent effects and permanent shocks producing large cumulative impacts.

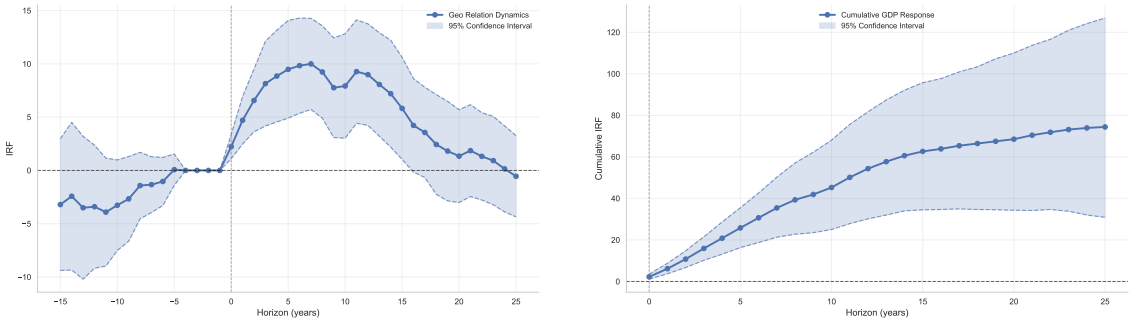
6.2. Alternative Measures of Geopolitical Relations

Our event-based measure represents a methodological innovation, but its validity requires examining alternative specifications and comparisons with existing approaches. We conduct three tests: first, we analyze unsmoothed geopolitical events to verify that our smoothing procedure does not drive the results; second, we implement our framework using UN General Assembly voting patterns, the predominant measure in existing literature; third, we perform horse-race specifications against economic sanctions, the most direct observable form of economic statecraft.

[36]The parametric structure delivers narrower confidence intervals compared to local projections. At the 25-year horizon, the 95% confidence interval spans 40 to 120 log points, improving precision about long-run effects.

6.2.1. Impulse Responses to Geopolitical Events

Our main analysis employs a dynamic geopolitical relations measure that smooths volatile bilateral events to capture persistent trends. We examine robustness by estimating impulse responses to unsmoothed, event-based geopolitical scores $\tilde{S}_{ct}$, which correspond to setting the depreciation rate $\delta = 1$ in equation (1).[37]



A. Response to Event-Based Scores

B. Cumulative Response to Permanent Shock

FIGURE 20. GDP Responses to Geopolitical Events

Panel (a) shows the impulse response of GDP per capita to a unit shock in event-based geopolitical scores. Panel (b) displays the cumulative response to a permanent unit shock in event scores. Shaded areas represent 95% confidence intervals.

Figure 20 reveals that while GDP responds positively to favorable geopolitical events, the magnitude is substantially smaller—peaking at 10 log points versus 30 in our baseline. This attenuation reflects the transitory nature of individual events.[38] However, panel (b) demonstrates that a permanent change in event flows yields a cumulative response of approximately 75 log points after 25 years—virtually identical to our baseline estimate. This convergence validates our framework: permanent changes in event flows mechanically generate permanent changes in the stock of geopolitical relations, yielding equivalent long-run effects, and our smoothing geopolitical relations retain the fundamental relationship between geopolitics and growth. Appendix B.9 provides additional discussions.

6.2.2. Measuring Geopolitical Relations Using UNGA Votes

Our event-based measure captures bilateral geopolitical dynamics with universal coverage. As an alternative approach, we examine whether voting patterns in the United Nations General Assembly—the predominant measure in existing literature (Signorino and Ritter 1999)—can generate similar results. We implement our empirical analysis using

[37] We estimate $y_{c,t+h} = \alpha_h^{\text{event}} \tilde{S}_{ct} + \gamma_h' \mathbf{x}_{ct} + \mu_{c,t+h}$, where $\tilde{S}_{ct} = \sum_{j \in \mathcal{N}} \tilde{S}_{ij,t} \times \text{GDP share}_{jt}$ represents the GDP-weighted average of bilateral event scores in year t without smoothing.

[38] Appendix B.9 shows that event scores exhibit rapid mean reversion, with 65% of the initial impact dissipating within one year.

the negative Ideal Point Distance (IPD) from Bailey, Strezhnev, and Voeten (2017), which measures alignment based on UNGA voting behavior.

Figure A22 in Appendix B.10 reveals fundamental limitations of UNGA-based measures for capturing growth-relevant geopolitical dynamics. When we maintain our baseline specification with country fixed effects—essential for causal interpretation (Acemoglu et al. 2019; Kremer, Willis, and You 2022)—neither the aggregate GDP-weighted IPD nor bilateral alignment with the United States yields statistically significant effects on economic growth. The impulse responses hover near zero throughout the 25-year horizon, with confidence intervals consistently spanning zero. This null result stands in stark contrast to our event-based measure, which produces robust and persistent growth effects.

The failure of UNGA measures reflects three fundamental limitations. First, Assembly votes primarily address multilateral issues—decolonization resolutions, human rights declarations, budget allocations—rather than the bilateral concerns that directly affect economic relationships. Countries with tense bilateral relations often vote similarly on global issues, while close allies may diverge on symbolic resolutions. Second, strategic voting behavior adds substantial noise: small states often vote with regional blocs or in exchange for aid commitments, while major powers use votes to signal positions to domestic audiences. Third, the temporal structure of UNGA voting—clustered in annual sessions—creates artificial spikes that poorly capture the continuous evolution of diplomatic relationships.[39]

This divergence from our baseline results has clear methodological implications. In Section 3.4.1, we demonstrated that geopolitical relations with the US and with other major powers generate nearly identical growth effects—evidence of a general phenomenon rather than US-specific dynamics. The failure of UNGA measures to replicate this pattern confirms that Assembly votes capture positioning within the US-led multilateral system rather than the broader bilateral relationships that drive economic outcomes.

6.2.3. Categorical Measures: Sanctions

Our event-based measure captures the full spectrum of geopolitical interactions, from diplomatic consultations to military conflicts. To illustrate its comprehensiveness relative to existing categorical approaches, we examine the relationship between our measure and economic sanctions—arguably the most direct and measurable form of economic statecraft. Using the Global Sanctions Database (Felbermayr et al. 2020; Yalcin et al. 2025), we construct a country-level sanctions exposure measure that parallels our geopolitical relations index: $p_{ct}^{\text{Sanction}} = \sum_{j \in \mathcal{N}} \mathbb{1}_{jct} \times \text{GDP share}_{jt}$, where $\mathbb{1}_{jct}$ indicates whether a major

[39]The positive cross-sectional correlation between US alignment and GDP (when country fixed effects are removed) likely reflects reverse causality and omitted variables: wealthier countries tend to share US positions on international law and market economics, rather than alignment causing prosperity.

nation j imposed sanctions on country c in year t.

Figure A23 in Appendix B.11 presents horse-race results between our comprehensive measure and sanctions exposure. The findings are striking: when we control for sanctions, the dynamic effects of geopolitical relations remain virtually unchanged, with the impulse response maintaining its characteristic hump shape and peaking at approximately 28 log points after 7 years. In sharp contrast, controlling for geopolitical relations substantially attenuates the sanctions effect—the immediate impact shrinks from 10 to 6 log points, and the effect becomes statistically insignificant after year 8.

These patterns reveal that sanctions represent one manifestation of deteriorating geopolitical relations rather than an independent channel. While sanctions generate immediate economic disruption through trade restrictions, asset freezes, and technology embargoes, their persistent effects operate through the broader degradation of bilateral relationships that our measure captures. Sanctions rarely emerge in isolation—they typically follow a cascade of negative events including diplomatic protests, recalled ambassadors, suspended cooperation agreements, and public condemnations. By incorporating this full spectrum of interactions, our event-based measure subsumes much of the information content in binary sanctions indicators while providing additional variation from the diplomatic dynamics that precede, accompany, and follow formal economic restrictions.[40]

The robustness of our comprehensive measure when controlling for this most explicit form of economic coercion underscores its methodological advantages. Rather than requiring researchers to choose among multiple categorical indicators—sanctions, alliances, rivalries, trade agreements—our unified framework captures how the full complexity of international relations shapes economic outcomes. This comprehensiveness proves essential for understanding geopolitical dynamics in an era where economic and security concerns increasingly intertwine.

7. Conclusion

This paper establishes geopolitical relations as a first-order determinant of economic growth. Using a novel event-based measure constructed from over 440,000 bilateral political events spanning 1960–2019, we demonstrate that improvements in geopolitical alignment generate substantial and persistent economic gains. A one-standard-deviation improvement in geopolitical relations increases GDP per capita by 9.6 log points over 25 years, with effects ranging from −35% to +30% across countries and time periods.

Three key findings emerge from our analysis. First, geopolitical alignment operates

[40]The timing difference between measures reinforces this interpretation: our event-based approach records sanctions when announced or lifted—capturing the geopolitical signal—while the sanctions database tracks their continuous enforcement. This explains why geopolitical relations better predict long-run outcomes despite sanctions' immediate economic bite.

through multiple reinforcing channels. Improved international relations immediately enhance domestic political stability and investment, followed by gradual expansions in trade openness, productivity, and human capital accumulation. This multi-channel propagation mechanism explains both the magnitude and persistence of growth effects, as geopolitical relations simultaneously relax political, technological, and financial constraints on development.

Second, the economic benefits of geopolitical alignment transcend ideological boundaries. Countries experience similar growth trajectories whether improving relations with the United States, China, or other major powers. This symmetry suggests that economic gains flow from integration into global networks rather than alignment with particular political systems. Notably, while democratization facilitates Western alignment and explains most of democracy's short-run growth effect, non-democratic countries can achieve comparable growth through alternative forms of international cooperation.

Third, our analysis captures fundamental shifts in the global geopolitical landscape. The transformation from Cold War bipolarity through post-Cold War convergence to contemporary re-polarization has profound economic implications. While the 1990–2010 period generated widespread gains from global integration, the 2010s witnessed renewed fragmentation. The emergence of "connector" states that maintain positive relations across geopolitical divides offers a potential model for navigating the new multipolar landscape.

Our findings carry important policy implications. For developing countries, domestic reforms alone are insufficient—their effectiveness depends critically on the international environment. The persistence of growth effects from even transitory diplomatic improvements suggests high returns to investments in international relationships. Conversely, geopolitical misalignment imposes costs comparable to major institutional failures, with countries like Venezuela and Zimbabwe sacrificing 20–30% of potential GDP through international isolation.

This research opens several avenues for future work. While our identification strategy leverages within-country variation, it may understate the total importance of international stability. The event-based measure, though comprehensive, could be extended to capture subtle forms of economic integration not manifested in discrete political events. Future research could explore heterogeneous effects across different economic structures or examine how domestic institutions mediate the growth impact of geopolitical shocks.

As great power competition intensifies and the post-Cold War consensus fractures, understanding the economic consequences of geopolitical choices becomes increasingly urgent. Our results suggest that while strategic considerations will shape international alignments, the economic imperative for broad engagement remains powerful. The finding that relations with different major powers generate similar economic benefits offers

hope that economic development need not become hostage to strategic rivalry. For policymakers navigating an increasingly fragmented geopolitical landscape, the challenge is preserving the growth benefits of global integration while managing strategic competition.

References

Acemoglu, Daron, Nicolas Ajzenman, Cevat Giray Aksoy, Martin Fiszbein, and Carlos Molina. 2025. "(successful) democracies breed their own support." *The Review of Economic Studies* 92 (2): 621–655.

Acemoglu, Daron, Simon Johnson, and James A Robinson. 2001. "The colonial origins of comparative development: An empirical investigation." *American Economic Review* 91 (5): 1369–1401.

Acemoglu, Daron, Suresh Naidu, Pascual Restrepo, and James A Robinson. 2019. "Democracy does cause growth." *Journal of Political Economy* 127 (1): 47–100.

Aghion, Philippe, Xavier Jaravel, Torsten Persson, and Dorothée Rouzet. 2019. "Education and military rivalry." *Journal of the European Economic Association* 17 (2): 376–412.

Ahn, Daniel P, and Rodney D Ludema. 2020. "The sword and the shield: The economics of targeted sanctions." *European Economic Review* 130 (103587): 103587.

Alcala, F, and A Ciccone. 2004. "Trade and productivity." *The Quarterly Journal of Economics* 119 (2): 613–646.

Bailey, Michael A, Anton Strezhnev, and Erik Voeten. 2017. "Estimating dynamic state preferences from united Nations voting data." *Journal of Conflict Resolution* 61 (2): 430–456.

Baker, Scott R, Nicholas Bloom, and Steven J Davis. 2016. "Measuring economic policy uncertainty." *The Quarterly Journal of Economics* 131 (4): 1593–1636.

Baldwin, David A. 1985. *Economic Statecraft*. Princeton, NJ: Princeton University Press.

Barro, Robert J. 1991. "Economic growth in a cross section of countries." *The Quarterly Journal of Economics* 106 (2): 407–443.

Barro, Robert J. 1996. "Determinants of Economic Growth: A Cross-Country Empirical Study." Working Paper 5698, National Bureau of Economic Research.

Barro, Robert J. 2003. "Determinants of economic growth in a panel of countries." *Annals of Economics and Finance* 4: 231–274.

Bilal, Adrien, and Diego R Känzig. 2024. "The macroeconomic impact of climate change: Global vs. local temperature.", National Bureau of Economic Research.

Blackwill, Robert D, and Jennifer M Harris. 2016. *War by Other Means: Geoeconomics and Statecraft*. Cambridge, MA: Harvard University Press.

Bolt, Jutta, and Jan Luiten Van Zanden. 2025. "Maddison-style estimates of the evolution of the world economy: A new 2023 update." *Journal of Economic Surveys* 39 (2): 631–671.

Boschee, Elizabeth, Jennifer Lautenschlager, Sean O'Brien, Steve Shellman, James Starz, and Michael Ward. 2015. "ICEWS coded event data."

Broner, Fernando, Alberto Martín, Julian Meyer, and Christoph Trebesch. 2025. "Hegemonic Globalization." Discussion Paper DP20339, CEPR. Paris and London.

Caldara, Dario, and Matteo Iacoviello. 2022. "Measuring geopolitical risk." *American Economic Review* 112 (4): 1194–1225.

Cameron, A Colin, Jonah B Gelbach, and Douglas L Miller. 2008. "Bootstrap-based improvements for inference with clustered errors." *The Review of Economics and Statistics* 90 (3): 414–427.

Clayton, Christopher, Antonio Coppola, Matteo Maggiori, and Jesse Schreger. 2025. "Geoeconomic Pressure." research paper, Columbia Business School and Stanford University Graduate School of Business.

Clayton, Christopher, Matteo Maggiori, and Jesse Schreger. 2023. "A framework for geoeconomics.", National Bureau of Economic Research.

Clayton, Christopher, Matteo Maggiori, and Jesse Schreger. 2024. "A Theory of Economic Coercion and Fragmentation.", National Bureau of Economic Research.

Dell, M. 2010. "The persistent effects of Peru's Mining Mita." *Econometrica* 78 (6): 1863–1903.

Dell, Melissa. 2025. "Deep learning for economists." *Journal of Economic Literature* 63 (1): 5–58.

Dell, Melissa, Benjamin F Jones, and Benjamin A Olken. 2012. "Temperature shocks and economic growth: Evidence from the last half century." *American Economic Journal: Macroeconomics* 4 (3): 66–95.

Diamond, Jared. 1997. *Guns, Germs, and Steel: The Fates of Human Societies*. New York, NY: W. W. Norton & Company.

Driscoll, J, and Aart C Kraay. 1998. "Consistent covariance matrix estimation with spatially dependent panel data." *The Review of Economics and Statistics* 80: 549–560.

Durlauf, Steven N, Paul A Johnson, and Jonathan R W Temple. 2005. "Chapter 8 growth econometrics." In *Handbook of Economic Growth*, edited by Philippe Aghion and Steven N Durlauf, vol. 1, 555–677: Elsevier.

Feenstra, Robert C, Robert Inklaar, and Marcel P Timmer. 2015. "The next generation of the Penn World Table." *American Economic Review* 105 (10): 3150–3182.

Felbermayr, Gabriel, Alexandra Kirilakha, Constantinos Syropoulos, Erdal Yalcin, and Yoto V. Yotov. 2020. "The Global Sanctions Data Base." *European Economic Review* 129.

Felbermayr, Gabriel, T Clifton Morgan, Constantinos Syropoulos, and Yoto V Yotov. 2021. "Understanding economic sanctions: Interdisciplinary perspectives on theory and evidence." *European Economic Review* 135 (103720): 103720.

Feyrer, James. 2019. "Trade and income—exploiting time series in geography." *American Economic Journal: Applied Economics* 11 (4): 1–35.

Flynn, Joel P, Antoine B Levy, Jacob Moscona, and Mai Wo. 2025. "Foreign Political Risk and Technological Change." Working Paper 33964, National Bureau of Economic Research.

Frankel, Jeffrey A, and David Romer. 1999. "Does trade cause growth?" *American Economic Review* 89 (3): 379–399.

Gibler, Douglas M. 2008. "The costs of reneging: Reputation and alliance formation." *Journal of Conflict Resolution* 52 (3): 426–454.

Goldberg, Pinelopi K, and Tristan Reed. 2023. "Is the global economy deglobalizing? If so, why? And what is next?" *Brookings Papers on Economic Activity* 2023 (1): 347–423.

Goldstein, Joshua S. 1992. "A conflict-cooperation scale for WEIS events data." *Journal of Conflict Resolution* 36 (2): 369–385.

Gopinath, Gita, Pierre-Olivier Gourinchas, Andrea F Presbitero, and Petia Topalova. 2025. "Changing global linkages: A new Cold War?" *Journal of International Economics* 153 (104042): 104042.

Guiso, Luigi, Paola Sapienza, and Luigi Zingales. 2006. "Does culture affect economic outcomes?"

The Journal of Economic Perspectives 20 (2): 23–48.

Hall, R E, and C I Jones. 1999. "Why do some countries produce so much more output per worker than others?" *The Quarterly Journal of Economics* 114 (1): 83–116.

Hassan, T A, S Hollander, Lent L Van, and A Tahoun. 2019. "Firm-level political risk: Measurement and effects." *The Quarterly Journal of Economics* 134 (4): 2135–2202.

Hassan, Tarek A, Jesse Schreger, Markus Schwedeler, and Ahmed Tahoun. 2024. "Sources and transmission of country risk." *The Review of Economic Studies* 91 (4): 2307–2346.

Hirschman, Albert Otto. 1945. *National Power and the Structure of Foreign Trade*. Berkeley, CA: University of California Press.

Hirschman, Albert Otto. 1958. *The Strategy of Economic Development*. New Haven, Conn: Yale University Press.

Johnson, Paul, and Chris Papageorgiou. 2020. "What remains of cross-country convergence?" *Journal of Economic Literature* 58 (1): 129–175.

Jordà, Òscar. 2005. "Estimation and inference of impulse responses by local projections." *American Economic Review* 95 (1): 161–182.

Jordà, Òscar, Moritz Schularick, and Alan M Taylor. 2015. "Betting the house." *Journal of International Economics* 96: S2–S18.

Jordà, Òscar, Moritz Schularick, and Alan M Taylor. 2020. "The effects of quasi-random monetary experiments." *Journal of Monetary Economics* 112: 22–40.

Jordà, Òscar, and Alan M Taylor. 2025. "Local projections." *Journal of Economic Literature* 63 (1): 59–110.

Kleinman, Benny, Ernest Liu, and Stephen J Redding. 2024. "International friends and enemies." *American Economic Journal: Macroeconomics* 16 (4): 350–385.

Kremer, Michael, Jack Willis, and Yang You. 2022. "Converging to convergence." *NBER macroeconomics annual* 36: 337–412.

La Porta, Rafael, Florencio Lopez-de silanes, Andrei Shleifer, and Robert W Vishny. 1997. "Legal determinants of external finance." *The Journal of Finance* 52 (3): 1131–1150.

La Porta, Rafael, Florencio Lopez-de Silanes, Andrei Shleifer, and Robert W Vishny. 1998. "Law and Finance." *Journal of Political Economy* 106 (6): 1113–1155.

Lagakos, David, Stelios Michalopoulos, and Hans-Joachim Voth. 2025. "American Life Histories.", National Bureau of Economic Research.

Leeds, Brett Ashley. 2003. "Do alliances deter aggression? The influence of military alliances on the initiation of militarized interstate disputes." *American Journal of Political Science* 47 (3): 427–439.

Leetaru, Kalev, and Philip A Schrodt. 2013. "GDELT: Global data on events, location, and tone, 1979–2012." *International Studies Quarterly* 57 (4): 1–16.

Mankiw, N, D Romer, and D Weil. 1992. "A contribution to the empirics of economics growth." *The Quarterly Journal of Economics* 107: 407–437.

Maoz, Z, and B Russett. 1993. "Normative and structural causes of democratic peace, 1946–1986." *American Political Science Review* 87: 624–638.

Montiel Olea, José Luis, and Mikkel Plagborg-Møller. 2021. "Local projection inference is simpler and more robust than you think." *Econometrica* 89 (4): 1789–1823.

Morgan, T Clifton, Constantinos Syropoulos, and Yoto V Yotov. 2023. "Economic sanctions: Evolution, consequences, and challenges." *The Journal of Economic Perspectives* 37 (1): 3–29.

North, Douglass C. 1990. *Institutions, Institutional Change and Economic Performance*. Cambridge, UK: Cambridge University Press.

Nunn, Nathan. 2008. "The long-term effects of Africa's slave trades." *The Quarterly Journal of Economics* 123 (1): 139–176.

Olea, José Luis Montiel, Mikkel Plagborg-Møller, Eric Qian, and Christian K Wolf. 2024. "Double robustness of local projections and some unpleasant varithmetic.", National Bureau of Economic Research.

Park, Ziho. 2024. "Democratic Favor Channel." *arXiv preprint arXiv:2408.05059*.

Plagborg-Møller, Mikkel, and Christian K Wolf. 2021. "Local projections and VARs estimate the same impulse responses." *Econometrica* 89 (2): 955–980.

Rajan, Raghuram G., and Luigi Zingales. 1998. "Financial Dependence and Growth." *The American Economic Review* 88 (3): 559–586.

Rodrik, Dani. 1998. "Why do more open economies have bigger governments?" *Journal of Political Economy* 106 (5): 997–1032.

Sachs, Jeffrey D, and Andrew M Warner. 1995. "Natural Resource Abundance and Economic Growth." Working Paper 5398, National Bureau of Economic Research.

Schrodt, Philip A, and Omur Yilmaz. 2012. "CAMEO: Conflict and Mediation Event Observations Event and Actor Codebook.", Pennsylvania State University.

Signorino, Curtis S, and Jeffrey M Ritter. 1999. "Tau-b or not tau-b: Measuring the similarity of foreign policy positions." *International Studies Quarterly* 43: 115–144.

Sims, C. 1986. "Are forecasting models usable for policy analysis." *Quarterly Review* 10 (Win): 2–16.

Tabellini, Guido. 2010. "Culture and Institutions: Economic Development in the Regions of Europe." *Journal of the European Economic Association* 8 (4): 677–716.

Thompson, William R. 2001. "Identifying rivals and rivalries in world politics." *International Studies Quarterly* 45 (4): 557–586.

Yalcin, Erdal, Gabriel Felbermayr, Heba Kariem, Alexandra Kirilakha, Ohyun Kwon, Constantinos Syropoulos, and Yoto V. Yotov. 2025. "The Global Sanctions Data Base - Release 4: The Heterogeneous Effects of the Sanctions on Russia." *The World Economy*.

Appendix A. Event-based Measure of Geopolitical Relations

This section describes additional results related to the event-based measure of geopolitical relations involving all 196 countries and 24 major nations.

A.1. Major Nations

Our event-based measure of geopolitical relations is designed to be flexible and applicable to any country over time. In this analysis, we examine geopolitical relations involving all 196 countries, with a particular focus on 24 major nations selected for their significant geopolitical, military, and, most critically, economic influence. These nations were chosen based on their substantial global economic impact, which underpins their relevance to our study of geopolitical dynamics and its influence on economic growth.

Figure A1 presents the time series of aggregate and individual GDP shares for these 24 major nations. [41] Panel (a) illustrates the combined GDP share of these nations relative to the global total, highlighting their collective economic dominance over time. Panel (b) displays the individual GDP share for each nation, revealing variations in economic influence across countries and over the study period.

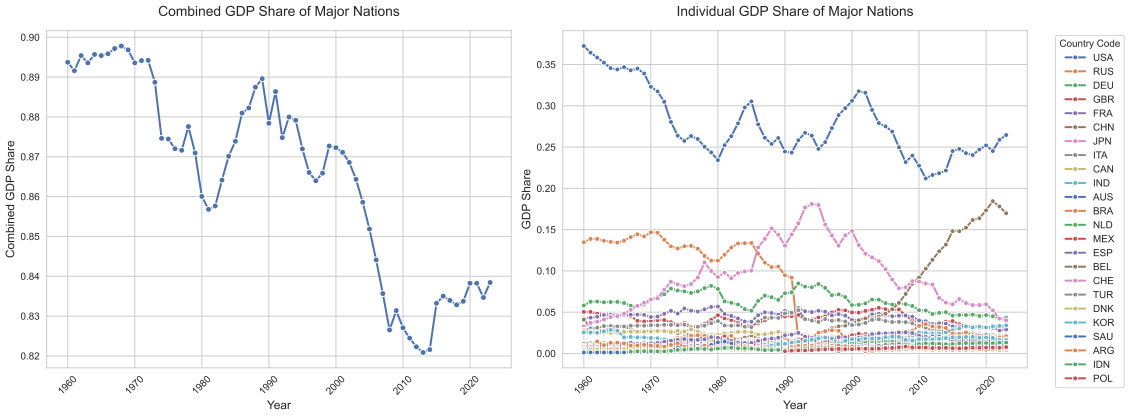


FIGURE A1. GDP Shares of Major Nations. Panel (a) shows the combined GDP share of 24 major nations (Argentina, Australia, Belgium, Brazil, Canada, Switzerland, People's Republic of China, Germany, Denmark, Spain, France, United Kingdom, Indonesia, India, Italy, Japan, Republic of Korea, Mexico, Netherlands, Poland, Russian Federation, Saudi Arabia, Turkey, and United States) relative to global GDP over time. Panel (b) presents the individual GDP share for each nation, illustrating cross-country variations and temporal trends. Data are sourced from the World Bank, with Soviet Union GDP calculated using relative GDP to the United States from the Maddison Project (Bolt and Van Zanden 2025).

The GDP shares depicted in Figure A1 provide critical insights into the economic power

[41] GDP data is nominal GDP in current USD and sourced from the World Bank. For the Soviet Union, GDP is calculated using relative GDP to the United States, obtained from the Maddison Project.

dynamics among major nations. The combined GDP share underscores the significant and sustained influence of these 24 nations, which collectively account for a substantial portion of global economic output. Individual GDP shares, however, reveal heterogeneity, with nations such as the United States maintaining large and relatively stable shares, while others, such as Russia (the Soviet Union) or China, experience fluctuations driven by economic growth, policy changes, or global events.

A.2. Geopolitical Event Data: Methodology and Descriptive Statistics

This section provides technical details on our LLM-based methodology for compiling bilateral geopolitical events and presents comprehensive descriptive statistics of the resulting dataset spanning 1960–2019. We first describe the systematic procedure for event identification and classification, then analyze temporal patterns across 442,305 events to validate our framework's ability to capture major shifts in international relations. Complete prompt specifications are provided in Appendix C.

A.2.1. Event Compilation and Analysis

Our analytical framework leverages a large language model (Gemini) with web search capabilities to systematically identify and classify major political events between country pairs from 1960–2019. The complete prompt structure and technical implementation details are provided in Online Appendix C.

Entity Verification and Historical Accuracy. Our framework begins by verifying the political entities corresponding to each country pair for the target year. This step is crucial for maintaining historical accuracy, as it accounts for state succession events such as the dissolution of the Soviet Union and emergence of the Russian Federation on December 26, 1991. The LLM references authoritative sources including the Correlates of War State System Membership dataset when available. For years when specified entities did not exist, the framework identifies the primary political entities controlling the relevant territories or populations and applies them consistently throughout the analysis.

Systematic Event Identification. The LLM conducts comprehensive searches across multiple dimensions of bilateral relations to identify major political events that significantly affect or strongly indicate the state of the bilateral relationship:

- *Economic Diplomacy*: Actions involving tariffs, economic sanctions (financial sanctions, trade restrictions, Entity List designations), trade agreements and treaties (negotiation milestones, signing, ratification, withdrawal), and other economic policies with political significance (quotas, subsidies, investment rules)

- *Formal Diplomatic Actions*: Changes in representation (ambassador recalls/appointments), establishment/closure of missions, significant diplomatic communications (protests, démarches)
- *High-Level Interactions*: State visits, ministerial meetings, bilateral summits, and their substantive outcomes not covered under other dimensions
- *Intelligence Operations*: Publicly revealed espionage scandals or large-scale expulsions of intelligence personnel
- *Security and Military*: Formation/dissolution of security pacts, joint military exercises, arms sales/transfers, border incidents, arms control developments
- *International Cooperation/Contestation*: Joint diplomatic initiatives or major disagreements within international organizations

Events are included only when verified through multiple credible sources to ensure authenticity. The framework prioritizes events with demonstrable significant effects on the relationship's trajectory, with particular attention to political actions carried out through economic means and major developments concerning trade or security agreements. Detailed criteria for major political event identification are provided in Online Appendix C.2.

CAMEO Classification and Goldstein Scoring. Each identified event undergoes systematic classification using the Conflict and Mediation Event Observations (CAMEO) framework, which categorizes international political actions along two dimensions: cooperation versus conflict and verbal versus material. This creates four quadrant classes with hierarchical coding—root codes (two-digit) for general categories and event codes (three-digit) for specific actions. Following CAMEO classification, we assign Goldstein Scale scores ranging from −10.0 (maximum conflict) to +10.0 (maximum cooperation) based on the event code's typical intensity, with contextual adjustments for the bilateral relationship's historical context.

Additionally, we classify each event's economic content into five categories: Tariffs, Economic Sanctions, Trade Agreements and Treaties, Other Economic Policies, or Not an Economic Event. This classification enables targeted analysis of how different forms of economic diplomacy affect bilateral relations and economic outcomes. The detailed CAMEO codebook and Goldstein scoring guidelines are provided in Online Appendix C.3.

The stark contrast between Tables 1 and A1 demonstrates our methodology's ability to capture fundamental shifts in bilateral relations. While 2019 was dominated by material conflicts with negative Goldstein scores ranging from −6.0 to −8.0, the 1972 détente period exclusively features cooperative events with positive scores from +5.0 to +8.0. The concentration of high-scoring material cooperation events—including landmark arms control treaties (ABM, SALT I) and the comprehensive trade agreement—illustrates how our event-based approach quantifies both the intensity and multifaceted nature of diplo-

TABLE A1. Major U.S.-Soviet Union Bilateral Events in 1972: LLM Analysis Results

Event Name	Event Description	CAMEO Class.	Econ. Type	Goldstein Score
Moscow Summit	President Nixon's historic visit to Moscow for summit with Soviet leaders, marking first US presidential visit to USSR and facilitating multiple bilateral agreements	Verbal Coop. (04-042)	Not econ.	+6.0
ABM Treaty Signing	US and USSR sign Anti-Ballistic Missile Treaty during Moscow Summit, establishing landmark arms control agreement limiting strategic defensive missile systems	Material Coop. (05-057)	Not econ.	+8.0
SALT I Agreement	Signing of Interim Agreement on Strategic Offensive Arms, freezing number of strategic offensive missile launchers for five years	Material Coop. (05-057)	Not econ.	+8.0
US-Soviet Trade Agreement	Comprehensive trade agreement signed to expand bilateral trade, including provisions for reciprocal MFN status and major grain deal	Material Coop. (05-057)	Trade Agree.	+6.0
Basic Principles Agreement	Agreement outlining fundamental principles of bilateral relations, emphasizing peaceful coexistence and avoiding military confrontation	Material Coop. (05-057)	Not econ.	+7.0
Incidents at Sea Agreement	Agreement on preventing incidents on high seas to improve safety and avoid dangerous military encounters between naval forces	Material Coop. (05-057)	Not econ.	+5.0

matic breakthroughs. This temporal variation within the same country pair validates our measure's sensitivity to geopolitical dynamics and its capacity to distinguish periods of cooperation from conflict.

A.2.2. Statistics of Geopolitical Events

Our comprehensive compilation of bilateral geopolitical events spans six decades (1960–2019) and encompasses 442,301 individual events across all country pairs. Table A2 and Figure A2 provide detailed statistics revealing both the scale and evolution of international political interactions over this period.

The data reveal a pronounced cooperative bias in international relations, with cooperative events (both verbal and material) comprising 85.8% of all recorded interactions (379,371 events) compared to 14.2% for conflictual events (62,933 events). Material cooperation represents the single largest category with 199,904 events (45.2%), followed by verbal cooperation with 179,464 events (40.6%). This distribution suggests that tangible cooperative actions—such as economic agreements, aid provision, and joint initiatives—constitute

TABLE A2. Summary Statistics of Geopolitical Events by Decade, 1960–2019

	1960s	1970s	1980s	1990s	2000s	2010s	Total
CAMEO Event Classification							
Verbal Cooperation	16,357	18,013	18,668	24,024	39,971	62,431	179,464
Material Cooperation	18,924	21,729	22,986	32,021	44,989	59,255	199,904
Verbal Conflict	4,572	4,302	4,671	4,435	5,969	8,512	32,461
Material Conflict	4,034	4,244	4,894	5,020	5,070	7,210	30,472
Goldstein Scale Statistics							
Mean	3.32	3.61	3.44	4.08	4.24	4.06	3.91
Std. Dev.	4.34	4.21	4.27	3.98	3.54	3.50	3.86
Minimum	−10.00	−10.00	−10.00	−10.00	−10.00	−10.00	−10.00
Maximum	10.00	10.00	10.00	9.00	10.00	9.00	10.00
Median	5.00	5.00	5.00	6.00	5.00	5.00	5.00
Economic Event Classification							
Tariffs	74	118	80	160	198	302	932
Economic Sanctions	573.00	791.00	1,165	2,135	1,834	2,821	9,319
Trade Agreements And Treaties	4,987	6,659	6,445	9,217	10,713	12,594	50,615
Other Economic Policies	11,001	13,781	15,664	18,515	31,754	46,666	137,381
Not An Economic Event	27,252	26,939	27,865	35,473	51,500	75,025	244,054
Summary							
Total Events	43,887	48,288	51,219	65,500	95,999	137,408	442,301

CAMEO classifications follow the Conflict and Mediation Event Observations framework. Goldstein Scale ranges from −10 (most conflictual) to +10 (most cooperative). Economic events include Tariffs, Economic Sanctions, Trade Agreements and Treaties, and Not an Economic Event categories. All figures represent event counts except Goldstein Scale statistics.

the foundation of international political interaction, while diplomatic statements and consultations provide the communicative framework for these relationships.

The temporal evolution demonstrates substantial growth in event documentation, with total events more than tripling from 43,887 in the 1960s to 137,408 in the 2010s. This expansion reflects both improved global communication and the increasing complexity of international interactions in an interconnected world. Notably, the growth is heavily concentrated in cooperative categories: verbal cooperation increases nearly fourfold (from 16,357 to 62,431), while material cooperation more than triples (from 18,924 to 59,255). Conflict events show more modest increases, with verbal conflict growing from 4,572 to 8,512 and material conflict from 4,034 to 7,210, reinforcing the overall cooperative trajectory of the international system.

The Goldstein Scale statistics illuminate important shifts in relationship intensity over time. The Cold War decades (1960s–1980s) exhibit relatively lower mean cooperation scores (3.32–3.61) and higher standard deviations (4.21–4.34), indicating more volatile and polarized international interactions. The globalization era (1990s–2000s) shows marked

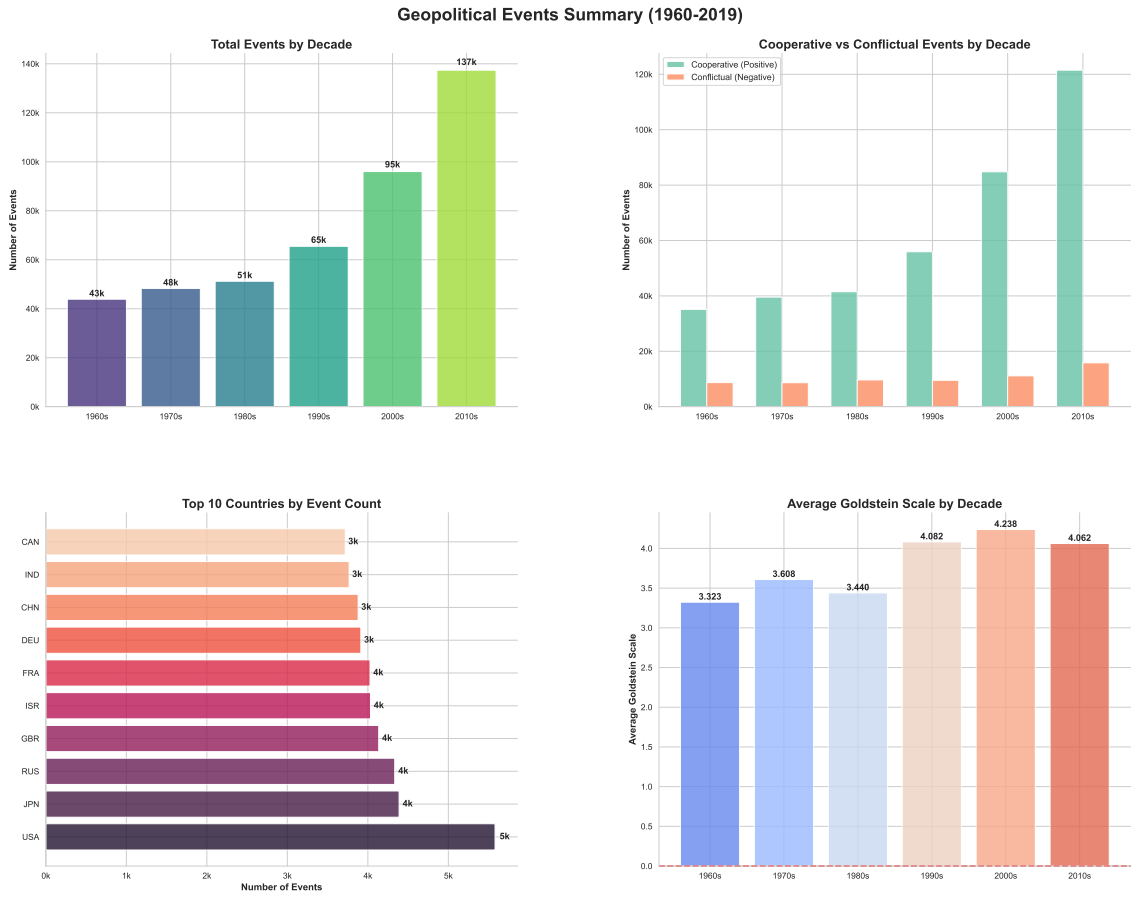


FIGURE A2. Geopolitical Events Summary (1960–2019)

improvement, with mean scores reaching their peak at 4.24 in the 2000s and reduced volatility (standard deviation of 3.54). However, the 2010s display a slight decline in mean cooperation to 4.06, suggesting emerging tensions in the contemporary international order while maintaining the reduced volatility characteristic of the post-Cold War period.

Economic diplomacy represents a significant component of international political interaction, accounting for 43.7% of all events (193,247 events). Other economic policies dominate this category with 137,381 events (71.1% of economic events), followed by trade agreements and treaties with 50,615 events (26.2%), reflecting the diverse instruments of economic statecraft in modern international relations. Economic sanctions, while less frequent with 9,319 events (4.8%), show notable temporal variation: increasing from 573 events in the 1960s to a peak of 2,135 in the 1990s, declining slightly in the 2000s (1,834), then surging to 2,821 in the 2010s. This pattern corresponds to the post-Cold War expansion of multilateral sanctions regimes and their recent intensification amid renewed strategic competition. Tariff-related events remain relatively infrequent (932 total, 0.5%) but show steady growth, particularly accelerating in the 2010s (302 events), coinciding with the

return of trade protectionism and economic nationalism in global politics.

Online Appendix C provides additional visualizations of these temporal patterns through CAMEO quadrant distributions, root code evolution, and Goldstein Scale distributions by decade, which further illuminate the macro-historical shifts captured by our methodology.

A.3. Additional Validation for Geopolitical Scores

This section provides detailed validation of our dynamic geopolitical scores through case studies of bilateral relationships that illustrate the measure's ability to capture the timing and intensity of major historical episodes. We compare our event-based scores with the negative Ideal Point Distance (IPD) from UN voting data to demonstrate the superior responsiveness of our measure to bilateral dynamics.

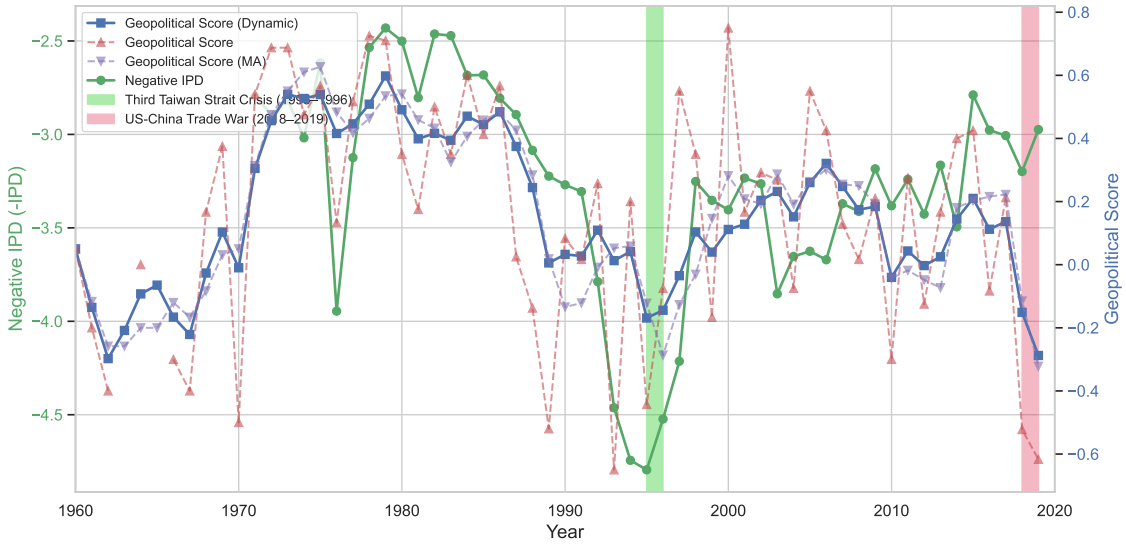


FIGURE A3. Geopolitical Scores Between United States and China

Time series comparison of geopolitical relationship measures between the United States and China, 1960–2019. The blue line shows our dynamic geopolitical score, the orange dashed line shows the yearly geopolitical score, the purple dashed line shows the four-year moving average, while the green line displays the negative Ideal Point Distance (–IPD) from UN voting data. Shaded regions highlight the Third Taiwan Strait Crisis (1995–1996, green) and the U.S.-China Trade War (2018–2019, red). Key geopolitical events are annotated on the dynamic score series.

Figure A3 illustrates the U.S.-China relationship from 1960–2019, revealing dramatic shifts that our dynamic score captures with precision. The measure successfully identifies the strategic rapprochement of the 1970s following Nixon's opening to China, with scores improving from around –0.4 to positive territory by the late 1970s. This warming reflected shared strategic interests in countering Soviet influence, culminating in the establishment of formal diplomatic relations in 1979.

Our measure then captures the sharp deterioration after 1989 following the Tiananmen Square incident, with scores plummeting as the U.S. imposed sanctions and suspended military cooperation. The Third Taiwan Strait Crisis of 1995–1996, when China conducted missile tests near Taiwan and the U.S. deployed two carrier battle groups to the region, appears as a significant negative spike in our measure—though notably less severe than the post-1989 nadir, accurately reflecting that this crisis, while serious, did not fundamentally rupture the relationship as Tiananmen had.

The subsequent recovery in our score tracks China's WTO accession process (2001) and the period of economic integration that followed. However, our measure reveals a gradual decline beginning in the Obama administration (2009–2017), coinciding with the "pivot to Asia" strategy that China interpreted as containment despite Obama's initial attempts at engagement. The administration's constructive policies were overshadowed by increased military tensions in the East and South China Seas, reflected in our steadily declining scores.

Most strikingly, our measure captures the precipitous decline during the U.S.-China trade war (2018–2019), with scores reaching levels comparable to the Third Taiwan Strait Crisis—a deterioration that the IPD measure, constrained by the multilateral nature of UN voting, fails to capture adequately. This demonstrates our measure's sensitivity to bilateral economic conflicts conducted through tariffs and sanctions.

Figure A4 demonstrates our measure's ability to capture economic interdependence and its political implications. The warming period from 1986–1993 coincides with Venezuela's strategic importance as a major oil supplier to the United States. PDVSA's acquisition of CITGO in 1986 (50% stake) and 1990 (remaining 50%) created deep economic integration, with Venezuelan refineries specifically configured for U.S. markets.

Our dynamic score accurately reflects how this economic relationship translated into improved political relations during the Carlos Andrés Pérez presidency (1989–1993). Venezuela became the leading U.S. oil supplier between 1995 and 1998, accounting for 13.7% of U.S. oil imports, while Pérez implemented U.S.-supported neoliberal reforms, including an IMF structural adjustment program in 1989. This period represents the apex of U.S.-Venezuela cooperation, with our score reaching positive territory—a warming completely missed by the IPD measure, which remains relatively flat throughout this crucial period.

The dramatic deterioration beginning with Hugo Chávez's presidency (1999–2013) is vividly captured in our measure, reflecting not just ideological differences but the weaponization of the oil relationship. Despite political tensions, including Chávez calling President Bush "the devil" at the UN in 2006, the economic relationship largely continued unhindered, explaining why our score, while negative, does not reach the extreme lows seen in purely adversarial relationships. However, under Nicolás Maduro (2013–present),

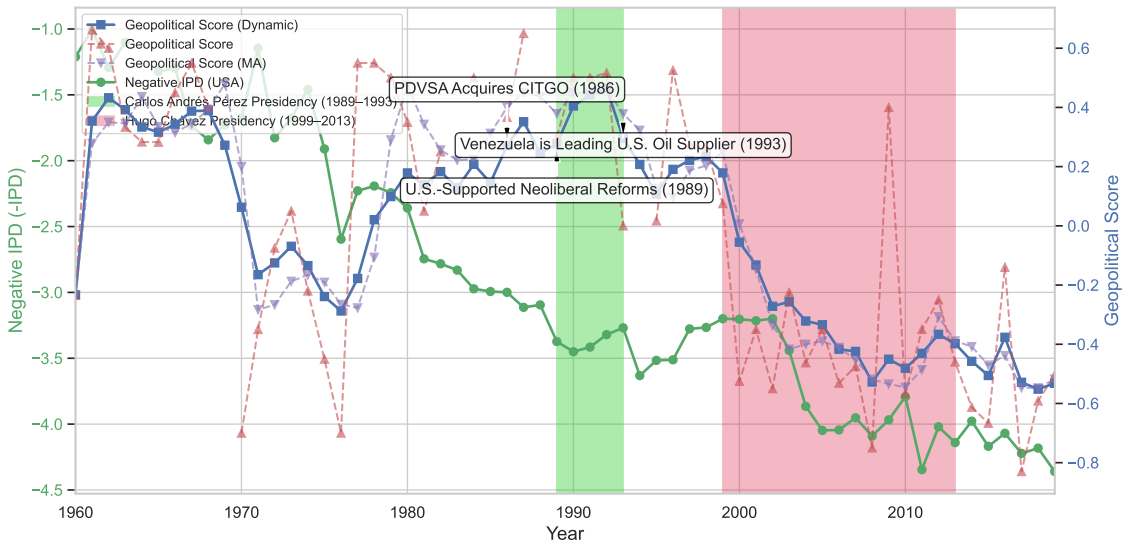


FIGURE A4. Geopolitical Scores Between United States and Venezuela

Time series comparison of geopolitical relationship measures between the United States and Venezuela, 1960–2019. The blue line shows our dynamic geopolitical score, the orange dashed line shows the yearly geopolitical score, the purple dashed line shows the four-year moving average, while the green line displays the negative Ideal Point Distance (–IPD) from UN voting data. Shaded regions highlight the Carlos Andrés Pérez presidency (1989–1993, green) and the Hugo Chávez presidency (1999–2013, red). Key economic and political events, including PDVSA's acquisition of CITGO and major oil supply milestones, are annotated on the dynamic score series.

the complete breakdown is evident, with scores reaching historical lows as the Trump administration froze PDVSA assets and blocked oil revenues in 2019.

Figure A5 reveals the complex dynamics of U.S.-South Africa relations during and after apartheid, with our measure capturing crucial variations that the IPD completely misses during the 1960s–1990s period. The relatively less negative scores in the early 1960s reflect the pre-Soweto period when international pressure was still building. The deterioration in the late 1970s and 1980s corresponds to increasing U.S. domestic pressure following the Soweto uprising (1976) and the murder of Steve Biko (1977).

During the 1980s, the Reagan administration pursued a policy of "constructive engagement" with the apartheid government, viewing South Africa as a bastion against Marxist forces in Southern Africa. This approach is reflected in our scores showing less severe negativity than might be expected given the apartheid system's brutality. However, grassroots pressure culminated in Congress overriding Reagan's veto of the Comprehensive Anti-Apartheid Act in 1986, marking a turning point captured by further score deterioration.

The dramatic improvement beginning in 1990 precisely tracks F.W. de Klerk's reforms: the release of Nelson Mandela, unbanning of the ANC, and initiation of negotiations that would lead to democratic elections in 1994. Our measure shows continued improvement

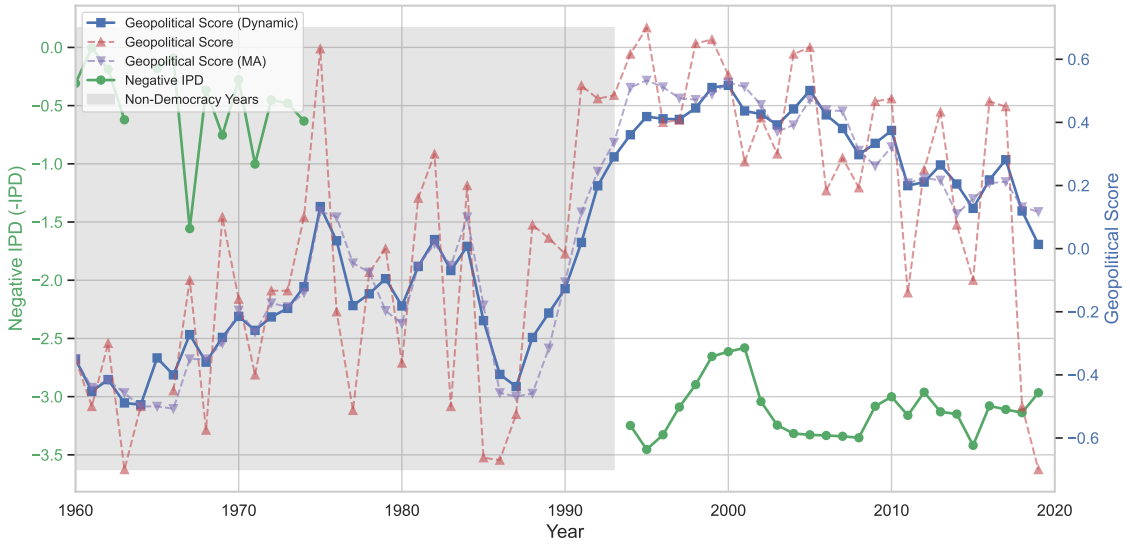


FIGURE A5. Geopolitical Scores Between United States and South Africa

Time series comparison of geopolitical relationship measures between the United States and South Africa, 1960–2019. The blue line shows our dynamic geopolitical score, the orange dashed line shows the yearly geopolitical score, the purple dashed line shows the four-year moving average, while the green line displays the negative Ideal Point Distance (–IPD) from UN voting data. Gray shaded regions indicate non-democracy years under the apartheid regime. The dramatic improvement beginning in 1990 coincides with F.W. de Klerk's reforms and Nelson Mandela's release, culminating in democratic elections in 1994.

through Mandela's presidency and beyond, reaching consistently positive scores by the late 1990s—a transformation reflecting increased U.S. aid, the return of American companies that had disinvested in the 1980s, and Mandela's address to a joint session of Congress in 1990.

Remarkably, the IPD measure shows virtually no variation throughout this entire period of dramatic change, remaining flat from the height of apartheid through democratization. This starkly illustrates the limitations of using UN voting patterns to capture bilateral relationships, particularly when one country (South Africa) was isolated from much of the international system.

Figure A6 provides a compelling illustration of how our measure captures differentiated bilateral dynamics during critical historical junctures. The four panels reveal how Argentina's relationships with major powers evolved differently around its democratization in 1983, with particular sensitivity to the Falklands/Malvinas War's differential impact.

The military junta launched the invasion of the Falkland Islands on April 2, 1982, hoping to bolster domestic support amid economic crisis and growing opposition to military rule. The war's impact on bilateral relations is strikingly differentiated in our measure. With the UK, scores plummet to extreme negative levels during and after the conflict, remaining severely depressed through the 1980s. This captures not just the military confrontation but

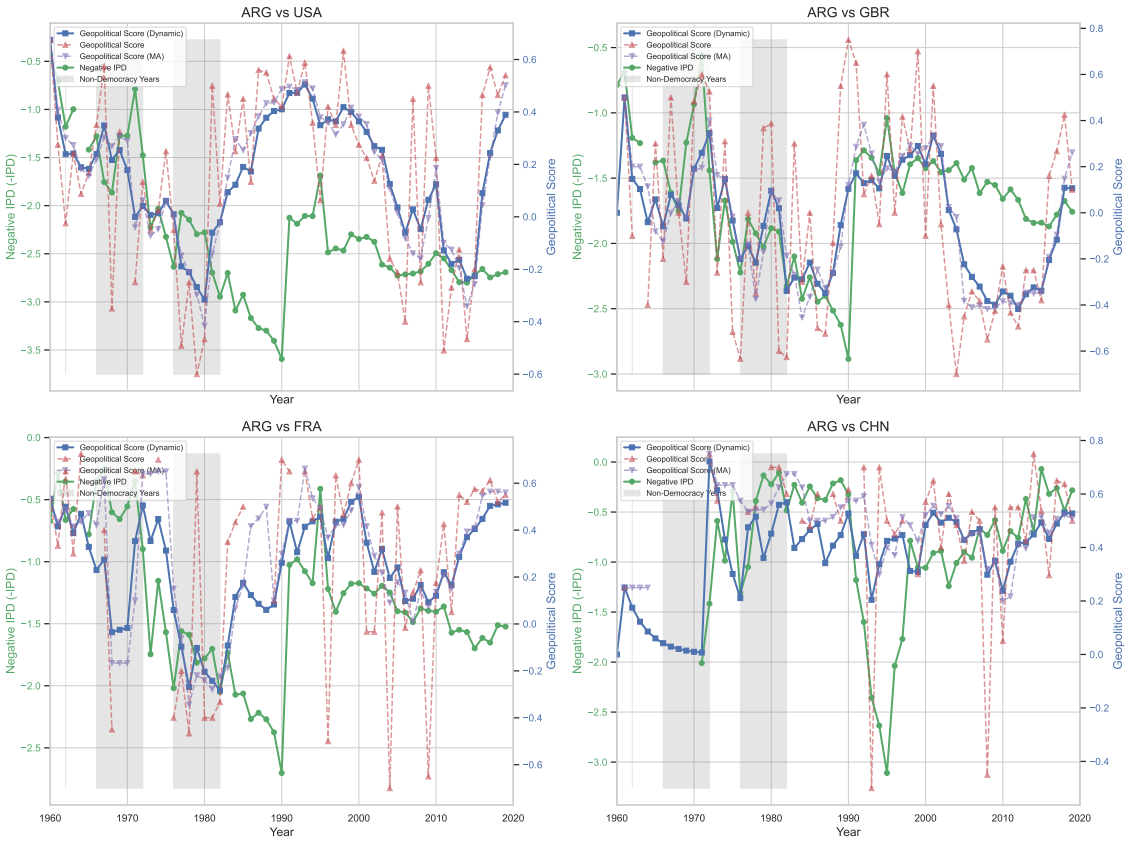


FIGURE A6. Geopolitical Scores for Argentina

Four-panel time series comparing Argentina's bilateral relationships with the United States, United Kingdom, France, and China from 1960–2019. Each panel shows our dynamic geopolitical score (blue line), yearly geopolitical score (orange dashed), four-year moving average (purple dashed), and negative IPD (green line). Gray shaded regions indicate non-democracy years under military rule. The differential impact of the 1982 Falklands/Malvinas War and the 1983 democratic transition is clearly visible across the four relationships, with the UK showing the most severe deterioration while China remains largely unaffected by these events.

the severing of diplomatic relations and ongoing tensions over the islands' sovereignty.

In contrast, Argentina's relationships with the U.S. and France show different patterns around democratization. While the Reagan administration ultimately supported Britain after failed mediation attempts by Secretary Haig, most Latin American countries viewed this as a betrayal of hemispheric solidarity. Our measure shows U.S.-Argentina relations beginning to improve even before the democratic transition, accelerating after Raúl Alfonsín's election in October 1983. This improvement reflects both the restoration of democracy and the U.S. desire to support the new democratic government after years of supporting military regimes during the Cold War.

The France panel shows similar improvement coinciding with democratization, though starting from a less negative baseline, reflecting France's more ambiguous position during the Falklands conflict—Peru attempted to purchase Exocet missiles from France to deliver

to Argentina, suggesting continued French arms relationships despite the conflict.

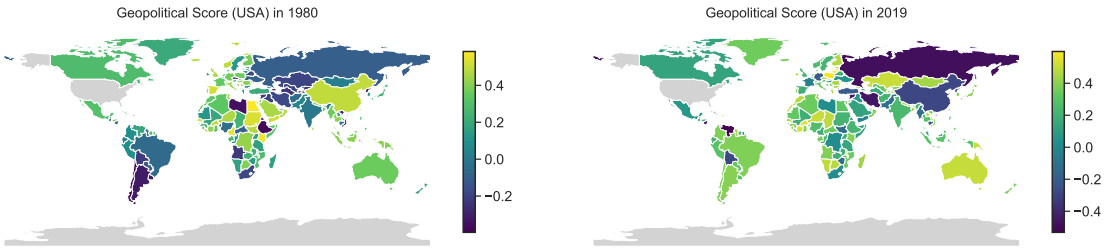
The Argentina-China panel reveals a distinctly different pattern. The relationship shows gradual improvement from the 1970s through the 1980s, largely unaffected by either the Falklands War or democratization. Both Cuba and China offered support to Argentina during the conflict, with China's position reflecting its anti-colonial stance and opposition to British imperialism. The continued improvement through the 1990s and 2000s reflects growing economic ties as China became a major market for Argentine agricultural exports.

Notably, the IPD measures for the U.S., UK, and France track very closely throughout this period, failing to capture the dramatically different bilateral dynamics our event-based measure reveals. Only in the Argentina-China relationship does the IPD show meaningful variation, though it still misses important nuances captured by our dynamic score.

These four case studies demonstrate that our event-based measure successfully captures: (1) the timing of major bilateral crises and reconciliations; (2) the intensity of both conflict and cooperation; (3) the role of economic interdependence in shaping political relations; (4) differentiated responses to the same historical events across different bilateral relationships; and (5) crucial bilateral dynamics that multilateral voting patterns fail to detect. These validations confirm that our measure provides a more accurate and nuanced assessment of bilateral geopolitical relations than existing alternatives.

A.4. Landscape of Geopolitical Relations

Maps of Bilateral Geopolitical Relations with the US and Its Rivals. This section provides geographic visualization of geopolitical relations, comparing Cold War patterns (1980) with the contemporary landscape (2019) for both the United States and its principal rivals.

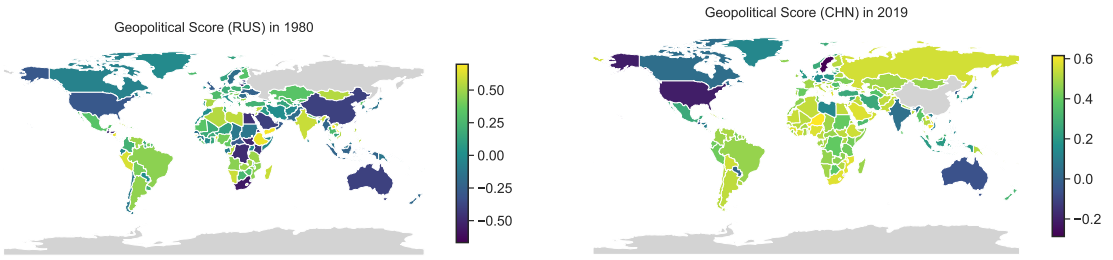


A. United States, 1980 B. United States, 2019

FIGURE A7. Geographic Distribution of Geopolitical Relations with the United States

World maps showing bilateral geopolitical scores with the United States in 1980 and 2019. Warmer colors (yellow/green) indicate positive relations; cooler colors (blue/purple) indicate negative relations. The transformation from stark Cold War divisions to a more nuanced contemporary pattern is evident, though traditional alliances remain strong.

Figure A7 reveals both continuity and change in U.S. geopolitical relations. The 1980 map displays classic Cold War geography: strong alignment throughout NATO, Pacific



A. Soviet Union, 1980 B. China, 2019

FIGURE A8. Geographic Distribution of Geopolitical Relations: Soviet Union (1980) vs. China (2019)

Comparison of America's principal rival's geopolitical reach in 1980 (Soviet Union) and 2019 (China). While the Soviet Union's positive relations were concentrated in Eastern Europe and select developing countries, China's positive relations extend broadly across Asia, Africa, and Latin America through economic engagement.

allies (Japan, South Korea, Australia), and most of the Western Hemisphere, contrasted with hostility across the Soviet bloc and aligned states. By 2019, while core alliances remain intact, the sharp geographic divisions have given way to more graduated patterns. Post-Soviet states show varied relationships, many African and Asian states have shifted from negative to neutral or positive, and new adversarial relationships have emerged (notably with Russia and Iran).

Figure A8 contrasts the geographic reach of America's principal rivals across eras. The Soviet Union's 1980 influence concentrated in contiguous Eastern Europe, Cuba, Vietnam, and select African clients—largely maintained through military and ideological ties. China's 2019 map reveals a fundamentally different pattern: positive relations extend across most of the developing world, particularly in Africa and Asia, achieved primarily through trade and infrastructure investment rather than military alliances.[42]

Several patterns validate our measure's ability to capture known geopolitical dynamics:

Cold War Bipolarity (1980): The near-mirror imaging between U.S. and Soviet maps confirms the era's zero-sum competition. Countries showing strong positive relations with one superpower typically display negative relations with the other. Notable exceptions like India and Egypt (showing moderate scores with both) align with their non-aligned status.

Contemporary Complexity (2019): The U.S. and China maps no longer display mirror-image qualities. Many countries maintain positive relations with both powers, creating the "connector" states identified in our network analysis. However, China's most negative relations (darkest blue) concentrate among America's closest allies, suggesting that strategic competition intensifies alignment pressures in key regions.

[42]This shift from ideological-military to economic modes of influence expansion reflects broader changes in how great powers compete in the contemporary era.

Regional Variations: Different regions display distinct evolutionary patterns. Europe shows remarkable stability in U.S. alignment. Asia transformed from a Cold War battleground to an arena of complex economic interdependence alongside security competition. Africa shifted from proxy conflict to pragmatic multi-alignment. Latin America maintains hemispheric ties while diversifying partnerships.

These geographic patterns corroborate our distributional findings. The stark geographic blocs of 1980 produced the bimodal distribution observed in Figure 4, while the complex geometry of 2019—mixing continued alliances, new partnerships, and selective rivalries—generates the more continuous but increasingly dispersed contemporary distribution. The maps thus provide face validity for our measure by showing geographically coherent patterns that align with established historical narratives while revealing nuanced variations that aggregate measures miss.

Statistics of Country-level Geopolitical Relations. Table A3 presents summary statistics for country-level geopolitical relations across six decades, revealing systematic patterns in the evolution of global geopolitical alignment.

The summary statistics reveal three key patterns. First, mean geopolitical relations improved substantially from 0.188 in the 1960s to 0.303 in the 2000s—a 61% increase—before stabilizing at 0.306 in the 2010s. This trajectory aligns with our distributional analysis showing post-Cold War convergence followed by recent stabilization. Second, the standard deviation declined from 0.152 in the 1960s to 0.094 in the 2010s, indicating reduced heterogeneity as countries converged toward more cooperative average relations. Third, the 5th percentile improved dramatically from −0.075 in the 1960s to 0.125 in the 2010s, demonstrating that even the most isolated countries experienced substantial improvement in their average geopolitical relations.

The countries occupying extreme positions provide additional validation of our measure. During the Cold War decades, apartheid-era South Africa and Zimbabwe consistently ranked among the most geopolitically isolated states, reflecting international sanctions and diplomatic ostracism. The contemporary period's most isolated countries—North Korea, Syria, Venezuela, and Iran—are all subjects of extensive international sanctions or military conflicts. Conversely, the highest-scoring countries often represent small states successfully maintaining positive relations across geopolitical divides (Singapore, Jordan) or beneficiaries of particular historical moments (Czech Republic and Poland during post-Cold War democratization, African states like Ghana and Benin engaging multiple development partners). These patterns confirm that our measure captures both systematic features of the international system and country-specific geopolitical strategies.

TABLE A3. Summary Statistics of Geopolitical Relations by Decade, 1960–2019

	1960s	1970s	1980s	1990s	2000s	2010s
Summary Statistics						
Mean	0.188	0.210	0.209	0.277	0.303	0.306
Median	0.204	0.224	0.237	0.300	0.322	0.328
Std. Dev.	0.152	0.112	0.122	0.124	0.103	0.094
Min	−0.424	−0.390	−0.319	−0.406	−0.165	−0.346
Max	0.520	0.484	0.434	0.486	0.478	0.454
5th Pct.	−0.075	0.017	−0.034	0.035	0.104	0.125
25th Pct.	0.073	0.140	0.147	0.225	0.265	0.273
75th Pct.	0.307	0.294	0.298	0.361	0.374	0.367
95th Pct.	0.402	0.364	0.362	0.428	0.420	0.407
N Countries	195	196	196	196	196	196
Countries with Lowest Geopolitical Relations (Bottom 5)						
1.	Zimbabwe	S. Africa	S. Africa	Libya	Myanmar	N. Korea
2.	S. Africa	Zimbabwe	Libya	Iraq	Zimbabwe	Syria
3.	Albania	Albania	Afghanistan	Myanmar	Belarus	Venezuela
4.	N. Korea	Taiwan	N. Korea	Serbia	Iraq	Iran
5.	Namibia	Timor-L.	Iran	Sudan	Iran	Eritrea
Countries with Highest Geopolitical Relations (Top 5)						
1.	Senegal	Bangladesh	Bangladesh	Czech Rep.	Estonia	Singapore
2.	Liberia	Romania	Madagascar	Luxembourg	Benin	Ghana
3.	Afghanistan	Nepal	Cameroon	Poland	Jordan	Benin
4.	Nepal	Belgium	Botswana	Mongolia	Ghana	Mozambique
5.	San Marino	Finland	Senegal	Hungary	Mozambique	Jordan

Geopolitical Relation measures the GDP-weighted average of bilateral geopolitical scores for each country. Statistics are calculated using all available country-year observations within each decade. Countries are ranked by their decade average geopolitical relation scores.

A.5. Dynamics of Geopolitical Relations

This section examines the dynamic properties of our geopolitical measures using local projection methods. We analyze both the persistence of bilateral geopolitical scores and country-level geopolitical relations to understand how these measures evolve over time.

Methodology. We estimate impulse response functions using local projections for two key measures. For country-level geopolitical relations, we estimate:

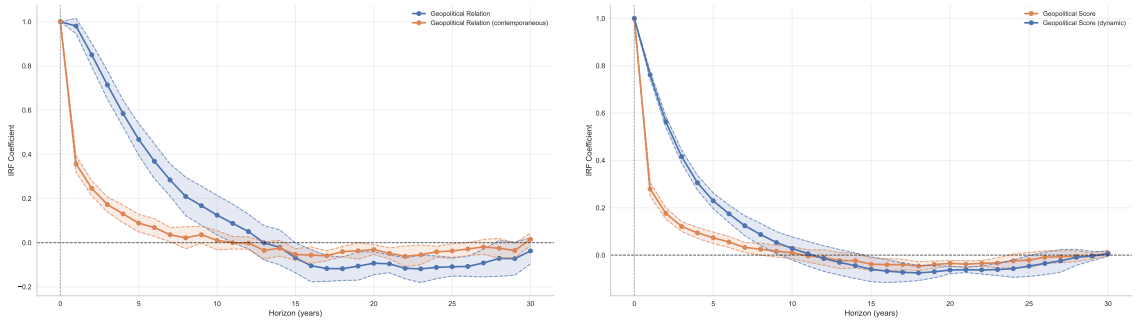
$$p_{c,t+h} = \alpha_h^{\text{Geo. Relation}} p_{ct} + \boldsymbol{\gamma}_h' \mathbf{x}_{ct} + \mu_{c,t+h}, \quad h = 0, 1, \ldots, 30$$

where p_{ct} denotes either our dynamic geopolitical relation measure or the contemporaneous average, $\mathbf{x}_{ct}$ includes four lags of GDP and the respective geopolitical measure, and we control for country and year fixed effects.

For bilateral geopolitical scores, we estimate:

$$S_{ij,t+h} = \alpha_h^{\text{Score}} S_{ij,t} + \boldsymbol{\gamma}_h' \mathbf{x}_{ij,t} + \mu_{ij,t+h}, \quad h = 0, 1, \ldots, 30$$

where $S_{ij,t}$ represents either the yearly average score or our dynamic score, $\mathbf{x}_{ij,t}$ contains four lags of the score variable, and we include country-pair and year fixed effects with Driscoll-Kraay standard errors.



A. Country-Level Geopolitical Relations B. Bilateral Geopolitical Scores

FIGURE A9. Impulse Response Functions of Geopolitical Measures

Local projection impulse responses to own shocks. Panel (a): Country-level geopolitical relations with dynamic measure (blue) and contemporaneous average (orange). Panel (b): Bilateral geopolitical scores with dynamic score (blue) and yearly average (orange). Shaded areas represent 95% confidence intervals. Panel (a) includes four lags of GDP growth and the respective geopolitical measure, plus country and year fixed effects with Driscoll-Kraay standard errors. Panel (b) includes four lags of the respective score variable, plus country-pair and year fixed effects with Driscoll-Kraay standard errors.

Results. Figure A9 presents the impulse responses for both country-level relations and bilateral scores. Panel (a) shows that the dynamic geopolitical relation measure exhibits substantial persistence with a half-life of approximately 5 years, while the contemporaneous average displays rapid mean reversion, returning to baseline within 2–3 years. Notably, the dynamic measure shows slight overshooting between years 15–20 before converging to zero, consistent with cyclical patterns in international relations.

Panel (b) reveals similar patterns at the bilateral level. The yearly average score exhibits strong mean reversion with a half-life under one year, reflecting the transitory nature of individual geopolitical events. In contrast, our dynamic score demonstrates markedly higher persistence, with effects remaining significant for over a decade. This enhanced persistence stems from our decay parameter $\delta = 0.3$, calibrated to capture the typical four-year political cycle while allowing past events to influence current relations. These findings validate our dynamic specification's ability to capture the inherent persistence in geopolitical relationships while filtering out short-term noise from individual events.

A.6. Instruments: Non-economic Mild-conflict Events

Our instrumental variable strategy exploits variation from non-economic mild conflicts—diplomatic disputes and political tensions that affect bilateral relations without directly impacting economic activity. This section provides a detailed analysis of these events, which constitute our exclusion restriction for causal identification.

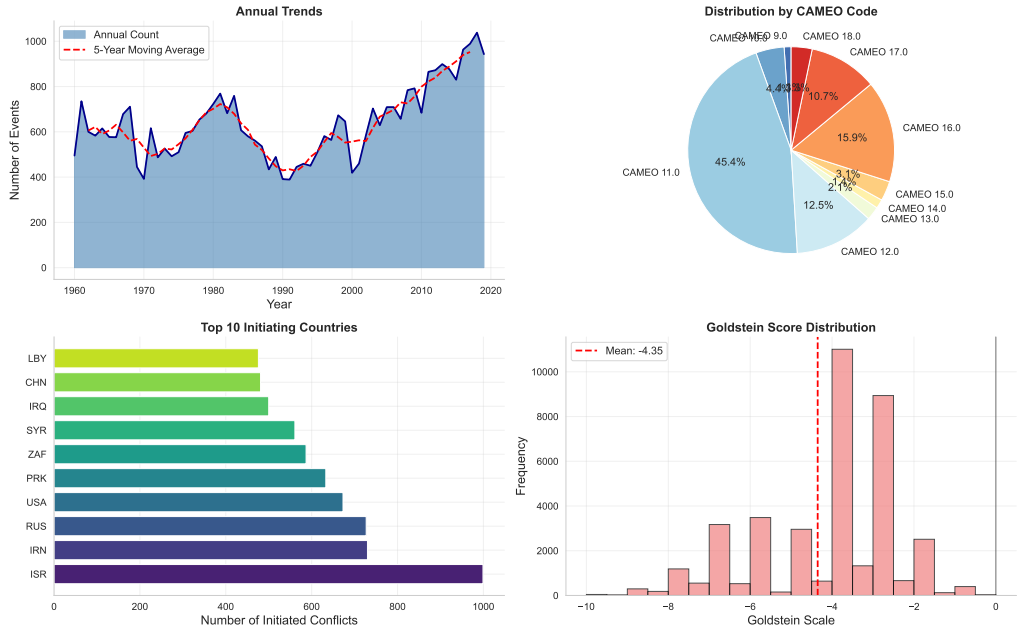


FIGURE A10. Non-Economic Mild Conflict Events: Summary Statistics (1960–2019)

This figure presents four panels analyzing 38,227 non-economic mild conflict events. Panel A shows annual trends with a 5-year moving average, revealing increasing frequency over time. Panel B displays the distribution across CAMEO root codes, with "Disapprove" (45.4%) and "Reduce Relations" (15.9%) dominating. Panel C identifies the top 10 initiating countries, led by Israel, Iran, and Russia. Panel D presents the Goldstein score distribution, with a mean of −4.35, confirming the conflictual nature of these events. Data include only events with Goldstein scores ≤ 0 and exclude economic events.

Figure A10 synthesizes patterns across 38,227 non-economic mild conflict events from our dataset. These events exhibit three key characteristics that validate their use as instruments. First, they show substantial temporal variation, increasing from approximately 450 events annually in the 1960s to over 1,000 by 2018, providing rich identifying variation across time. Second, the distribution across CAMEO categories reveals that verbal conflicts (codes 9–14) comprise 67.0% of events, while material conflicts (codes 15–18) account for 33.0%, demonstrating a spectrum of intensity that generates heterogeneous effects on bilateral relations. Third, the negative mean Goldstein score of −4.35 confirms these events consistently deteriorate geopolitical relations without involving economic content.

Table A4 details the taxonomy of non-economic mild conflicts that constitute our instrumental variable. The predominance of "Disapprove" events (17,369 occurrences,

TABLE A4. Non-economic Mild-conflict Events: CAMEO Root Codes 09–18

Root Code & Category	Event Types	Primary Causes
Panel A: Verbal Conflict Events		
09 INVESTIGATE	Investigations into crime, corruption, human rights abuses, military actions, and war crimes	Accountability demands, transparency requirements, moral obligations, violation of international norms
10 DEMAND	Diplomatic cooperation, political reform, compliance, meetings, negotiations, dispute settlement, mediation initiatives	Political disagreements, sovereignty disputes, governance failures, diplomatic tensions
11 DISAPPROVE	Criticism, accusations, opposition mobilization, official complaints, legal proceedings, guilt determinations	Ideological differences, policy disagreements, human rights concerns, norm violations
12 REJECT	Refusal of cooperation, political reform, negotiations, mediation; defiance of norms and laws	Political incompatibility, sovereignty protection, ideological resistance, strategic positioning
13 THREATEN	Diplomatic threats, administrative sanctions, political dissent support, negotiation suspension, military ultimatums	Deterrence strategies, power projection, diplomatic leverage, security concerns
14 PROTEST	Political dissent, demonstrations, hunger strikes, boycotts, obstructions, violent riots	Political grievances, social justice issues, governance problems, rights violations
Panel B: Material Conflict Events		
15 EXHIBIT FORCE	Military/police mobilization, alert status increases, cyber-force deployment	Security threats, territorial disputes, deterrence signaling, crisis response
16 REDUCE RELATIONS	Diplomatic tie severance, personnel expulsion, negotiation/mediation termination	Political incompatibility, diplomatic crises, security concerns, policy protests
17 COERCE	Property seizure, administrative sanctions, arrests, deportations, repression, cyber attacks	Law enforcement, political control, security operations, retaliation
18 ASSAULT	Unconventional violence: abduction, physical assault, bombing, human shields, assassination	Terrorism, political violence, extremism, asymmetric warfare

This table presents the classification scheme for geopolitical conflict events using the Conflict and Mediation Event Observations (CAMEO) framework, focusing on root codes 09–18 representing escalating conflict intensity. Panel A covers verbal conflicts involving rhetorical confrontation without material force, while Panel B encompasses material conflicts involving tangible demonstrations of power or violence. Events are classified based on primary action type rather than underlying motivations, which may include multiple concurrent factors. Economic conflict events (e.g., trade disputes, sanctions) are excluded from this classification to focus on political, security, and social dimensions of bilateral tensions.

45.4%) and "Reduce Relations" events (6,091 occurrences, 15.9%) reflects the diplomatic nature of most bilateral tensions. These events—ranging from human rights criticisms to ambassador expulsions—generate substantial variation in our geopolitical relations measure while remaining orthogonal to economic fundamentals.

The exclusion restriction requires that these non-economic conflicts affect GDP only through their impact on overall geopolitical relations. This assumption is plausible for several reasons. First, by construction, we exclude all events with direct economic content (tariffs, sanctions, trade agreements). Second, the events predominantly involve symbolic or political actions—diplomatic protests, investigations into human rights violations, or ideological disagreements—that lack immediate economic consequences. Third, the distribution of initiating countries spans diverse political systems and development levels, suggesting these conflicts arise from idiosyncratic political factors rather than systematic economic conditions.

Importantly, while these mild conflicts generate negative Goldstein scores (mean = −4.35), they create sufficient variation in bilateral relations to identify causal effects. A typical diplomatic dispute scoring −4.0 on the Goldstein scale meaningfully deteriorates the bilateral relationship, affecting the country-level geopolitical measure through our GDP-weighted aggregation. The instrument's strength derives from both the frequency of these events (averaging 637 per year) and their cumulative impact on diplomatic relations.

The temporal trend reveals increasing diplomatic activity over our sample period, with events rising from 450 in 1960 to 1,038 in 2018. This growth reflects both improved event documentation and genuine increases in international engagement. Crucially for identification, the trend exhibits substantial year-to-year variation rather than smooth growth, providing the quasi-random shocks necessary for our instrumental variables strategy.

Appendix B. Additional Empirical Results

B.1. Economic Data

This appendix documents the economic variables used in our analysis. Our dataset extends Acemoglu et al. (2019) to cover 196 countries over 1960–2019, incorporating updated democracy measures from Acemoglu et al. (2025) and economic indicators from the Penn World Tables (Feenstra, Inklaar, and Timmer 2015).

Table A5 organizes variables into four categories following the growth literature: enhanced Solow fundamentals (GDP, investment, capital, demographics), political institutions and governance (democracy, unrest, regime indicators), market institutions and reforms (liberalization indices, fiscal measures), and human capital and labor markets (education, employment, productivity measures). Coverage varies from 109 countries (TFP) to 195 countries (demographic variables), reflecting differences in data availability and statistical capacity across countries and time periods. All monetary variables are in constant prices for temporal comparability.

B.2. Additional Results for Baseline Estimates

This section provides supplementary evidence for our baseline results, including detailed coefficient estimates and robustness checks addressing potential concerns about sample composition, inference methods, and lag specifications.

Table A6 presents the complete local projection coefficients underlying our baseline impulse response function. The results reveal a clear dynamic pattern: insignificant pre-trends for negative horizons confirm the absence of reverse causality, while the contemporaneous effect of 6.3 log points grows to peak at 24.9 log points after 5 years before gradually declining. The coefficient remains statistically significant through horizon 15, demonstrating remarkable persistence. The within-R^2 values follow an inverse U-shape, reaching near-unity around horizons 0 and −5 where lagged dependent variables have maximum predictive power, then declining at longer horizons as prediction becomes more challenging.

Balanced versus Unbalanced Panel Estimates. Our baseline analysis employs an unbalanced panel where country coverage varies across horizons. To ensure compositional changes do not drive our results, we construct a balanced panel of 136 countries with complete data from $h = -15$ to $h = 25$. Panel (a) of Figure A11 shows remarkable stability: impulse responses from both panels closely track each other, with overlapping confidence intervals throughout most horizons. Both specifications exhibit the characteristic hump-shaped response, peaking around years 6–8 at approximately 30 log points. The absence of pre-trends in both samples reinforces our identification strategy.

TABLE A5. Data Description and Coverage

Variable	Data Source	Country Coverage	Data Period
Enhanced Solow Fundamentals			
GDP per capita (Constant US Dollar)	WDI	187 countries	1960–2019
Real GDP per capita	PWT	172 countries	1960–2019
Trade as Share of GDP	WDI	178 countries	1960–2019
Investment as Share of GDP	PWT	173 countries	1960–2019
Capital Stock	PWT	171 countries	1960–2019
Population	PWT	173 countries	1960–2019
0–14 Population Share	WDI	195 countries	1960–2019
15–65 Population Share	WDI	195 countries	1960–2019
Political Institutions and Governance			
Democracy (Acemoglu et al. 2019)	Acemoglu et al. (2019)	184 countries	1960–2010
Democracy (Acemoglu et al. 2025)	Acemoglu et al. (2025)	193 countries	1960–2019
Unrest	Acemoglu et al. (2019)	180 countries	1960–2010
Soviet Union	Acemoglu et al. (2019)	184 countries	1960–2019
Region	Acemoglu et al. (2025)	196 countries	1960–2019
Market Institutions and Reforms			
Market Reform Index	Acemoglu et al. (2019)	153 countries	1960–2005
Tax-to-GDP	Acemoglu et al. (2019)	136 countries	1960–2005
Human Capital and Labor Markets			
Human Capital Index	PWT	143 countries	1960–2019
Employment	PWT	173 countries	1960–2019
Labor Share	PWT	133 countries	1960–2019
Primary Enrollment	Acemoglu et al. (2019)	176 countries	1970–2010
Secondary Enrollment	Acemoglu et al. (2019)	176 countries	1970–2010
Productivity and Returns			
TFP	PWT	109 countries	1960–2010
Internal Rate of Return	PWT	132 countries	1960–2019
Real Consumption	PWT	173 countries	1960–2019
Real Domestic Absorption	PWT	173 countries	1960–2019

This table summarizes all variables used in the analysis, organized into four categories: enhanced Solow fundamentals, political institutions and governance, market institutions and reforms, and human capital measures. Country coverage represents the number of countries with at least one non-missing observation for each variable. Data sources: WDI = World Development Indicators; PWT = Penn World Tables.

TABLE A6. Local Projection Estimates: Dynamic Effects of Geopolitical Relations on GDP

Horizon (years)	$h = -15$	$h = -10$	$h = -5$	$h = 0$	$h = 5$	$h = 10$	$h = 15$	$h = 20$	$h = 25$
Geopolitical Relations	−9.382	−8.939	−0.997	6.332***	24.920***	21.797***	15.372**	3.123	−2.074
	(9.189)	(6.437)	(2.163)	(1.987)	(6.366)	(6.772)	(6.947)	(6.217)	(4.968)
Within-R^2	0.467	0.729	0.978	0.980	0.749	0.513	0.324	0.198	0.139
Observations	6,193	7,107	8,036	8,208	7,279	6,364	5,459	4,569	3,703
Countries	181	185	186	186	185	181	181	175	169

This table presents local projection estimates from equation (4) for the effect of geopolitical relations on log GDP per capita (×100). Each column represents a separate regression for horizon h, where negative horizons test for pre-trends. All specifications include country fixed effects, region-year fixed effects, and four lags of both log GDP per capita and geopolitical relations. Driscoll-Kraay standard errors in parentheses account for cross-sectional and temporal dependence. The sample spans 1960–2019 with varying coverage across horizons due to lag requirements and data availability. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

A. Balanced vs. Unbalanced Panel

B. Alternative Inference Methods

FIGURE A11. Robustness Checks for Baseline IRF Estimates

Panel (a) compares impulse responses using balanced (136 countries with complete data, blue) and unbalanced panels (all available observations, orange). Panel (b) displays the baseline IRF with three types of confidence intervals: Driscoll-Kraay standard errors (blue shaded), 1,000 country-block bootstrap iterations (green shaded), and 1,000 wild bootstrap iterations using Rademacher weights (red shaded). Both panels show the response of log GDP per capita (×100) to a unit shock in geopolitical relations. All specifications include four lags of the dependent variable and geopolitical relations, country fixed effects, and region-year fixed effects.

Bootstrap-Based Inference. Our baseline Driscoll-Kraay standard errors treat the geopolitical relations measure as fixed, potentially understating uncertainty. Panel (b) examines robustness using two alternative bootstrap procedures. First, we implement a block bootstrap that resamples entire countries with replacement, capturing both within-country serial correlation and measurement uncertainty in the geopolitical index. Second, we employ a wild bootstrap with Rademacher weights that preserves the panel structure while accounting for potential heteroskedasticity and within-cluster correlation.[43]

The confidence intervals from 1,000 iterations of each bootstrap method are marginally

[43]The wild bootstrap generates weights $w_i \in \{-1, +1\}$ with equal probability for each observation, then constructs bootstrap samples as $y^*_{it} = \hat{y}_{it} + w_i \hat{\epsilon}_{it}$, where $\hat{y}_{it}$ and $\hat{\epsilon}_{it}$ are fitted values and residuals from the baseline specification. This approach is particularly robust to heteroskedasticity of unknown form in panel settings (Cameron, Gelbach, and Miller 2008).

wider than the Driscoll-Kraay bands, particularly at medium horizons (5–15 years), but the differences are economically modest. The wild bootstrap intervals (red shaded area) are slightly narrower than the country-resampling bootstrap (green shaded area) at most horizons, suggesting that accounting for heteroskedasticity provides efficiency gains while maintaining valid inference. All three inference methods yield statistically significant positive effects throughout the key horizons, with the impulse response remaining well above zero even at the widest confidence bounds. The convergence of results across these diverse inference approaches—parametric clustered standard errors, block resampling, and wild bootstrap—confirms the robustness of our main findings.

Alternative Lag Specifications. Figure A12 examines sensitivity to lag length selection. Parsimonious specifications with one or two lags exhibit problematic pre-trends—GDP declines before geopolitical improvements—indicating inadequate control for growth dynamics. Our baseline four-lag specification eliminates these pre-trends while maintaining precision. The eight-lag specification yields nearly identical point estimates with moderately wider confidence intervals due to additional parameters. The convergence between four- and eight-lag results validates our baseline choice, confirming adequate capture of relevant dynamics without overfitting.

These robustness checks collectively reinforce our main findings. The stability of impulse responses across different samples, inference methods, and lag structures supports our conclusion that geopolitical alignment generates substantial and persistent economic returns. The consistency of results is particularly noteworthy given the stringent demands of within-country identification in growth regressions.

B.3. Impulse Responses to Transitory and Persistent Shocks

The impulse responses presented in Section 3.3 reflect both the direct impact of initial geopolitical shocks and the subsequent effects of geopolitical persistence. To isolate the direct effects, we construct responses to a counterfactual scenario where geopolitical improvements are purely transitory—increasing by one unit on impact and returning to zero immediately thereafter. Following Sims (1986) and Bilal and Känzig (2024), we combine the impulse responses of geopolitical relations and GDP to construct this counterfactual transitory response.

We begin by estimating the dynamics of geopolitical relations using local projections:

$$p_{c,t+h} = \phi_h^p p_{ct} + \gamma_h' \mathbf{x}_{ct} + \mu_{c,t+h}, \quad h = 0, 1, \ldots, H \tag{A1}$$

where $\{\phi_h^p\}_{h=0,\ldots,H}$ represents the impulse response of geopolitical relations to its own shock. To construct the purely transitory shock, we introduce a series of auxiliary shocks

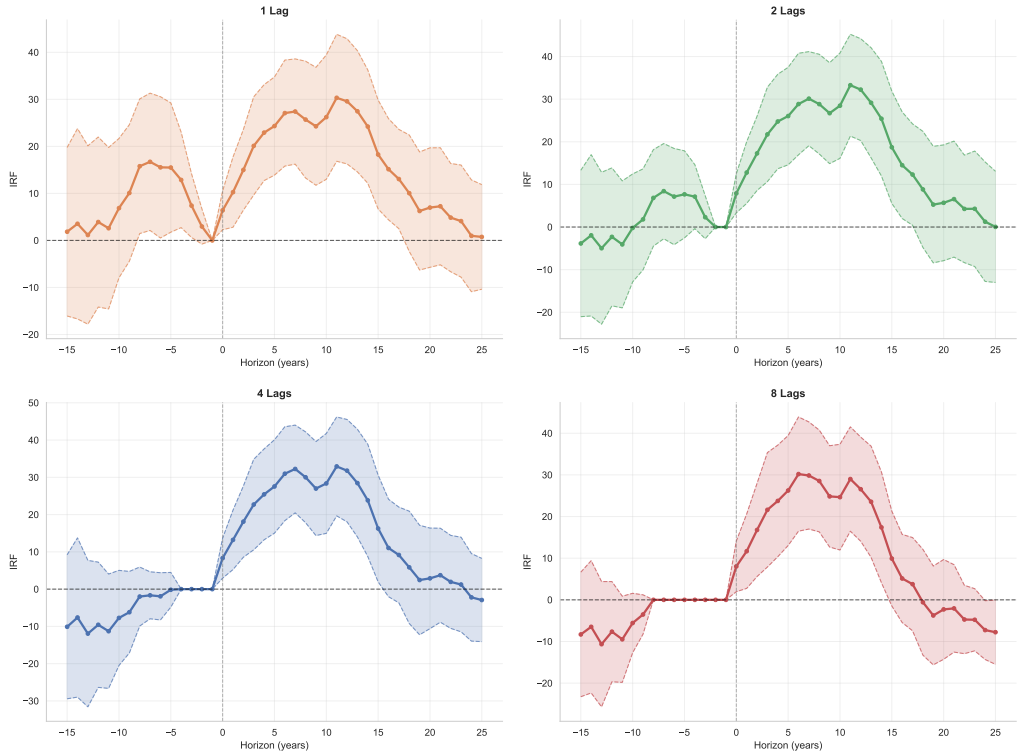


FIGURE A12. Impulse Response Functions Under Alternative Lag Specifications

IRF of log GDP per capita (×100) to a unit improvement in geopolitical relations. Each panel shows results with the indicated number of lags for both GDP and geopolitical relations. All specifications include country and region-year fixed effects. Shaded areas represent 95% confidence intervals with Driscoll-Kraay standard errors. The spurious pre-trends in one- and two-lag specifications highlight the importance of adequate lag structure for identification.

$\{p_h^{\text{shock}}\}_{h=0}^{H}$ at each horizon that impose the desired transitory response pattern $\widetilde{\boldsymbol{\phi}}^{p} = (1, 0, \ldots, 0)'$. The required shock series $\boldsymbol{p}^{\text{shock}}$ is obtained by solving:

$$\underbrace{\begin{pmatrix} p_0^{\text{shock}} \\ p_1^{\text{shock}} \\ \vdots \\ p_H^{\text{shock}} \end{pmatrix}}_{\boldsymbol{p}^{\text{shock}}} = \underbrace{\begin{pmatrix} 1 & 0 & \cdots & 0 \\ \phi_1^p & 1 & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ \phi_H^p & \phi_{H-1}^p & \cdots & 1 \end{pmatrix}^{-1}}_{\left(\boldsymbol{\Phi}^p\right)^{-1}} \underbrace{\begin{pmatrix} 1 \\ 0 \\ \vdots \\ 0 \end{pmatrix}}_{\widetilde{\boldsymbol{\phi}}^{p}} \tag{A2}$$

Given this shock series, the corresponding GDP impulse responses $\widetilde{\alpha}$ to the purely

transitory geopolitical shock are:

$$\underbrace{\begin{pmatrix} \tilde{\alpha}_0 \\ \tilde{\alpha}_1 \\ \vdots \\ \tilde{\alpha}_H \end{pmatrix}}_{\tilde{\boldsymbol{\alpha}}} = \underbrace{\begin{pmatrix} p_0^{\text{shock}} & 0 & \cdots & 0 \\ p_1^{\text{shock}} & p_0^{\text{shock}} & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ p_H^{\text{shock}} & p_{H-1}^{\text{shock}} & \cdots & p_0^{\text{shock}} \end{pmatrix}}_{\mathbf{P}^{\text{shock}}} \underbrace{\begin{pmatrix} \alpha_0 \\ \alpha_1 \\ \vdots \\ \alpha_H \end{pmatrix}}_{\boldsymbol{\alpha}} \tag{A3}$$

The resulting impulse responses $\tilde{\boldsymbol{\alpha}}$ represent the GDP effects following a one-time, purely transitory improvement in geopolitical relations. This decomposition enables computation of responses to geopolitical shocks with arbitrary persistence patterns. For the permanent shock response shown in Figure 7, we compute the cumulative effect as $\sum_{s=0}^{h} \tilde{\alpha}_s$, which represents the total GDP impact when geopolitical relations permanently increase by one unit. Statistical inference employs block bootstrap resampling across countries to account for estimation uncertainty in both stages.

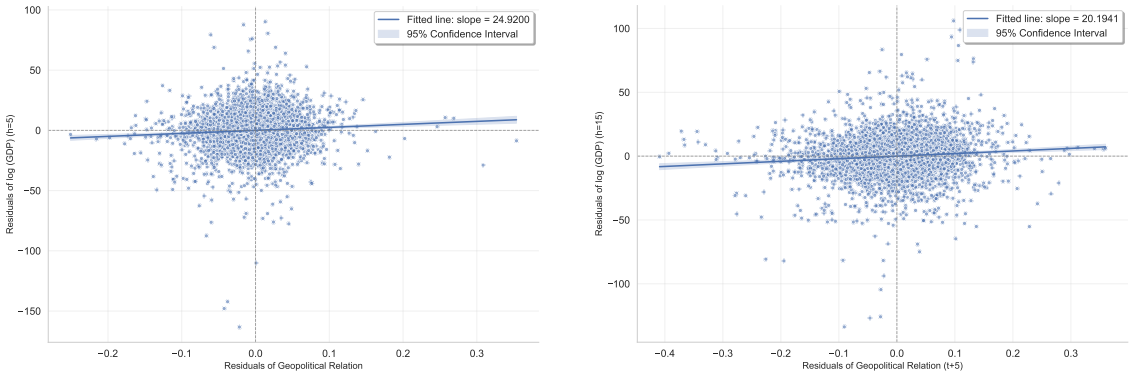
Methodological Caveat. This approach assumes that the economic effects of a sequence of unanticipated geopolitical shocks equal those of an anticipated path announced at time zero. While this assumption facilitates decomposition analysis and is standard in the impulse response literature, it abstracts from forward-looking behavior that might differ under anticipation of future geopolitical changes. The assumption is most plausible for transitory shocks where agents have limited ability to anticipate persistence. We employ this decomposition primarily to illustrate the economic importance of geopolitical persistence rather than for structural policy analysis.

B.4. Additional Robustness Results

This section provides additional evidence supporting the robustness of our main findings through extended visualizations and decomposition analyses.

Sources of Variation. We present both raw scatter plots and binscatter plots at various horizons to demonstrate that the positive relationship between geopolitical relations and economic growth is not driven by outliers or specific subsamples.

Figure A13 presents the raw data underlying our main binscatter analysis. The scatter plots reveal several important features. First, the positive relationship is evident across the entire distribution of geopolitical relations, from hostile (−0.3) to cooperative (+0.3) relationships. Second, the relationship appears approximately linear, with no obvious nonlinearities or threshold effects. Third, while there is substantial dispersion—reflecting the many factors affecting GDP beyond geopolitical relations—no extreme outliers drive



A. Raw Scatter: GDP at $t + 5$ vs. Geo at t

B. Raw Scatter: GDP at $t + 15$ vs. Geo at $t + 5$

FIGURE A13. Raw Scatter Plots of Residualized GDP and Geopolitical Relations

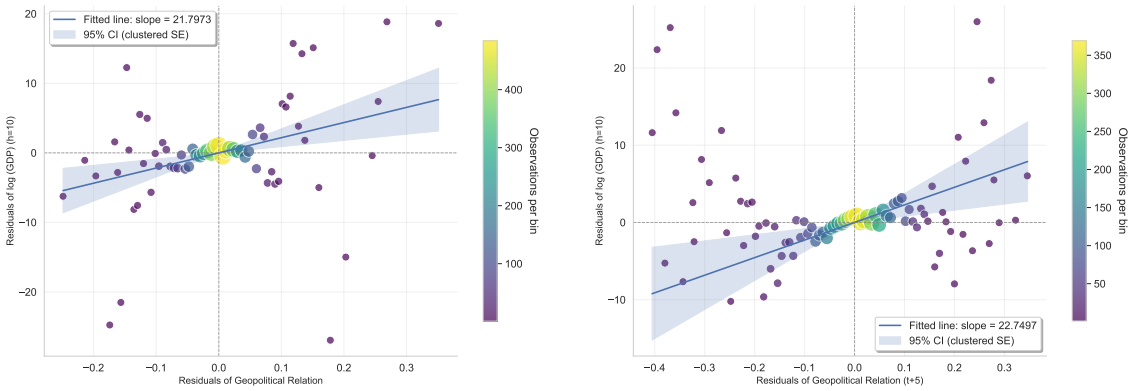
This figure displays raw scatter plots corresponding to the binscatter plots in Figure 8. Panel (a) shows all residualized observations of log GDP per capita at $t + 5$ against geopolitical relations at t. Panel (b) plots GDP at $t + 15$ against forward geopolitical relations at $t + 5$. Both panels partial out four lags of GDP and geopolitical relations, country fixed effects, and region-year fixed effects using the Frisch-Waugh-Lovell theorem. The fitted lines have slopes of 24.9 and 20.2, respectively, with 95% confidence intervals based on Driscoll-Kraay standard errors.

the results. The consistency of slopes across panels (a) and (b) demonstrates that our findings hold whether using contemporaneous or forward geopolitical measures.

Figure A14 examines the relationship at the 10-year horizon from two perspectives. Panel (a) shows that geopolitical relations continue to predict GDP growth 10 years later, with a slope coefficient of 21.8 log points. This modest decline from the 5-year coefficient (24.9) aligns with the hump-shaped impulse response in our main results. Panel (b) examines a shorter prediction window by relating GDP at $t + 10$ to geopolitical relations at $t + 5$, yielding a slope of 22.7. The similarity of these coefficients—whether using a 10-year or 5-year prediction horizon—reinforces our interpretation that geopolitical alignment generates persistent economic benefits.

The binscatter visualization effectively addresses concerns about outliers by grouping observations into bins of equal size, revealing a smooth, approximately linear relationship across the entire distribution. Using forward geopolitical relations — which capture cumulative changes over 5-year windows — yields remarkably consistent results across all horizons. The slopes remain stable whether examining GDP at $t + 5$, $t + 10$, or $t + 15$, ranging from 20.2 to 24.9 log points. This consistency across different shock sizes and time windows confirms that our results reflect a genuine economic relationship rather than the influence of extreme events or specific subsamples.

Geopolitical Relations with Western and Non-Western Countries. Building on our decomposition of geopolitical effects, we examine whether growth impacts differ between alignment with Western democracies versus non-Western powers. We partition our geopolitical



A. Binscatter: GDP at $t + 10$ vs. Geo at t

B. Binscatter: GDP at $t + 10$ vs. Geo at $t + 5$

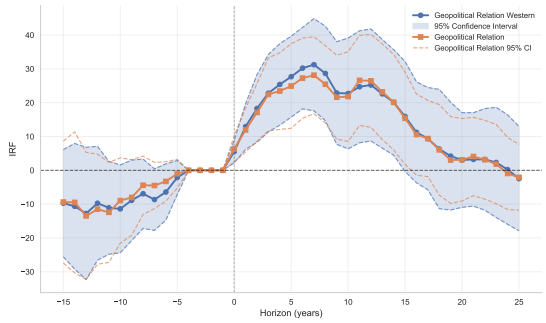
FIGURE A14. Binscatter Plots at Extended Horizons

This figure extends the binscatter analysis to the 10-year horizon. Panel (a) relates log GDP per capita at $t + 10$ to geopolitical relations at t, while panel (b) examines GDP at $t + 10$ against forward geopolitical relations at $t + 5$. Each dot represents the mean of approximately 100 observations within each bin, with size proportional to the number of observations. The specification includes four lags of both variables, country fixed effects, and region-year fixed effects. Fitted lines use Driscoll-Kraay standard errors.

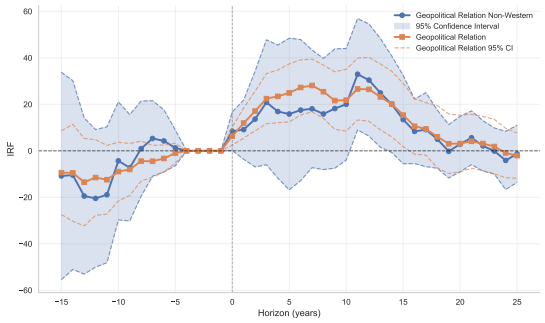
relations measure into two components: relations with Western countries (United States, United Kingdom, Germany, France, Canada, Australia, Belgium, Denmark, Italy, Netherlands, Spain, and Switzerland) and relations with non-Western countries (China, Russia, India, Japan, South Korea, Brazil, Mexico, Argentina, Indonesia, Turkey, Saudi Arabia, and Poland). This classification captures the traditional West/non-West divide in international relations while accounting for the economic weight of each group.

Figure A15 presents impulse responses from joint estimation of both components. Panel (a) reveals that improved relations with Western countries generate substantial growth effects, with GDP per capita increasing by approximately 30 log points at the peak after 7–8 years. The response exhibits our characteristic hump shape, with effects persisting significantly through year 15. Panel (b) demonstrates remarkably similar dynamics for relations with non-Western countries: the impulse response peaks at approximately 32 log points with comparable timing and persistence. The overlapping confidence intervals throughout most horizons indicate no statistically significant difference between Western and non-Western alignment effects.

This symmetry extends our main finding that geopolitical benefits transcend ideological boundaries. Whether countries improve relations with traditional Western democracies or emerging non-Western powers, the growth dividends are economically equivalent. The orange overlay showing our baseline aggregate measure confirms that both components contribute meaningfully to overall geopolitical effects, with neither dominating the aggregate response. These results reinforce that economic gains flow from integration into global networks—regardless of which major powers anchor those networks—rather than



A. Geopolitical Relations with Western Countries



B. Geopolitical Relations with Non-Western Countries

FIGURE A15. Decomposing Geopolitical Relations: Western versus Non-Western Countries

This figure shows impulse responses of log GDP per capita (×100) to unit improvements in geopolitical relations with Western countries (panel a) and non-Western countries (panel b). Blue lines with shaded areas show the decomposed effects from joint estimation, while orange lines display the baseline aggregate effect for comparison. Both specifications include four lags of all variables, country fixed effects, and region-year fixed effects. Shaded areas represent 95% confidence intervals based on Driscoll-Kraay standard errors.

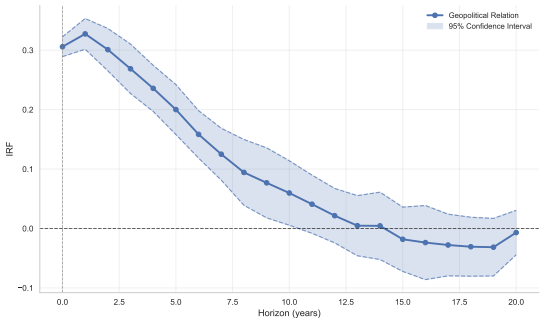
from alignment with particular political or economic systems. For developing countries navigating an increasingly multipolar world, this finding suggests that diversified diplomatic engagement across both Western and non-Western powers can yield substantial economic returns without requiring exclusive alignment with either bloc.

B.5. Additional Results for IV Estimates

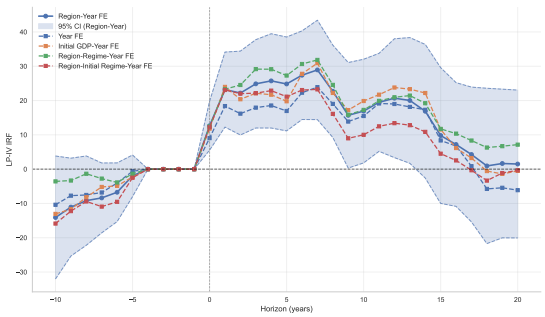
This appendix provides supplementary results for our instrumental variables analysis, including the first-stage relationship between non-economic mild conflicts and overall geopolitical relations, as well as LP-IV estimates under alternative fixed effects specifications.

First-Stage Dynamics. Panel (a) of Figure A16 demonstrates the strength and persistence of our first-stage relationship. The instrument generates a strong negative response: a one-unit increase in non-economic mild conflicts reduces overall geopolitical relations by 0.32 units on impact. This effect peaks at horizon 1 (reaching -0.33) before gradually decaying. The persistence of the first-stage relationship—remaining statistically significant for approximately 8 years—reflects how initial diplomatic tensions cascade through bilateral relationships. The effect eventually dissipates, returning to zero by horizon 13, consistent with the transitory nature of many diplomatic disputes.

LP-IV Robustness Across Fixed Effects. Panel (b) of Figure A16 examines the sensitivity of our IV estimates to different assumptions about unobserved heterogeneity. The remarkable



A. First-Stage: Conflicts → Geopolitical Relations



B. LP-IV Estimates with Alternative Fixed Effects

FIGURE A16. First-Stage Relationship and LP-IV Robustness

Panel (a) displays the first-stage impulse response of overall geopolitical relations to a unit shock in non-economic mild conflicts. The specification includes four lags of geopolitical relations, GDP, and the instrument, plus country and region-year fixed effects. Panel (b) presents LP-IV estimates of GDP responses under alternative fixed effects specifications. All specifications include four lags of core variables and the instrument with Driscoll-Kraay standard errors. Sample restricted to countries with complete data across all specifications (N=149).

stability across specifications reinforces our causal interpretation. All specifications show minimal pre-trends and generate similar impulse response patterns, with peak effects occurring between horizons 5-8.

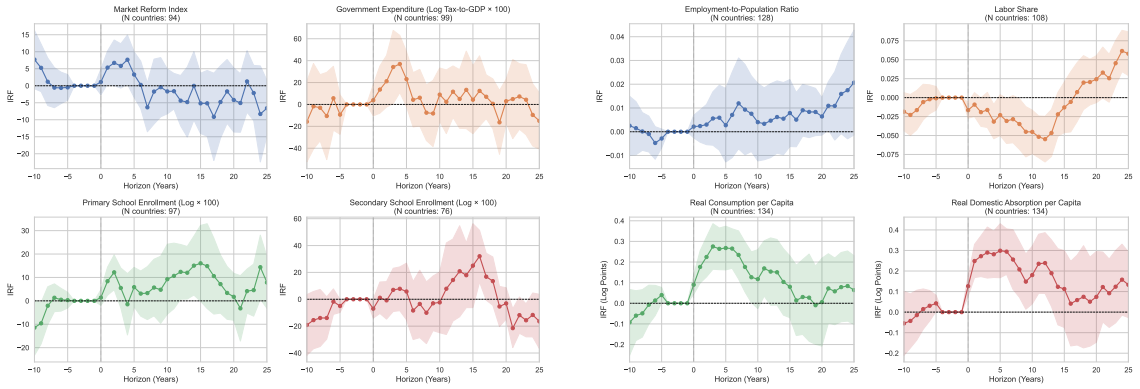
When we replace region-year fixed effects with only year effects—allowing for global shocks but not regional ones—the IV estimates remain virtually identical, with GDP increasing by 25-30 log points at the peak. This similarity suggests our results are not driven by regional confounders. The initial GDP quintile-year specification, which compares countries at similar development stages, yields comparable results with peak effects around 30 log points. The region-regime-year and region-initial regime-year specifications—our most demanding tests that account for political institutions—produce similar point estimates, though the latter shows somewhat earlier peak timing.

The consistency of LP-IV estimates across these diverse fixed effects structures is striking. Despite varying assumptions about relevant comparison groups and sources of unobserved heterogeneity, all specifications yield peak effects between 25 and 35 log points occurring 5-8 years after geopolitical improvements. This robustness, combined with the strong first-stage relationship and absence of pre-trends, provides compelling evidence that our instrument isolates plausibly exogenous variation in geopolitical relations. The convergence of IV and OLS estimates across multiple identification strategies strengthens our conclusion that geopolitical alignment causally drives economic growth, with effects that are neither driven by regional patterns nor dependent on specific institutional contexts.

B.6. Other Correlates of Growth

This section extends our analysis of geopolitical effects by examining additional growth correlates beyond those presented in the main text. We investigate two sets of outcomes: (i) institutional and human capital variables emphasized by Acemoglu et al. (2019) in their study of democracy's economic effects, and (ii) labor market and absorption measures from the Penn World Tables that capture alternative dimensions of economic development.

Market Reforms and Human Capital Formation. Panel (a) of Figure A17 reveals heterogeneous institutional and educational responses. The market reform index shows a transitory positive response peaking at 8 points around year 5, suggesting that geopolitical alignment facilitates initial liberalization that may face subsequent implementation challenges. Government expenditure exhibits high volatility with wide confidence intervals, reflecting competing pressures between enhanced fiscal capacity and market-oriented reforms. Education responses display distinct temporal patterns: primary enrollment gradually improves by 15 log points over 15 years, while secondary enrollment shows delayed but more pronounced effects, peaking at 30 log points. This sequencing reflects both cohort dynamics and the higher resource requirements for secondary education that become feasible as economic conditions improve.



A. Market Reforms and Education B. Employment and Consumption

FIGURE A17. Dynamic Effects of Geopolitical Relations on Additional Growth Correlates

Panel (a) displays impulse responses of market reform index, government expenditure (log tax-to-GDP × 100), primary and secondary school enrollment (log × 100) to a unit improvement in geopolitical relations. Panel (b) shows responses for employment-to-population ratio, labor share, real consumption and domestic absorption per capita (log × 100). All specifications follow equation (6) with four lags of the dependent variable, GDP, and geopolitical relations, plus country and region-year fixed effects. Sample restricted to countries with complete data (N in parentheses). Shaded areas represent 95% confidence intervals based on Driscoll-Kraay standard errors.

Labor Markets and Domestic Absorption. Panel (b) demonstrates broad-based welfare improvements. The employment-to-population ratio rises persistently by 2 percentage points over 25 years, indicating that geopolitical alignment creates extensive-margin employment opportunities. The labor share initially remains stable before increasing markedly after year 15, reaching 5 percentage points by year 25—suggesting that workers eventually capture productivity gains after initial benefits accrue to capital. Both consumption measures closely track GDP responses: real consumption per capita peaks at 25 log points while domestic absorption reaches 30 log points, confirming that growth translates into household welfare improvements and validating the investment boom documented in our main analysis.

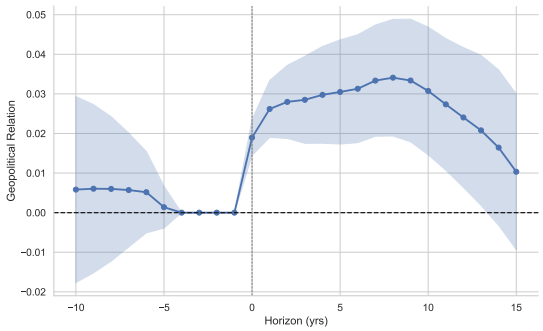
Synthesis. These results reinforce our main findings while revealing important adjustment dynamics. The positive responses across diverse outcomes confirm that geopolitical alignment generates broad-based benefits rather than concentrated gains. Temporal patterns show that institutional changes and fiscal responses occur quickly but may lack persistence, while human capital and distributional adjustments unfold gradually but generate lasting effects. This sequencing—from reduced uncertainty and improved investment climate to gradual educational and employment gains—aligns with theoretical predictions. The heterogeneous responses, particularly volatile fiscal dynamics and delayed labor share adjustments, highlight that realizing the full benefits of geopolitical alignment requires navigating complex policy trade-offs and managing distributional consequences over extended time horizons.

B.7. Additional Results for Democracy and Geopolitics

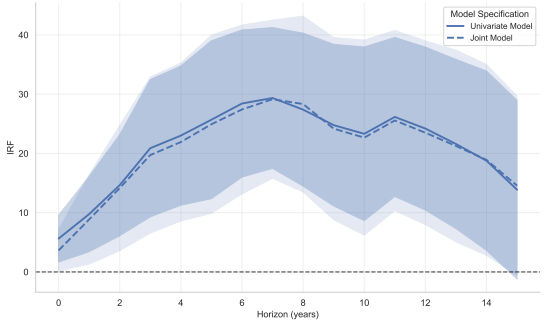
This appendix provides supplementary results for our analysis of democracy and geopolitical relations, including the conditional correlation between these variables and robustness tests using our baseline fixed effects specification.

Democracy and Geopolitical Relations: Conditional Correlation. While our main analysis examines how democracy and geopolitics jointly affect growth, understanding their mutual relationship provides additional insights. Figure A18 presents two complementary perspectives.

Panel (a) reveals that democratization generates sustained improvements in geopolitical relations, with alignment increasing gradually to peak at 0.035 units (approximately 0.3 standard deviations) after 8 years—roughly half the difference between neutral relations and moderate cooperation. The absence of pre-trends confirms that international improvements follow rather than precede democratization, with effects persisting through year 15. This complements our bilateral analysis: while democratization primarily im-



A. Response of Geopolitical Relations to Democracy



B. Geopolitical Effects with Region-Year FE

FIGURE A18. Democracy-Geopolitics Nexus: Additional Evidence

Panel (a) shows the impulse response of overall geopolitical relations to a democratization shock, estimated using local projections with four lags of geopolitical relations, country fixed effects, and year fixed effects. Panel (b) compares the growth effects of geopolitical relations with and without controlling for democracy, using our baseline region-year fixed effects specification. Both panels use Driscoll-Kraay standard errors with 95% confidence intervals.

proves Western relations, these gains are sufficient to raise the GDP-weighted aggregate measure.

Robustness with Alternative Fixed Effects. Our main democracy analysis follows ANRR using year fixed effects to preserve variation from regional democratization waves, while our baseline employs region-year fixed effects. Panel (b) demonstrates that geopolitical relations drive growth regardless of specification choice. The growth effects remain virtually identical whether controlling for democracy or not, with both specifications peaking around 28–30 log points. This stability confirms that geopolitical relations capture distinct variation from democratic institutions—even within region-year cells, geopolitical alignment generates substantial growth differences unexplained by shared democratization waves.

These results clarify two key points. First, the positive democracy - geopolitics association explains why controlling for democracy modestly attenuates our estimates — democratization represents one pathway to improved international relations, though not the only one. Second, our findings prove robust across fixed effects specifications, whether comparing countries globally or within regions. Combined with our IV estimates and robustness tests, this evidence establishes geopolitical alignment as a first-order growth determinant independent of democratic institutions.

B.8. Additional Results for Growth Accounting

This appendix presents additional country case studies that complement the analysis in Section 5. We examine two distinct groups: rapid-growth economies where geopolitical factors play a surprisingly minor direct role, and countries experiencing significant geopolitical volatility with corresponding economic impacts.

B.8.1. Rapid Growth Despite Limited Geopolitical Variation

Figure A19 presents four countries that achieved remarkable economic growth—ranging from 150% to 400% increases in GDP per capita—while maintaining relatively stable geopolitical relations. This pattern reveals an important nuance: for some countries, the absence of geopolitical disruption may be as important as active diplomatic engagement.

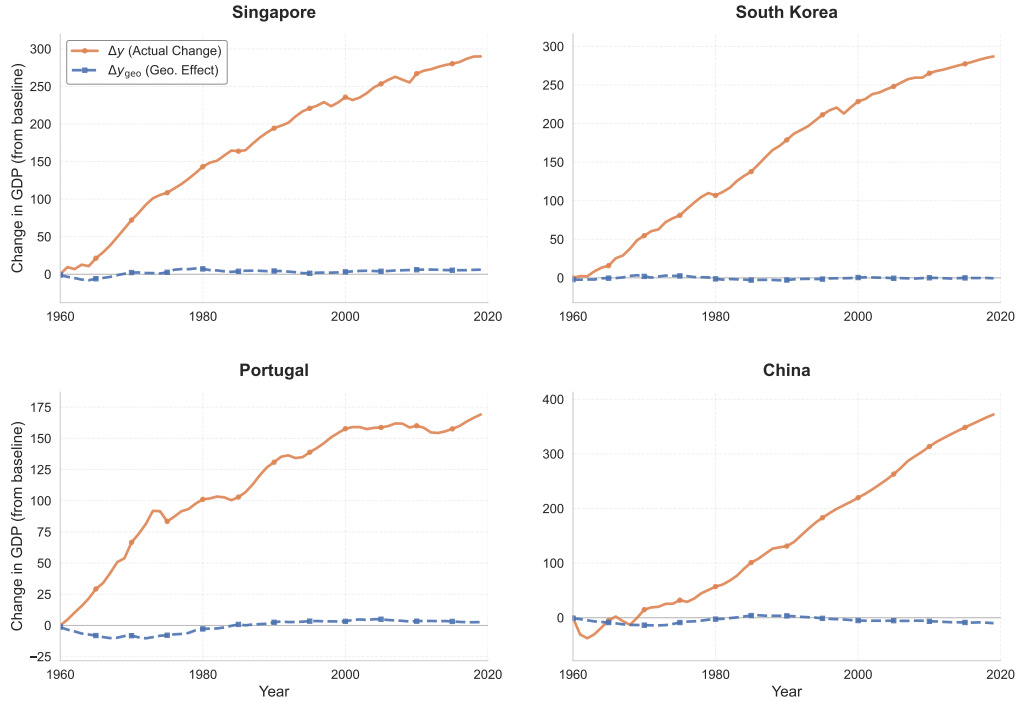


FIGURE A19. Geopolitical Contributions to GDP: Singapore, South Korea, Portugal, and China

This figure displays actual GDP changes from baseline (Δy, orange line) and the contribution of geopolitical relations to GDP (Δy_{geo}, blue dashed line) for four rapid-growth economies. Despite dramatic economic transformations, these countries show minimal direct geopolitical effects, suggesting that stable international relations enabled growth through other channels.

Singapore and South Korea exemplify the Asian miracle economies, achieving sustained growth exceeding 250% over our sample period. Remarkably, their geopolitical contributions remain near zero throughout, reflecting consistent alignment with the

global median. This stability, however, masks the underlying importance of geopolitics: both countries benefited from security guarantees (U.S. defense commitments) and preferential market access that enabled export-oriented industrialization. Portugal's trajectory following EU accession in 1986 shows similar patterns—European integration provided a stable geopolitical framework within which domestic reforms could flourish.

China presents the most striking case: GDP per capita increased nearly 400% with minimal direct geopolitical contribution despite significant diplomatic realignments (normalization with the U.S. in 1979, WTO accession in 2001). This apparent paradox reflects two factors. First, China's geopolitical relations improved gradually from a low base, maintaining proximity to the global median throughout the reform period. Second, our methodology captures direct effects through temporal variation but may understate the long-term structural benefits of global economic integration.

B.8.2. Geopolitical Volatility and Economic Instability

Figure A20 illustrates countries where geopolitical factors directly explain substantial portions of economic performance.

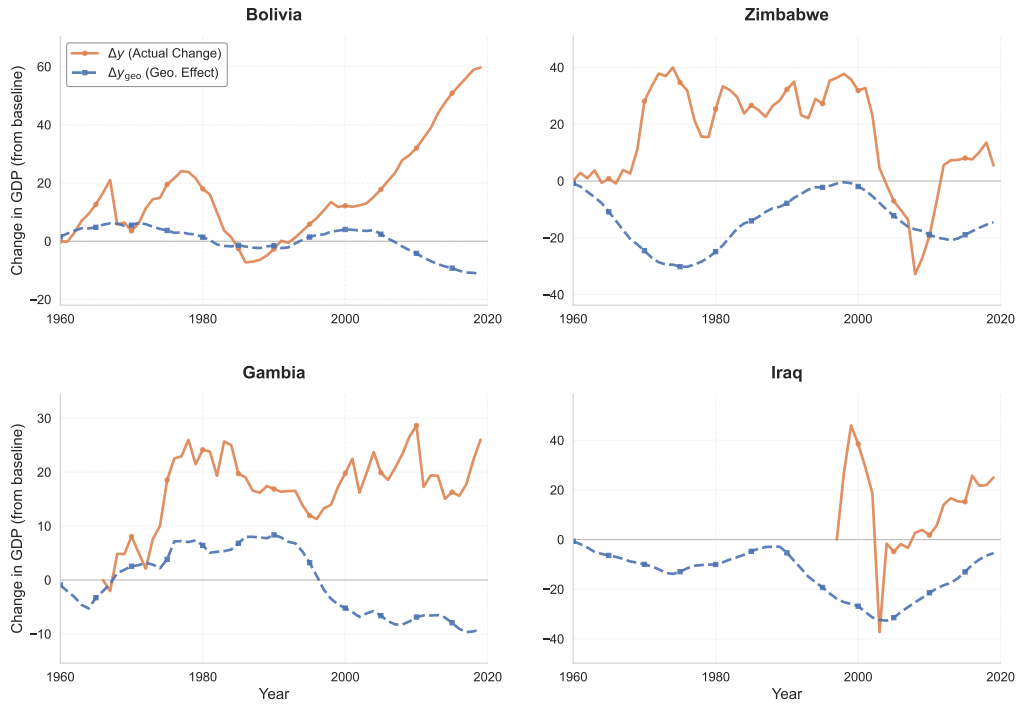


FIGURE A20. Geopolitical Contributions to GDP: Bolivia, Zimbabwe, Gambia, and Iraq

This figure shows countries experiencing significant geopolitical volatility. Geopolitical factors explain substantial portions of economic fluctuations, with contributions ranging from −30% to +10% of GDP. The close tracking between geopolitical effects and overall economic performance highlights the vulnerability of these economies to international relations.

Zimbabwe demonstrates how political choices trigger geopolitical isolation with devastating economic consequences. The country maintained positive geopolitical contributions through the 1980s, but the combination of the Congo intervention (1998), land reform crisis (2000), and subsequent Western sanctions created a geopolitical penalty reaching −30% of GDP. The partial recovery after 2010 reflects re-engagement efforts, though the country remains well below its potential.

Iraq's experience starkly illustrates the economic costs of international conflict. The Iran-Iraq War (1980–1988) and Gulf War (1991) created severe but temporary geopolitical penalties. However, the 2003 invasion and subsequent instability generated a persistent negative effect exceeding −30% of GDP, demonstrating how military conflict creates long-lasting economic scarring through damaged international relationships.

Bolivia and Gambia represent smaller economies where geopolitical swings—often related to regime changes and shifting international alignments—create substantial economic volatility. Bolivia's nationalization policies and ideological shifts between market-friendly and socialist governments generate geopolitical effects ranging from −10% to +5% of GDP. Gambia's trajectory reflects the economic impact of political instability and international isolation under authoritarian rule, with geopolitical factors explaining much of the country's economic stagnation.

B.8.3. Methodological Implications

These contrasting cases highlight important methodological considerations for interpreting our results:

Direct versus Indirect Effects. Our empirical strategy identifies direct effects of geopolitical relations through temporal variation within countries. For rapidly growing economies with stable geopolitical relations, this approach may understate the total importance of international alignment. The counterfactual of geopolitical instability—restricted market access, limited technology transfer, and reduced foreign investment—might have prevented their growth miracles entirely. Our estimates thus provide a lower bound on the importance of geopolitics for development.

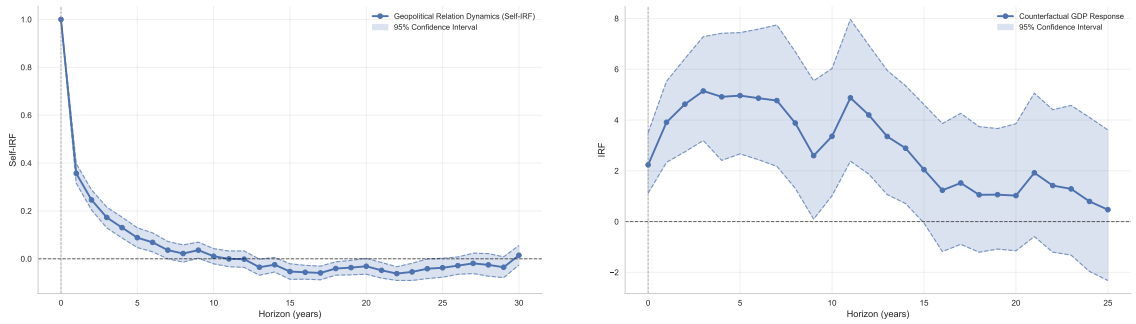
Asymmetric Effects. The country cases suggest potentially asymmetric effects: geopolitical deterioration may have larger and more immediate impacts than improvements. Countries experiencing negative shocks (Zimbabwe, Iraq) show sharp economic declines coinciding with geopolitical isolation. In contrast, positive geopolitical developments often enable growth through complementary channels (institutional reform, technology adoption, market integration) that materialize gradually.

State Capacity and Resilience. The impact of geopolitical shocks appears mediated by state capacity and economic structure. Resource-rich countries (Iraq, Bolivia) experience high volatility as geopolitical relations directly affect commodity export revenues. Countries with diversified economies and strong institutions show greater resilience, converting geopolitical stability into sustained growth through domestic policy choices.

These additional cases reinforce our main findings while revealing important nuances. Geopolitical relations create both opportunities and constraints for economic development, with effects ranging from enabling conditions for growth miracles to devastating economic isolation. The challenge for policymakers is navigating an increasingly complex international environment while building domestic resilience to geopolitical shocks.

B.9. Dynamics of Event-Based Geopolitical Scores

This appendix provides a detailed analysis of the event-based geopolitical scores $\tilde{S}_{ct}$ examined in Section 6.2.1. We document the persistence properties of these unsmoothed scores and demonstrate how transitory event shocks aggregate into permanent effects on GDP, providing insight into the dynamic relationship between diplomatic events and economic outcomes.



A. Persistence of Event Scores B. Response to Transitory Event Shock

FIGURE A21. Event Score Dynamics and Transitory Shock Responses

Panel (a) displays the impulse response of event-based geopolitical scores to their own shock, revealing rapid mean reversion. Panel (b) shows the GDP response to a purely transitory event shock (1 at $h = 0$, 0 thereafter), constructed using auxiliary shock methodology. Shaded areas represent 95% confidence intervals from 1,000 bootstrap iterations.

Panel (a) of Figure A21 reveals the fundamental difference between event scores and our smoothed geopolitical relations measure. Following a unit shock, event scores exhibit strong mean reversion: approximately 65% of the initial impact dissipates within one year, and the effect becomes statistically indistinguishable from zero after three years. This rapid decay reflects the inherently episodic nature of diplomatic events—summits conclude, sanctions are announced, tensions flare before subsiding. The mean reversion pattern suggests that individual geopolitical events, while impactful in the moment, lack

the institutional persistence that characterizes broader bilateral relationships. In contrast, our baseline geopolitical relations measure (Figure 6A) shows 50% persistence after five years, capturing the institutional memory and path dependence in international relations.

Panel (b) isolates the GDP response to a purely transitory event shock—a single-period improvement that immediately reverts to baseline. Even this fleeting diplomatic success generates persistent economic gains, with GDP remaining 2–4 log points higher for several years. The oscillating pattern reflects the complex dynamics of economic adjustment: initial optimism drives investment and trade expansion, followed by partial reversal as the transitory nature becomes apparent, before settling at a modest long-run gain. This persistence suggests that even temporary diplomatic breakthroughs can catalyze economic relationships that outlast the initial political impetus.

Combining panels (a) and (b) illuminates our estimand. The impulse response to event scores shown in Section 6.2.1 combines two effects: the direct impact of the initial event and the indirect effects through subsequent event persistence. Formally:

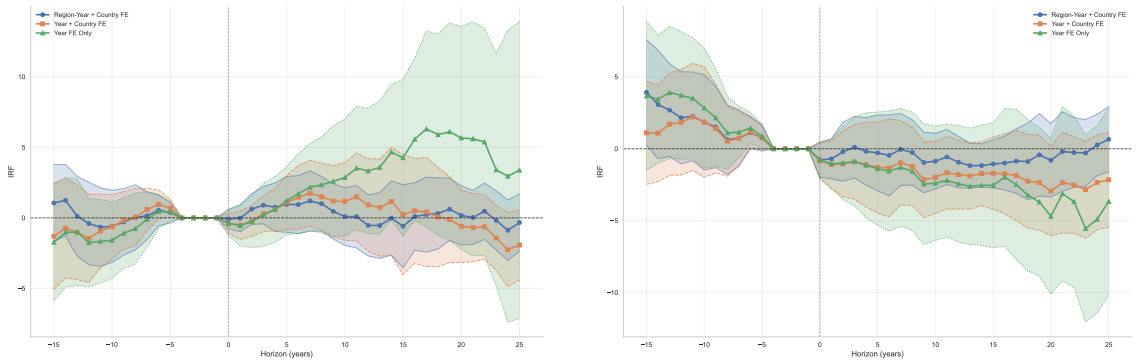
$$\text{IRF}_{event \to GDP}(h) = \sum_{s=0}^{h} \text{IRF}_{event \to event}(s) \times \text{IRF}_{transitory \to GDP}(h - s)$$

The rapid decay in event persistence explains why the direct response to $\tilde{S}_{ct}$ appears muted relative to our baseline specification. However, when we construct the response to a permanent change in event flows—effectively summing the transitory responses—we recover the same long-run effect as our smoothed measure. This equivalence confirms that our baseline approach captures the economically relevant variation in geopolitical relations while filtering out noise from isolated diplomatic incidents.

B.10. UNGA Voting and Economic Growth: Detailed Results

This appendix presents comprehensive results using UNGA voting alignment as an alternative measure of geopolitical relations. We employ the negative Ideal Point Distance (IPD) from Bailey, Strezhnev, and Voeten (2017), which ranges from −5 (complete disagreement) to 0 (perfect alignment). Higher values thus indicate closer alignment in voting behavior. The IPD measure has been widely used in the international relations literature as a proxy for foreign policy similarity, making it a natural benchmark for our event-based approach.

Figure A22 reveals why UNGA voting patterns fail to capture the economic effects of geopolitical relations. Panel (a) examines alignment with US voting positions. With our baseline specification including country fixed effects (blue line), the impulse response hovers near zero throughout the horizon, with confidence intervals consistently spanning zero. This null result persists when we relax to year plus country fixed effects (orange line). Only when we remove country fixed effects entirely (green line) does a positive relationship emerge, reaching approximately 6 log points after 20 years. However, this



A. Alignment with United States

B. GDP-Weighted Alignment

FIGURE A22. Impulse Responses Using UNGA Voting Alignment

This figure displays impulse responses of log GDP per capita to improvements in UNGA voting alignment. Panel (a) shows responses to closer alignment with US positions (negative IPD with USA). Panel (b) presents responses to improved GDP-weighted alignment with all major powers. Three specifications are shown: region-year plus country fixed effects (blue, our baseline), year plus country fixed effects (orange), and year fixed effects only (green). All specifications include four lags of GDP and the IPD measure. Shaded areas represent 95% confidence intervals with Driscoll-Kraay standard errors.

cross-sectional correlation likely reflects omitted variables rather than a causal effect of voting alignment on growth.

Panel (b) presents results for GDP-weighted alignment with all major powers, constructed analogously to our main geopolitical measure but using IPD rather than bilateral events. The pattern is even more striking: all three specifications yield economically small and statistically insignificant effects. Even without country fixed effects, which should maximize the chance of finding a relationship, the impulse response remains indistinguishable from zero. This complete absence of growth effects for the aggregate measure suggests that UNGA voting patterns fail to capture the economically relevant aspects of international relations.

These null results contrast sharply with our event-based measure for three fundamental reasons:

Limited Bilateral Content. UNGA votes primarily address multilateral issues—decolonization, human rights declarations, nuclear disarmament, budget allocations—rather than bilateral economic or security concerns. The voting agenda is dominated by symbolic resolutions that have little direct bearing on trade, investment, or technology transfer. Countries with tense bilateral relations (e.g., India and Pakistan) often vote similarly on global issues, while close allies (e.g., US and Israel) may diverge on symbolic resolutions. Our event-based measure, by focusing on direct bilateral interactions, captures the economically relevant variation that UNGA votes miss.

Strategic Voting Behavior. UNGA votes reflect complex strategic calculations beyond bilateral relationships. Small states often vote with regional blocs (e.g., African Union positions) or in exchange for aid commitments, while major powers use votes to signal positions to domestic audiences or third parties. Vote trading is common, with countries supporting each other's pet resolutions regardless of substantive agreement. This strategic behavior adds noise that obscures the underlying bilateral relationships driving economic outcomes. Moreover, the one-country-one-vote structure gives equal weight to all nations regardless of economic importance, further diluting the signal about economically meaningful relationships.

Temporal Misalignment. UNGA votes cluster in annual sessions running from September to December, creating artificial spikes in measured alignment changes. Important bilateral developments occurring outside this window are poorly captured. Our event-based measure, drawing from the continuous flow of diplomatic interactions throughout the year, better captures the full picture of geopolitical shifts and their economic consequences.

The positive cross-sectional relationship between US alignment and GDP (green line, panel a) likely reflects reverse causality and omitted variables. Wealthier countries tend to share US positions on international law, human rights, and market economics—preferences that correlate with but do not cause their prosperity. The absence of any relationship for the GDP-weighted measure (panel b) suggests that even this cross-sectional variation fails to capture meaningful geopolitical alignment.

These findings reinforce our methodological contribution. By developing an event-based measure that directly captures bilateral interactions, we overcome the fundamental limitations of existing approaches and reveal the true economic importance of geopolitical relations.

B.11. Sanctions and Geopolitical Relations: A Horse-Race Analysis

This appendix examines the relationship between our comprehensive geopolitical relations measure and economic sanctions—a categorical measure that captures the most explicit form of economic statecraft. We implement horse-race specifications to disentangle their respective contributions to economic growth and assess whether sanctions provide additional explanatory power beyond our event-based measure.

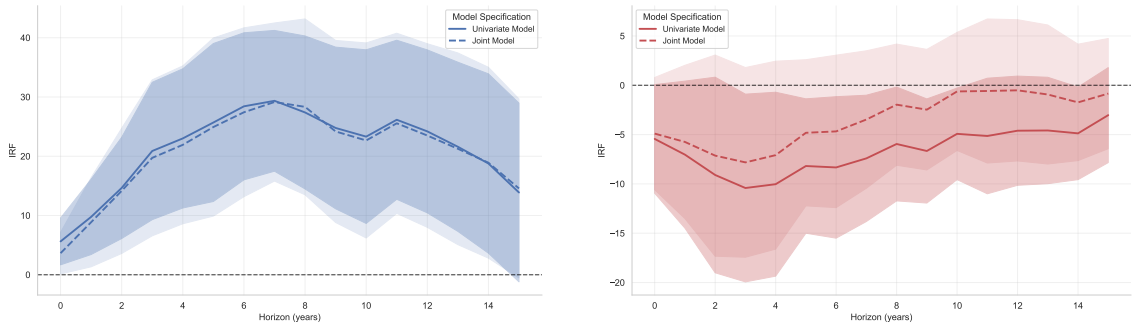
Empirical Specification. We estimate both univariate and joint specifications to assess how sanctions and geopolitical relations interact:

(A4) Univariate: $$y_{c,t+h} = \alpha_h^k p_{ct}^k + \sum_{\ell=1}^{4} \beta_\ell y_{c,t-\ell} + \sum_{\ell=1}^{4} \gamma_\ell^k p_{c,t-\ell}^k + \delta_c + \delta_{rt} + \varepsilon_{c,t+h}$$

Joint: $$y_{c,t+h} = \alpha_h^{\text{Geo}} p_{ct} + \alpha_h^{\text{Sanc}} p_{ct}^{\text{Sanction}} + \sum_{\ell=1}^{4} \beta_\ell y_{c,t-\ell} + \sum_{\ell=1}^{4} \gamma_\ell^{\text{Geo}} p_{c,t-\ell}$$

(A5) $$+ \sum_{\ell=1}^{4} \gamma_\ell^{\text{Sanc}} p_{c,t-\ell}^{\text{Sanction}} + \delta_c + \delta_{rt} + \varepsilon_{c,t+h}$$

where $k \in \{\text{Geo}, \text{Sanction}\}$ indexes the measure type. The univariate specifications include four lags of GDP and the respective geopolitical measure, while the joint specification controls for both measures and their lags simultaneously. This approach follows our baseline methodology while accounting for the potential interdependence between sanctions and broader geopolitical relations.



A. Geopolitical Relations B. Sanctions

FIGURE A23. Horse-Race: Geopolitical Relations versus Sanctions

This figure compares univariate and joint specifications for geopolitical relations and sanctions. Panel (a) shows impulse responses for our geopolitical relations measure, comparing the univariate model (solid line) with the joint specification controlling for sanctions (dashed line). Panel (b) presents analogous results for sanctions exposure. Both panels include 95% confidence intervals based on Driscoll-Kraay standard errors.

Results and Interpretation. Figure A23 presents striking evidence for the primacy of comprehensive geopolitical relations over categorical sanctions measures. Panel (a) demonstrates remarkable stability in the geopolitical relations effect: the impulse response peaks at approximately 28 log points after 7 years in both specifications, with nearly identical trajectories throughout the 15-year horizon. The confidence intervals overlap almost perfectly, indicating that sanctions exposure provides minimal additional information once we account for our comprehensive measure. This stability suggests that our event-based approach already captures the economically relevant variation associated with sanctions through the diplomatic deterioration that precedes, accompanies, and follows their imposition.

Panel (b) tells a dramatically different story for sanctions. The univariate specification (solid line) shows sanctions reducing GDP by approximately 10 log points on impact, with effects persisting but gradually attenuating over time. This immediate impact reflects the direct economic disruption from trade embargoes, financial restrictions, and technology controls. However, the joint specification (dashed line) reveals substantial changes: the immediate impact shrinks to approximately 6 log points—a 40% reduction—and the effect becomes statistically insignificant after year 8. The confidence intervals widen substantially, reflecting the reduced precision once we control for the broader geopolitical context. By year 10, the sanctions coefficient is economically small and statistically indistinguishable from zero.

Comprehensiveness of Event-Based Measures. Our event-based approach captures not only formal sanctions announcements but also the entire diplomatic ecosystem surrounding them. Sanctions rarely emerge suddenly; they typically follow an escalating pattern of diplomatic tensions, failed negotiations, and deteriorating bilateral trust. Our measure incorporates diplomatic protests, recalled ambassadors, suspended cooperation agreements, cancelled summits, hostile rhetoric, and other negative events that precede formal economic restrictions. Similarly, it captures the diplomatic efforts at sanctions relief, negotiated settlements, and gradual normalization that may follow. By incorporating this full spectrum of interactions, our measure subsumes much of the information content in binary sanctions indicators while providing additional variation from the broader relationship context.

The robustness of our geopolitical relations measure to controlling for sanctions—the most explicit and measurable form of economic coercion—validates our comprehensive approach. Rather than requiring researchers to choose among multiple categorical indicators or construct indices combining different relationship types, our event-based methodology captures the full complexity of international relations and their economic consequences. This comprehensiveness proves essential for understanding how geopolitical dynamics shape national prosperity in an interconnected world where economic, diplomatic, and security concerns increasingly intertwine.

Appendix C. LLM Prompt and Related

C.1. Prompt Structure

This subsection delineates the LLM prompt structure for compiling and analyzing major political events shaping the bilateral relationship between two countries, {country_1} (code: {country_1_code}) and {country_2} (code: {country_2_code}), or their historical predecessors, during {target_year}. The analysis employs the Conflict and Mediation Event Observations (CAMEO) framework, detailed in Section C.3, and the Goldstein scale, described in Section C.3, to classify events and assess their intensity. If no major events are identified, a historical context-based relationship assessment is provided. The output is a single JSON object for computational integration.

Relationship Assessment Framework. The bilateral relationship for {target_year} is classified into one mutually exclusive category, reflecting interaction intensity and nature:

- **State of War / Active Conflict**: Sustained, large-scale armed conflict.
- **Crisis / Intense Confrontation**: High tension with disputes or limited clashes, short of war.
- **Hostile / Antagonistic Relationship**: Animosity marked by sanctions or diplomatic friction.
- **Competitive / Rivalrous Relationship**: Strategic competition with limited cooperation.
- **Limited Contact / Cool Relationship**: Minimal, neutral interaction.
- **Selective Cooperation / Transactional Relationship**: Cooperation on specific interests amid competition.
- **Broad Cooperation / Partnership**: Extensive sectoral cooperation with regular dialogue.
- **Strategic Partnership**: Deep coordination on strategic issues with high trust.
- **Alliance**: Formal treaty-based mutual support, often military.

Analytical Steps. The analysis follows five steps for rigorous event identification, classification, and assessment:

a. **Verify Political Entities**: Confirm {country_1} (code: {country_1_code}) and {country_2} (code: {country_2_code}) existed in {target_year}. If not, identify the primary political entity controlling the relevant territory (e.g., Soviet Union for Russia before December 26, 1991; Russian Federation thereafter). Ambiguities are noted in the evaluation summary, with analysis using the best-identified entities, reflected in JSON fields `country1` and `country2`.

b. **Data Collection**: Use search tools to compile interactions between verified entities during {target_year}.

c. **Identify Major Political Events**: Identify events in {target_year} significantly influencing the bilateral relationship, verified by reliable sources. Events include economic diplomacy, diplomatic actions, high-level interactions, and security measures, with details in Section C.2.
d. **Event Analysis**: For each event:
    i. Assign `country1` and `country2` as initiator/target or participants.
    ii. Provide `event_name` and `event_description`.
    iii. Classify using CAMEO (see Section C.3): `CAMEO_quad_class` (Verbal/Material Cooperation/Conflict), `CAMEO_root_code` (e.g., 04), `CAMEO_event_code` (e.g., 043), emphasizing economic actions (e.g., 163 for sanctions) and mediation (e.g., 045).
    iv. Assign `Goldstein_Scale` (–10.0 to +10.0; see Section C.3), reflecting intensity, adjusted for bilateral context but consistent with CAMEO.
    v. Classify `economic_event`: Tariffs, Economic Sanctions, Trade Agreements and Treaties, Other Economic Policies, or Not an economic event.
    vi. Provide `evaluation_summary` justifying classifications and scores.
e. **Overall Relationship Assessment**: Select one `relationship` category for {target_year}, integrating event patterns (via CAMEO/Goldstein) and historical context. If no events are found, assess based on interaction absence and historical trends.

JSON Output. The output is a JSON object with key `historical_political_events`:

- If events found: List of objects with fields:
    - `year`, `country1`, `country2`, `event_name`,
    - `event_description`, `CAMEO_quad_class`, `CAMEO_root_code`,
    - `CAMEO_event_code`, `economic_event`, `Goldstein_Scale`,
    - `relationship`, `evaluation_summary`.
- If no events found: Single object with `event_name` = "No Major Bilateral Events Found," null CAMEO/Goldstein fields, and context-based `relationship`.

Implementation Notes.

- Entity verification ensures historical accuracy using country codes.
- "Major" events have significant political impact.
- The `relationship` assessment is uniform for {target_year} and historically contextualized.
- JSON output adheres to the specified structure for automation.

C.2. Event Identification Details

This subsection elaborates on the criteria for identifying major political events that significantly influence the bilateral relationship between {country_1} (code: {country_1_code}) and {country_2} (code: {country_2_code}), or their historical predecessors, during {target_year}, as referenced in Section C.1. Events are selected for their demonstrable impact on the relationship's trajectory, with a focus on economic diplomacy and trade or security agreements.

Event Verification. Potential events are critically evaluated using reliable sources to confirm authenticity. Unverified or fabricated events are excluded to ensure analytical rigor.

Event Dimensions. Events are identified across diverse dimensions of the bilateral relationship, ensuring comprehensive coverage:

- **Economic Diplomacy**: Politically motivated economic actions with significant bilateral impact, including:
  - Tariffs: Government-imposed taxes on imports, adjusted or removed for political or diplomatic purposes (e.g., trade disputes).
  - Economic Sanctions: Restrictive measures targeting economic activities, such as financial sanctions (asset freezes, transaction restrictions), trade restrictions (embargoes, export controls), or directives to cease operations, aimed at specific entities for political or security reasons.
  - Trade Agreements and Treaties: Major milestones in trade agreements, including negotiation starts, conclusions, breakdowns, signings, ratifications, withdrawals, or disputes under formal mechanisms.
  - Other Economic Policies: Measures like foreign aid, import/export quotas, trade-impacting subsidies, exchange rate actions, foreign investment rule changes, or non-tariff barriers (e.g., regulations, licensing) with clear political intent.
- **Formal Diplomatic Actions**: Changes in diplomatic representation (e.g., ambassador recalls, appointments), mission establishments or closures, and significant communications (e.g., protests, démarches).
- **High-Level Interactions**: State visits by Heads of State or Government, key ministerial meetings (e.g., Foreign, Defense, Trade), bilateral summits, and their outcomes (e.g., joint declarations) not covered elsewhere.
- **Intelligence/Counter-Intelligence Operations**: Publicly revealed espionage scandals or large-scale personnel expulsions impacting relations.
- **International Legal and Judicial Actions**: Bilateral disputes before international courts (e.g., International Court of Justice), contentious extraditions, or conflicts over

international law becoming political flashpoints.

- **Targeted Technology Controls**: Restrictions on technology transfers, research collaborations, or standards-setting targeting the other nation, often for security or economic reasons.
- **Public Statements/Rhetoric**: Widely reported official speeches or policy statements by high-level officials that frame or impact the relationship, not tied to other events.
- **Security/Military Interactions**: Security pacts, joint exercises, arms sales, border incidents, military confrontations/cooperation, or arms control agreement developments (e.g., suspensions, violations).
- **International Cooperation/Contestation**: Joint diplomatic initiatives or public disagreements in international organizations (e.g., United Nations votes, coordinated statements).

Selection Criteria. Events are prioritized for their significant effect or strong indication of the bilateral relationship's trajectory, with particular emphasis on economic diplomacy and trade or security agreements. Only key interactions meeting these criteria are included, ensuring focus on politically consequential events.

C.3. Conflict and Mediation Event Observations and Goldstein Score

Our analysis employs the Conflict and Mediation Event Observations (CAMEO) framework (Schrodt and Yilmaz 2012) to systematically classify and quantify bilateral political events. CAMEO provides a comprehensive coding scheme that categorizes international political actions along two primary dimensions: the nature of the interaction (cooperation versus conflict) and the form of action (verbal versus material). This framework enables consistent, objective classification of diverse political events while preserving crucial information about their intensity and character.

CAMEO Classification Structure. The CAMEO framework organizes events into four quadrant classes based on the intersection of cooperation-conflict and verbal-material dimensions:

- **Verbal Cooperation**: Diplomatic statements, consultations, expressions of intent to cooperate, and formal diplomatic cooperation including treaty signing and public endorsements.
- **Material Cooperation**: Tangible cooperative actions such as economic aid provision, military cooperation, intelligence sharing, and policy concessions.
- **Verbal Conflict**: Critical statements, accusations, demands, rejections, threats, and public protests that express disagreement or hostility.

- **Material Conflict**: Concrete hostile actions including economic sanctions, military demonstrations, coercive measures, and various forms of violence.

Within each quadrant, CAMEO provides a hierarchical coding system with root codes (two-digit) representing general action categories and event codes (three-digit) specifying precise actions. For example, root code 16 (REDUCE RELATIONS) includes event codes 163 (impose economic sanctions) and 161 (reduce diplomatic relations), allowing for nuanced differentiation within broader conflict categories.

Implementation in Our Analysis. Our LLM-based analysis applies CAMEO classification through structured prompt engineering that guides the model through systematic event categorization. The process begins with identifying the core bilateral action in each event description, determining its cooperative or conflictual nature, and assessing whether the action is primarily verbal or material. The LLM then selects the most appropriate root code within the identified quadrant class and chooses the specific event code that best captures the action's essence.

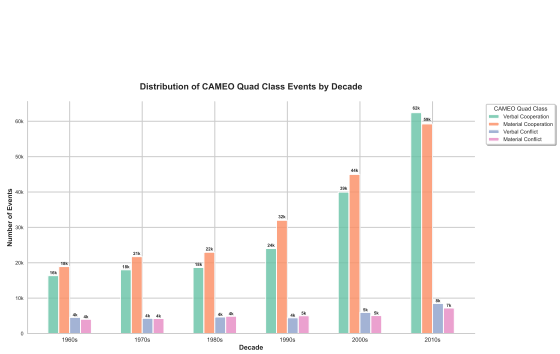
We pay particular attention to economic diplomacy events, ensuring that economic tools of statecraft receive appropriate classification. For instance, we distinguish between broad economic sanctions (code 163) and targeted administrative sanctions (code 172), recognizing their different mechanisms and intensities. Similarly, we differentiate between various forms of diplomatic cooperation, from routine consultations (code 040) to formal agreement signing (code 057), capturing the spectrum of cooperative engagement.

Integration with Goldstein Scale Scoring. CAMEO classifications inform our Goldstein Scale scoring (Goldstein 1992), which assigns numerical values from −10.0 (maximum conflict) to +10.0 (maximum cooperation) to each event. The LLM uses the CAMEO event code as the primary reference point for determining baseline intensity, then applies contextual adjustments based on the specific circumstances described in the event. This approach ensures consistency with established conflict-cooperation measurement while allowing for nuanced assessment of event significance within particular bilateral contexts.

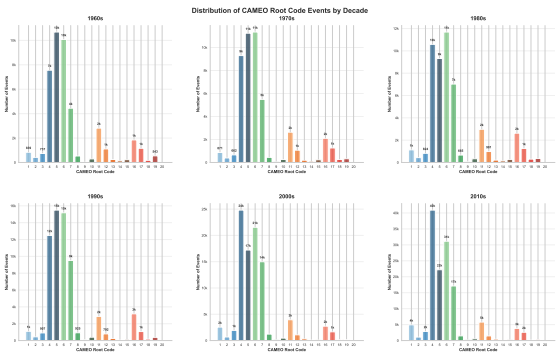
The combination of CAMEO's systematic classification with Goldstein Scale quantification enables our methodology to capture both the categorical nature of political actions and their relative intensity, providing a foundation for empirical analysis of how different types of geopolitical events affect economic outcomes. This dual-coding approach addresses limitations of purely categorical measures while maintaining the interpretability necessary for economic research applications.

Empirical Patterns in Event Classification. Figures A24 and A25 illustrate the distribution and evolution of our compiled geopolitical events across the CAMEO classification system

and Goldstein Scale from the 1960s through the 2010s, revealing distinct patterns that align with major shifts in the international order.



A. Distribution of CAMEO Quad Class Events by Decade



B. Distribution of CAMEO Root Code Events by Decade

FIGURE A24. Evolution of CAMEO Event Classification Patterns

The temporal patterns reveal striking correspondence with major historical periods in international relations. During the Cold War decades (1960s–1980s), Figure A24A shows relatively higher proportions of conflict events, with material conflict maintaining a consistent presence and verbal conflict representing a substantial share of total interactions. This pattern reflects the ideological confrontation and proxy conflicts that characterized superpower rivalry during this era.

A dramatic transformation occurs during the globalization period (1990s–2000s), coinciding with the end of the Cold War and the expansion of liberal international institutions. Figure A24A demonstrates a marked shift toward cooperation, with both verbal and material cooperation categories expanding substantially in absolute and relative terms, while conflict events diminish proportionally. This cooperative surge aligns with the era's emphasis on economic integration, multilateral diplomacy, and institutional cooperation that defined the "unipolar moment" and early stages of economic globalization.

However, the 2010s reveal a concerning reversal of this cooperative trend. Conflict events—both verbal and material—increase relatively more than cooperative activities, suggesting a return to more adversarial international dynamics. This shift is particularly evident in the Goldstein Scale distributions shown in Figure A25. While the 1990s and 2000s exhibit the highest mean cooperation scores (3.92 and 4.15 respectively) with relatively concentrated positive distributions, the 2010s show a notable decline in mean cooperation (3.07) and increased polarization, with more events clustering at both extreme positive and negative values.

Figure A24B provides additional insight into these historical transitions. The Cold War period shows a consistent presence of threatening behaviors and economic restrictions, while the globalization era exhibits expanded consultation activities (root code 04) and

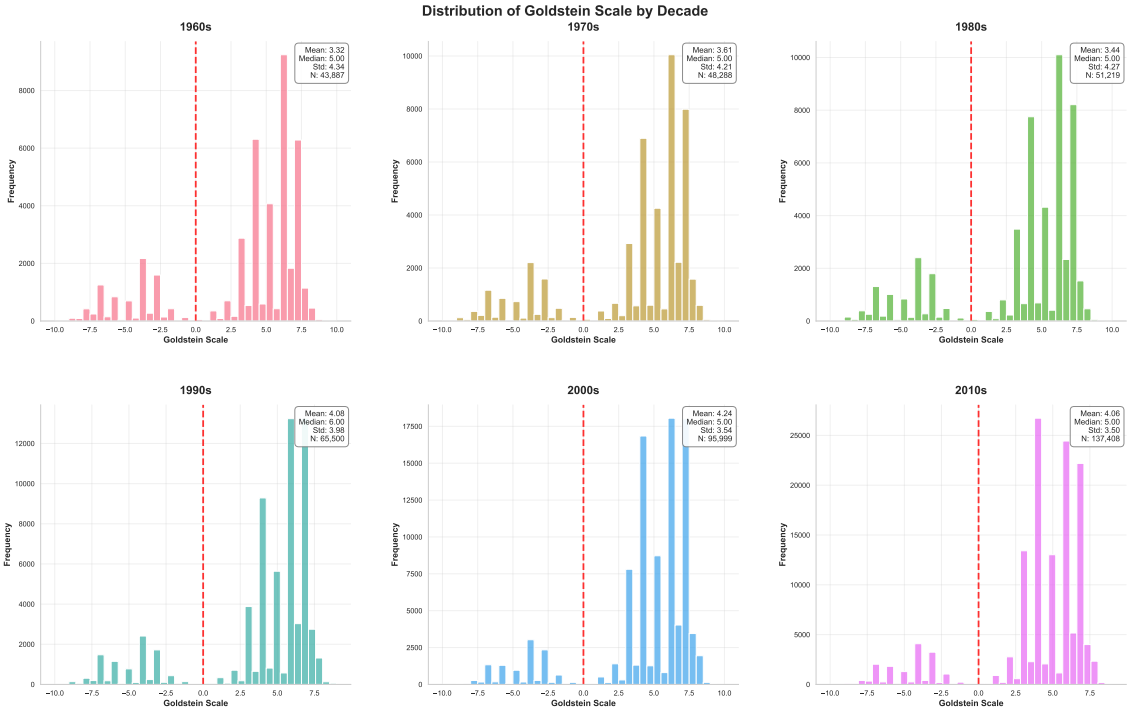


FIGURE A25. Distribution of Goldstein Scale Scores by Decade

material cooperation (root code 06). The 2010s demonstrate increased prominence of sanctions and economic restrictions (root codes 16–17), reflecting the growing use of economic statecraft as a tool of strategic competition in the contemporary multipolar environment.

The Goldstein Scale evolution particularly illuminates these macro-historical shifts. The Cold War decades display relatively symmetric distributions around modest positive values, reflecting a mixture of confrontation and routine diplomacy. The 1990s and 2000s show pronounced rightward skew toward cooperation, with the 2000s achieving the highest mean cooperation score. However, the 2010s exhibit increased variance and a more bimodal distribution, suggesting a fragmentation of international relations into increasingly polarized cooperative and conflictual interactions—a pattern consistent with emerging great power competition and the erosion of liberal international consensus.

These empirical patterns validate our framework's sensitivity to major historical transformations while demonstrating how contemporary geopolitical tensions manifest in measurably different event patterns compared to the cooperative globalization era. The data suggest that the 2010s represent not merely a return to Cold War-style confrontation, but rather a new form of competitive multipolarity characterized by a simultaneous intensification of both cooperation and conflict.