Measuring Geopolitical Fragmentation: Implications for Trade, Financial Flows, and Economic Policy

Florencia S. Airaudo, François de Soyres, Keith Richards, and Ana Maria Santacreu

Abstract

Recent geopolitical tensions have revived interest in understanding the economic consequences of geopolitical fragmentation. Using bilateral trade flows, portfolio investment data, and detailed records of economic policy interventions, we revisit widely used geopolitical distance metrics, specifically the ideal point distance (IPD) derived from United Nations General Assembly voting. We document substantial variability in measured fragmentation, driven significantly by methodological choices related to sample periods and vote categories, especially in the wake of Russia's 2022 invasion of Ukraine. Our results show robust evidence of increasing fragmentation in both trade flows and economic policy interventions among geopolitically distant country pairs, with particularly strong effects observed in strategically important sectors and policy motives. In contrast, financial portfolio allocations exhibit weaker, more heterogeneous, and context-sensitive responses. These findings highlight the critical importance of methodological transparency and careful specification when assessing geopolitical realignments and their implications for international economic relations.

JEL codes: F14; F36; F50; F60

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1. INTRODUCTION

Over the past decade, the trajectory of global economic integration has come under intense scrutiny due to heightened geopolitical tensions, increasing emphasis on national security, and a proliferation of policies explicitly aimed at reshaping global supply chains. While traditional indicators, such as the ratio of global trade to GDP, have suggested resilience, closer scrutiny of bilateral trade and financial flows reveals emerging patterns of fragmentation aligned with geopolitical considerations (Aiyar et al., 2023, Gopinath et al., 2025). Rising geopolitical tensions—notably exemplified by Russia's invasion of Ukraine in 2022, intensified trade disputes between the United States and China, and ongoing shifts toward protectionism—have triggered substantial reallocations in both trade and financial linkages. Concurrently, policymakers have increasingly used economic

Florencia S. Airaudo is an economist, François de Soyres is the section chief, and Keith Richards is a research assistant in the Advanced Foreign Economies Section at the Board of Governors of the Federal Reserve System. Ana Maria Santacreu is a senior economic policy advisor at the Federal Reserve Bank of Saint Louis.

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policy interventions, such as tariffs, subsidies, and export controls, to strategically reshape economic relationships, directly influencing fragmentation patterns. These developments have renewed interest in understanding the precise dynamics of geopolitical fragmentation and its broader economic consequences, particularly the role of deliberate economic policy choices.

A rapidly expanding literature quantifies geopolitical fragmentation by identifying alignment blocs based on countries' voting behaviors in international institutions, particularly the United Nations General Assembly (UNGA). The seminal contribution by Bailey, Strezhnev, and Voeten (2017) introduced a spatial voting model to estimate countries' *ideal points* on a geopolitical spectrum, leading to the widely adopted ideal point distance (IPD). This metric has since been integral to analyses exploring the economic impacts of political alignment, documenting negative associations between geopolitical distance and cross-border trade, foreign direct investment (FDI), and financial asset flows (Aiyar et al., 2023; Aiyar, Presbitero, and Ruta, 2023; Blanga-Gubbay and Rubínová, 2023; Catalan, Fendoglu, and Tsuruga, 2024).

Building on the IPD, in this article we develop a new measure—seg—that captures each country's relative geopolitical alignment between the U.S. and China. This normalized score provides a continuous, interpretable indicator of alignment and allows us to track recent shifts in global alliances. Recent studies also emphasize how escalating U.S.–China tensions and the geopolitical fallout from Russia's invasion of Ukraine have exacerbated fragmentation trends (Jakubik and Ruta, 2023; Campos, Freund, and Ruta, 2024; Qiu, Shin, and Zhang, 2023). Yet, despite these insights, significant uncertainty remains regarding how sensitive conclusions about fragmentation are to methodological choices in constructing IPD measures. Recent contributions have proposed alternative measures of geopolitical fragmentation (e.g., Fernández-Villaverde, Mineyama, and Song, 2024) and quantified the heterogeneous effects of fragmentation on trade using foreign policy alignment data (Hakobyan, Meleshchuk, and Zymek, 2024), highlighting the need for systematic, alignment-based measures like those we develop here.

We systematically address this uncertainty by examining how methodological variations in IPD specifications affect the measurement and interpretation of geoeconomic fragmentation. Specifically, we revisit critical methodological choices, including the selected historical sample period and the inclusion of specific vote categories (all votes versus economic votes), building upon the spatial voting framework developed by Bailey, Strezhnev, and Voeten (2017). These choices affect both the construction of IPDs and the resulting assignment of countries into geopolitical blocs, which in turn shape measured fragmentation outcomes. Our analysis shows that seemingly minor methodological variations significantly influence the interpretation and magnitude of geopolitical realignments, with substantial implications for policy interpretation and academic research.

Employing bilateral trade data from UN Comtrade (2001–2023) and bilateral financial flows from the International Monetary Fund's (IMF) Coordinated Portfolio Investment Survey (CPIS, 2015–2023), we document substantial heterogeneity in fragmentation outcomes contingent on IPD specification. We find robust evidence of increased trade fragmentation following Russia's 2022 invasion of Ukraine, consistent with Gopinath et al. (2025). However, the estimated impact varies notably depending on the IPD measure: IPDs capturing recent geopolitical shifts yield significantly higher fragmentation effects, highlighting how acute geopolitical events, such as wars or major diplomatic disputes, substantially reshape trade patterns. Conversely, IPDs based exclusively on economic votes produce more moderate fragmentation effects, suggesting that broader political tensions have stronger repercussions on trade than purely economic disagreements.

In contrast, we find that financial fragmentation is generally weaker and more heterogeneous across IPD specifications. This result suggests that global financial linkages exhibit greater resilience to geopolitical shocks or are mediated through third-party financial centers, reflecting the complexity and indirect nature of financial market responses to geopolitical uncertainty. These insights emphasize that while geopolitical tensions directly disrupt trade flows, financial markets may respond in subtler, more context-specific ways, reflecting underlying differences in trade versus financial integration structures.

Using detailed policy intervention data from the Global Trade Alert (GTA), we show that economic policy interventions explicitly reflect strategic motives aligned with geopolitical fragmentation. Policies targeting sectors crucial for national security, strategic autonomy, and resilience—such as critical minerals, advanced technology, and digital infrastructure—are particularly prevalent and strongly correlated with geopolitical distance. This strategic targeting of policy interventions substantially amplifies fragmentation trends, as governments actively reshape economic linkages according to geopolitical priorities, suggesting that economic policy plays a central role in driving the observed fragmentation patterns.

We deepen our analysis by decomposing bilateral trade flows across technology classifications (high-, medium-, and low-tech goods) using product-level data from Gaulier and Zignago (2010). Our findings indicate substantial fragmentation effects across all technology classes, though disruptions are particularly pronounced in medium- and low-tech sectors. Medium-tech goods, which include petroleum and industrial products, face significant disruption due to geopolitical tensions affecting energy and resource security. Low-tech goods, easier to substitute and relocate, experience fragmentation as countries seek alternative suppliers aligned with their geopolitical blocs. In contrast, high-tech goods display relatively smaller disruptions, possibly due to concentrated global production networks and significant barriers to rapid restructuring.

Our findings carry significant implications for research methodology and policy formulation. Methodologically, they underscore the critical importance of transparency and careful sensitivity analyses when constructing geopolitical distance measures. From a policy perspective, understanding the nuanced dimensions of geopolitical fragmentation can enable governments and international institutions to craft more targeted, effective strategies to enhance economic resilience, manage risk, and achieve strategic autonomy. In particular, our proposed seg metric provides a concise and interpretable measure of each country's relative alignment with the U.S. versus China, offering a valuable tool to monitor geopolitical realignments. Recent literature has highlighted the close correlation between economic interdependence and geopolitical alignment. For example, Kleinman, Liu, and Redding (2024) find robust empirical evidence that increased economic ties correlate strongly with greater political alignment among countries. While their analysis focuses primarily on economic relationships driving geopolitical outcomes, our article examines the reverse direction: investigating how geopolitical distances, measured through IPDs, influence patterns of trade and financial fragmentation.

The remainder of the article is structured as follows. Section 2 details the methodologies underlying the construction of ideal points and geopolitical distance measures. Section 3 presents alternative IPD specifications, normalization into U.S.–China alignment scores, and bloc classifications. Section 4 assesses fragmentation patterns in trade and financial flows across different bloc structures and geopolitical distance measures. Section 5 evaluates fragmentation in economic policy interventions and explores how strategic motives amplify geopolitical realignments. Section 6 concludes.

2. MEASURING GEOPOLITICAL ALIGNMENT: THE UN VOTING APPROACH

We measure geopolitical alignment using the methodology developed by Bailey, Strezhnev, and Voeten (2017), based on roll-call voting data from the UNGA. The key idea is to translate voting behavior into numerical indicators reflecting countries' underlying foreign-policy positions, known as *ideal points*. Each country is assumed to occupy a specific position along a single ideological dimension.

Votes at the UNGA are categorized into three possible outcomes for each participating country: approval (yes), opposition (no), or neutrality (abstain). The model identifies two latent thresholds or cut points for each vote, which delineate the ranges of ideal points corresponding to these distinct voting decisions. For instance, countries with ideal points close to those of Western-aligned nations may vote similarly to the U.S. on many issues, while countries with different ideological preferences might oppose or abstain.

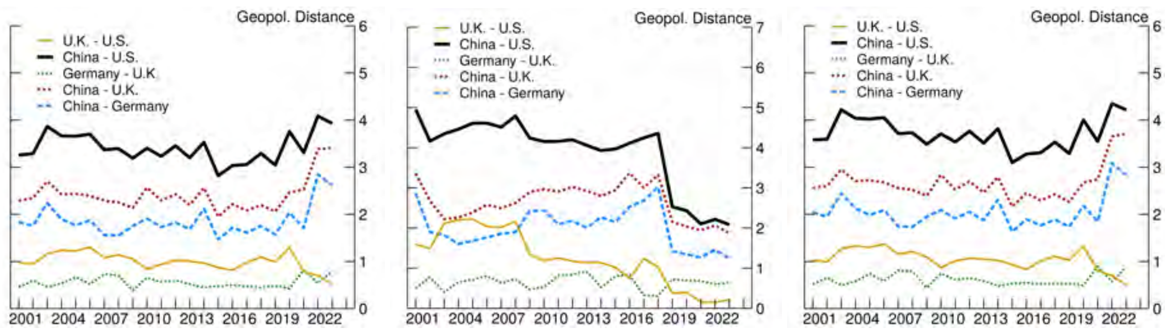
Additionally, each resolution is characterized by a discrimination parameter, reflecting how effectively it separates countries along the geopolitical alignment dimension. Votes with higher discrimination parameters are particularly informative about ideological differences and thus receive greater weight in the ideal point estimation. Conversely, less informative votes, which fail to differentiate clearly between countries, exert minimal influence on the alignment estimates.

Ideal points are estimated using Bayesian Markov chain Monte Carlo techniques, providing posterior distributions that capture uncertainty about each country's alignment position. The posterior mean is employed as the definitive measure of a country's ideal point for each year. Geopolitical distances between two countries—IPDs—are then calculated as the absolute differences between their respective ideal points. For example, a substantial IPD indicates significant divergence in foreign-policy preferences.

Our primary data source is the comprehensive UNGA roll-call voting dataset compiled by Voeten (2021), spanning from session 1 in 1946 to session 78 in 2023. This dataset includes all votes cast within the General Assembly and classifies resolutions into thematic categories such as colonialism, disarmament, human rights, Middle East issues, nuclear weapons, and economic development. Each resolution is tagged with specific keywords and metadata, allowing us to isolate alignment by thematic areas. Thus, we can compute IPDs based on all available resolutions or restrict the analysis to specific thematic categories, enhancing the flexibility and specificity of our alignment measures.

This methodology offers several advantages compared with simpler indices, such as basic agreement percentages. First, by explicitly estimating vote-specific thresholds, the model can distinguish between changes arising from shifting country positions and those resulting from variations in the resolution agenda. This allows a clearer interpretation of alignment shifts. Second, the inclusion of vote-level discrimination parameters ensures that only significant votes substantially influence alignment measures. This prevents consensus or near-unanimous votes—which do not effectively differentiate countries—from skewing alignment estimates.

Figure 1
IPD Measures for Selected Country Pairs



(a) IPD based on all votes 1946-2023 **(b) IPD based on economic votes 1971-2023** **(c) IPD based on all votes 1991-2023**

NOTE: The figure presents our three main IPD measures over time for a selected group of country pairs. For each year, bilateral distance (IPD) is computed as the absolute value of the difference of ideal points between the two countries. Panel (a) presents the IPDs estimated using UNGA voting data from 1946 to 2023 across all-vote categories. Panel (b) presents the economic IPD, which narrows the focus to economic votes while maintaining historical coverage from 1971 onward. Panel (c) shortens the historical window used in the IPD estimation to begin after the Cold War (1990–2023) while maintaining all-vote categories.

3. ALTERNATIVE SPECIFICATIONS AND METHODOLOGY

Building on the ideal point estimates described in the previous section, we develop several measures of geopolitical distance to assess trade fragmentation. Our approach proceeds in three steps. First, we estimate time-varying IPDs across countries under three different assumptions about the scope and time window of the voting data. Second, we transform these IPDs into normalized alignment scores that capture countries' relative positioning between the U.S. and China. Third, we construct discrete bloc segmentations based on the cross-sectional distribution of alignment scores at selected points in time, obtaining four different country classifications.

In the first stage, we construct three alternative IPD series, each reflecting a different methodological choice regarding the scope and time window of the voting data:

- **Full Historical Sample (1946–2023, All Votes):** In this specification, we maintain the original Bailey, Strezhnev, and Voeten (2017) framework without any modifications. This means using the complete set of UNGA votes from 1946 to 2023. No alterations are made to the original methodology.[1]
- **Economic Votes Only (1971–2023):** In this alternative, the primary change to the original methodology involves restricting the input dataset exclusively to resolutions categorized under economic issues, beginning from 1971 onward. Thus, instead of using the full set of thematic categories, the ideal point estimates specifically reflect countries' alignments on economic issues only.[2]
- **Post-Cold War Period (1990–2023, All Votes):** Here, the alteration from the original methodology involves changing the temporal scope. While the thematic scope (all resolution categories) remains unchanged, we limit the historical voting data to the period after the Cold War, specifically from 1990 onward. This temporal adjustment captures alignment dynamics reflective of the post–Cold War geopolitical landscape.

Figure 1 presents our three estimated IPD measures over time for a selected group of country pairs. While the relative distance between countries remains similar across all IPD measures, the choice of vote subset significantly influences the calculation of geopolitical distance. Additionally, the degree of stationarity varies across measures, affecting their sensitivity to short-term geopolitical developments, as evidenced by the economic IPDs.

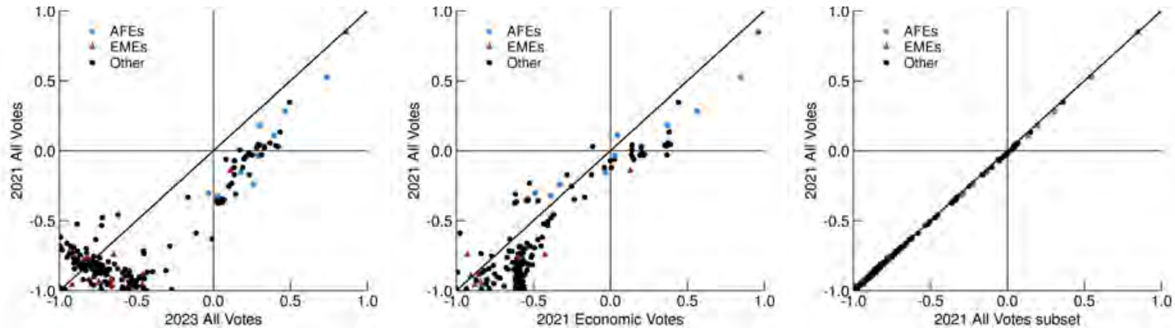
After estimating IPDs using the strategies described above, we refine these measures in a second stage by transforming them into normalized alignment scores. These scores reflect each country's relative positioning between the U.S. and China, providing a more intuitive view of global geopolitical dynamics. By normalizing

1. The full historical sample IPD data are available at https://dataverse.harvard.edu/dataverse/Voeten.

2. Votes involving embargoes are included under the economic votes category, with two caveats: (i) Embargo-related votes before 1971 are excluded due to the sample restriction, and (ii) unanimous embargo votes, which provide no information on ideological differences, are effectively excluded because they do not contribute to the estimation of ideal points.

Figure 2

Comparison of IPD Measures



(a) 2021 and 2023 all-vote IPDs **(b) 2021 IPDs for all votes and economic votes** **(c) 2021 IPDs for all votes and post-1990 votes**

NOTE: In panel (a) IPDs are estimated from all UN Votes 1946-2023. In panel (b) the x-axis is estimated with econ. votes from 1971 onward and the y-axis is estimated with all votes from all sessions. In panel (c) the x-axis is estimated with all votes from 1991 onward and the y-axis is estimated with all votes from all sessions. Source: Bailey et al. (2017) and authors' estimates.

the bilateral IPDs, we can assess how closely countries align with either the U.S. or China over time, facilitating the analysis of shifts in strategic orientation.

We transform each bilateral IPD series into a normalized alignment index, denoted as $seg(s)$, defined as

$$\text{seg}(s) = \frac{IPD(s, \text{China}) - IPD(s, \text{U.S.})}{IPD(s, \text{U.S.}) + IPD(s, \text{China})}.$$

The seg index ranges from –1 to +1, with values near –1 indicating stronger alignment with China, values near +1 indicating stronger alignment with the U.S., and values close to zero indicating relative neutrality. This transformation produces three corresponding time series of seg measures, each aligned with a different IPD estimation.

Figure 2 illustrates how countries' geopolitical alignments differ across these measures. In each panel, the vertical axis shows the baseline seg based on full-vote IPDs estimated through 2021, while the horizontal axis shows seg based on one of the alternative IPD definitions. In panel (a), geopolitical alignment is obtained using the first alternative, the 2023 IPD values; in panel (b), it is obtained using economic votes only; and in panel (c), it is obtained using post-1990 votes only. Each point represents a country. Points above the 45-degree line indicate countries that are relatively more China aligned in the alternative measure, while those below are relatively more U.S. aligned.

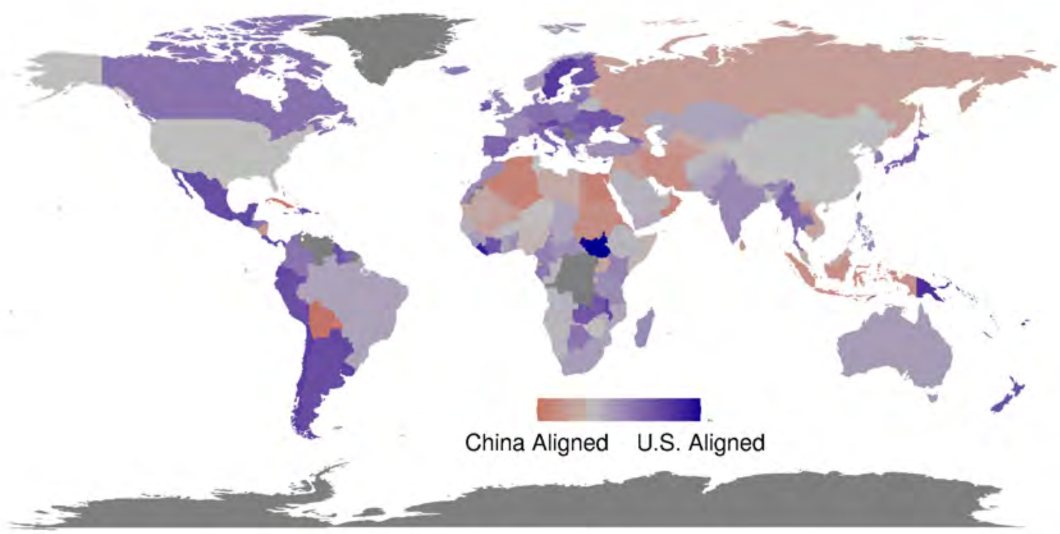
Panel (a) shows that from 2021 to 2023, countries shifted closer to the U.S., albeit from a strong China starting point. This trend is especially pronounced for advanced foreign economies (AFEs) (light blue dots).[3] This pattern suggests that recent geopolitical developments—such as Russia's invasion of Ukraine and escalating U.S.–China tensions—may have played a key role in reshaping alliances. The fact that the shift is more pronounced among AFEs, which are historically aligned with the U.S., may indicate a tightening of alliances within the Western bloc, particularly in response to economic and security concerns.

Panel (b) focuses on economic votes. In this case, if a country falls below the 45-degree line, it is more aligned with the U.S. than when using the full-vote sample. The clustering along the 45-degree line suggests that geopolitical alignment is relatively stable across voting subsets. However, we observe a concentration around –0.5 on the x-axis, indicating that some countries appear more neutral when votes on human rights and colonialism, among others, are excluded. Panel (c) shows that the choice of the estimation sample period (i.e., starting in 1946 or 1990) does not introduce substantial differences in geopolitical alignment, suggesting that IPD estimates are relatively robust to the estimation sample window.

Figure 3 translates the IPD shifts from Figure 2, panel (a) into a geographic visualization, showing how countries' alignments shifted between 2021 and 2023. The map reveals a notable pattern of nations moving closer to the U.S. despite initially being more aligned with China. This geographic perspective highlights regional trends not apparent in scatter plots, such as the coherent shift among European and Oceanic countries

3. AFE countries are Canada, Japan, the U.K., the U.S., France, Germany, Italy, Spain, Switzerland, Australia, and Sweden. Emerging market economy countries are China, India, Singapore, South Korea, Malaysia, Indonesia, the Philippines, Thailand, Mexico, Vietnam, Argentina, Brazil, Chile, Colombia, Israel, Russia, and Saudi Arabia.

Figure 3
Evolution of Segmented IPDs from 2021 to 2023



NOTE: The map illustrates changes in geopolitical alignments between 2021 and 2023 based on segmented IPD (seg measure). Countries shifting toward stronger alignment with the U.S. are marked accordingly, highlighting notable realignments, especially evident among European and Oceanic countries.

toward the U.S., while responses vary across Africa, South America, and Southeast Asia. Though the map does not capture the full magnitude of these shifts, it effectively illustrates how recent geopolitical events—Russia's invasion of Ukraine, U.S.–China tensions, and changing economic relationships—have influenced international alignments. This visualization provides geographical context to the numerical data, showing the spatial distribution of realignment patterns in response to evolving great power dynamics.

In the third stage, we use the segmented alignment scores to construct discrete country blocs. Our baseline bloc classification is based on the 2021 distribution of seg, derived from IPDs estimated using all votes from 1946 to 2923. We construct three alternative categorizations: (i) based on the 2023 distribution from the same IPD estimation, (ii) based on the 2021 distribution of the economic-vote IPDs, and (iii) based on the 2021 distribution of the post-1990 IPDs. Thus, while we estimate three underlying IPD (and seg) time series, we generate four alternative bloc classifications depending on the year and vote subset used. The formal definition of bloc membership—classifying countries as U.S. aligned, China aligned, or nonaligned—is detailed in the next section.

4. FRAGMENTATION

In this section, we follow the methodology outlined by Gopinath et al. (2025) to examine whether trade and financial flows are fragmenting along geopolitical lines and whether these findings are sensitive to the specific IPD measure used. By analyzing variations in the IPD specifications, we assess the robustness of observed fragmentation patterns, particularly considering recent geopolitical shifts.

First, we construct geopolitical alignment blocs based on countries' seg(s) scores derived from the estimated IPDs. Countries are classified into three groups: a U.S.-aligned bloc, comprising those in the top quartile of alignment with the U.S.; a China-aligned bloc, comprising those in the top quartile of alignment with China; and a nonaligned bloc, comprising all remaining countries. We apply this classification separately under each of the four IPD specifications introduced in the previous section: the baseline measure based on 2021 IPDs, the updated measure based on 2023 IPDs, the economic-vote IPDs from 2021, and the post-1990 IPDs from 2021.

Comparing bloc assignments under each alternative IPD specification to the baseline classification, we find that 48 percent of countries change blocs under the 2023 IPD, 31 percent under the economic-vote IPD, and only 2 percent under post-1990 IPDs. The higher reclassification rate under the 2023 IPD suggests that countries are reacting to immediate political and economic pressures rather than maintaining long-standing alignments. In contrast, the relative stability of bloc classifications under the economic-vote and post-1990 measures indicates that economic relationships and post–Cold War alignments may be more resistant to short-term geopolitical disruptions.

Second, we define three dummy variables based on geopolitical bloc membership. Specifically, $Between\ Bloc_{sd}$ equals 1 if countries s and d belong to different blocs, whereas $Within\ Bloc_{sd}$ equals 1 if both countries belong to the same bloc. Last, $Nonaligned_{sd}$ equals 1 if at least one country in the pair belongs to the nonaligned bloc. These dummy variables may vary for the same country pair sd, depending on the IPD specification and the resulting classification into blocs.

We estimate the following gravity equation:

$$Y_{sdt} = \beta_1 BetweenBloc_{sd} \times Post_t + \beta_2 Nonaligned_{sd} \times Post_t + \delta_{sd} + \tau_{st} + \phi_{dt} + \epsilon_{sdt}, \tag{1}$$

where Y_{sdt} is the value of total trade of goods between country s and country d or the change in the share of portfolio assets held by the reporting country s in the counterpart country d between year t and $t-1$. *Post* is an indicator equal to 1 after Russia's invasion of Ukraine (years 2022–2023). δ_{sd}, τ_{st}, and ϕ_{dt} are country-pair, source × time, and destination × time fixed effects, included in all specifications.

For trade, we estimate the gravity model using Poisson pseudo-maximum likelihood (PPML), using annual data for the period 2001–2023 from UN Comtrade. For portfolio holdings, we estimate the gravity model with ordinary least squares (OLS) using semi-annual data for the period 2015s1–2023s2. Financial data contain bilateral data on countries' holdings of cross-border portfolio investment (equity or debt) securities, excluding FDI, from the IMF's CPIS.

Table 1, Panel A shows the estimation results for trade under alternative IPD specifications.[4] The first column presents the results using the baseline IPD measure to construct the blocs, showing evidence of geopolitical fragmentation in trade flows. The estimated coefficient indicates that in the post-invasion period, trade flows between countries in different geopolitical blocs are 11.8 percent lower, on average, compared with trade flows between countries within the same bloc.[5] This result is statistically significant at the 1 percent level. In contrast, trade flows between country pairs where at least one country is nonaligned are not significantly different from trade flows within the same bloc. These findings align with those of Gopinath et al. (2025) despite differences in the underlying trade data.[6]

This effect strengthens with the 2023 IPD (–24.1 percent), reflecting recent geopolitical shifts, but weakens with economic votes (–9 percent), suggesting that trade alignment follows broader political ties more than economic cooperation. The post-1990 IPD yields similar results to the baseline (–12 percent), indicating that Cold War–era voting does not significantly affect fragmentation estimates. In all specifications, the coefficient for the interaction term *Nonaligned* × *Post* remains small and statistically insignificant, reinforcing the idea that trade among nonaligned countries is less affected by geopolitical tensions.

Overall, we find that the specification of IPDs plays a crucial role in shaping conclusions about the degree of trade fragmentation, as the magnitude of the observed effects varies depending on the choice of IPD measure. The 2023 IPD best captures recent geopolitical disruptions, making it ideal for analyzing short-term realignments. In contrast, the economic-vote IPD provides a clearer picture of trade relations driven by economic dependencies rather than broad political alliances. Meanwhile, the post-1990 IPD offers a historically consistent view of geopolitical fragmentation, minimizing distortions from Cold War–era dynamics. These findings confirm that trade fragmentation is increasing, but its intensity depends on the chosen IPD measure.

Panel B provides some evidence of financial fragmentation, with the share of portfolio holdings between countries in opposing blocs declining by 0.3 percentage points post-invasion in the baseline and post-1990 IPDs. However, the results are weaker and less robust across specifications, particularly in the 2023 and economic-vote IPDs. Meanwhile, the coefficients for nonaligned countries remain small and insignificant across all specifications, reinforcing the idea that financial flows among nonaligned countries were less affected by geopolitical tensions. Overall, while some specifications suggest portfolio fragmentation along geopolitical lines, these effects are highly sensitive to the choice of IPD measure, contrasting with the more robust and consistent fragmentation observed in trade flows.

The presence of offshore financial centers poses challenges for accurately identifying underlying geopolitical exposures, as they may obscure true investor-recipient relationships. To address this issue, in the appendix we reestimate our results, excluding prominent financial hubs, following the methodology proposed by Coppola et al. (2021), who examine the role of these centers in global portfolio allocations.[7]

4. Trade is the CIF (cost, insurance, and freight) value of total goods traded between Country A and Country B, in millions of USD. The estimation of the portfolio holdings equation uses the lag of the country-pair portfolio share as an additional regressor.

5. The coefficient from the Poisson regression is $e^{-0.125} - 1 \approx -11.8$ percent.

6. In this note, we use annual goods trade data from UN Comtrade for the period 2001–2023. In contrast, Gopinath et al. (2025) use quarterly total bilateral trade data from Trade Data Monitor, a private provider, for 2017:Q1–2024:Q1.

7. In our portfolio holdings analysis, we do not include well-known financial centers, such as Bermuda, the British Virgin Islands, the

Table 1
Regression Results

Description	Baseline IPD (Complete, 2021) (1)	All-Vote IPD (Complete, 2023) (2)	Economic IPD (Complete, 2021) (3)	All-Vote IPD (Subsample, 2021) (4)
Panel A: Trade				
Between Bloc × Post	-0.125***	-0.276***	-0.094**	-0.128***
Std. Error	(0.040)	(0.058)	(0.038)	(0.041)
Nonaligned × Post	-0.044	-0.066	-0.017	-0.041
Std. Error	(0.070)	(0.057)	(0.053)	(0.068)
Observations	389,747	389,761	387,589	389,747
Panel B: Portfolio Holdings				
Between Bloc × Post	-0.026*	-0.014	-0.000	-0.026*
Std. Error	(0.016)	(0.016)	(0.012)	(0.016)
Nonaligned × Post	-0.021	-0.016	-0.023	-0.021
Std. Error	(0.022)	(0.020)	(0.022)	(0.021)
Observations	231,450	231,971	231,578	231,450

NOTE: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For trade, we estimate the gravity model using PPML, using annual data from 2001 to 2023 from UN Comtrade. Standard errors are clustered at the country-pair level. We include country-pair, source × time, and destination × time fixed effects. Coefficient interpretation is the following: $\left(e^{\text{coefficient}} - 1\right) \times 100$. For portfolio holdings, we estimate the gravity model with OLS using semi-annual data for the period 2015s1–2023s2. Financial data contain bilateral data on countries' holdings of cross-border portfolio investment (equity or debt) securities, excluding FDI, from the IMF's CPIS. *Post* is a dummy that captures the period following the invasion of Ukraine and equals 1 for the years 2022 and 2023. Each column shows the results using a different IPD measure to construct the country blocs. Column 1 uses the baseline IPD measure, which is based on the 2021 values of IPDs estimated using UNGA voting data from 1946 to 2023 across all-vote categories. Column 2 uses the 2023 values of IPDs estimated using UNGA voting data from 1946 to 2023 across all-vote categories. Column 3 uses the 2021 values of the economic IPD, which narrows the focus to economic votes while maintaining historical coverage from 1971 onward. Column 4 uses the 2021 values of IPDs estimated using a subsample of votes after the Cold War (1990–2023) while maintaining all-vote categories.

4.1 Alternative Specification of Gravity Equations

In this section, we explore two alternative specifications of gravity equations to evaluate whether trade flows fragment along geopolitical lines.

While our previous analysis used normalized alignment measures (seg(s)) to classify countries into distinct blocs, here we employ bilateral IPD measures directly to assess fragmentation without imposing explicit bloc boundaries. We use lagged IPD to mitigate simultaneity concerns, assuming geopolitical alignment evolves gradually and is predetermined relative to trade and financial flows. The interaction term with *Post*, captures whether trade flows are affected by changes in geopolitical distance in the post-invasion period. Fixed effects are the same as in 1.

$$Y_{sdt} = \beta \ \mathrm{IPD}_{sdt-1} \times \mathrm{Post}_t + \delta_{sd} + \tau_{st} + \phi_{dt} + \epsilon_{sdt}, \tag{2}$$

Table 2 presents the estimation results of equation (2), using the IPDs estimated using all votes from 1946 to 2023 and those restricted to economic votes. We omit the results for IPD estimated with all votes since the 1990s, as they are nearly identical to the baseline specification. Columns 1 and 2 report the coefficients for the interaction term *IPD* × *Post*, while columns 3 and 4 include the direct effect of geopolitical distance *IPD* without interaction with the post-invasion period.[8]

Panel A of Table 2 presents the estimation results for total bilateral trade. Columns 1 and 2 show strong evidence of trade fragmentation along geopolitical lines in the post-invasion period. A one-unit increase in geopolitical distance is associated with an approximately 8 percent decline in trade flows, on average. These results are statistically significant at the 1 percent level and remain consistent across the baseline and economic IPD specifications.

Cayman Islands, and Hong Kong SAR, as source countries. In the appendix, we present a robustness check, where we further exclude other countries frequently identified as international financial centers, including Ireland, Luxembourg, the Netherlands, and Singapore.

8. In this note, we present the results using the IPD measures lagged one period to mitigate potential endogeneity concerns, as in Catalan, Fendoglu, and Tsuruga (2024). Lagging IPDs helps reduce potential reverse causality, as geopolitical alignment may both influence and be influenced by trade and financial flows.

Table 2
Regression Results with IPD

Description	All-Vote IPD	Economic IPD	All-Vote IPD	Economic IPD
	IPD × Post		IPD	
	(1)	(2)	(3)	(4)
Panel A: Trade				
β Coefficient	-0.087***	-0.080***	-0.068**	0.021*
Std. Error	(0.023)	(0.024)	(0.027)	(0.012)
Observations	374,365	371,609	374,365	371,609
Panel B: Portfolio Holdings				
β Coefficient	-0.075**	-0.058*	0.051	0.068
Std. Error	(0.038)	(0.037)	(0.076)	(0.062)
Observations	115,142	114,129	115,142	114,129

NOTE: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For trade, we estimate the gravity model using PPML, using annual data from 2001 to 2023 from UN Comtrade. We include country-pair, source × time, and destination × time fixed effects. Standard errors are clustered at the country-pair level. Coefficient interpretation is the following: $\left(e^{\text{coefficient}} - 1\right) \times 100$. For portfolio holdings, we estimate the gravity model with OLS using semi-annual data for the period 2015s1–2023s2. Financial data contain bilateral data on countries' holdings of cross-border portfolio investment (equity or debt) securities, excluding FDI, from the IMF's CPIS. Columns 1 and 3 use the IPD estimated with all votes from 1946 to 2023 as the explanatory variable. Columns 2 and 4 use the economic IPD, estimated using only economic votes from 1971 to 2023.

Columns (3) and (4) assess the direct effect of geopolitical distance on trade flows, independent of the post-invasion period. The estimated coefficient remains statistically significant under the baseline IPD measure, with a 7 percent decline in trade flows. However, the economic IPD (column 4) yields a smaller but positive coefficient (2 percent), suggesting that trade relationships based on economic alignment may be more resilient to geopolitical fragmentation, particularly in periods before 2022. The contrasting coefficients between $IPD \times Post$ (column 2) and direct IPD effects (column 4) reveal an important temporal pattern in how economic voting alignment relates to trade flows. While countries with different economic voting patterns show reduced trade after 2022 (negative $IPD \times Post$ coefficient), they actually maintained stronger trade relationships in the pre-invasion period (positive IPD coefficient). This suggests that economic voting differences did not disrupt trade until recent geopolitical tensions transformed how such alignment matters for economic relationships.

Panel B of Table 2 provides evidence of financial fragmentation, though the effects vary across specifications. In columns 1 and 2, the interaction term $IPD \times Post$ is negative and statistically significant (-0.075 and -0.058, respectively), indicating that in the post-invasion period, greater geopolitical distance is associated with a reduction in portfolio holdings between country pairs. However, in columns 3 and 4, where we estimate the direct effect of IPD independently of the post-invasion period, the coefficients are statistically insignificant. This suggests that while geopolitical distance has played a greater role in shaping portfolio allocations in recent years, its influence was more limited before 2022. Unlike trade, where fragmentation effects appear more persistent, portfolio holdings seem more reactive to recent geopolitical shocks rather than long-standing geopolitical alignments.

4.1.1 Distant, Aligned, and Nonaligned Countries

In this section, we examine a new definition of country blocs based on the distribution of the geopolitical distance of the country pair $IPD(s, d)$ instead of working on the segment space. Rather than assigning a central role to the U.S. and China in defining global geopolitical alignments, this approach classifies country pairs solely based on their relative geopolitical proximity. We define the following: a bloc of aligned country pairs, which includes country pairs in the lower quartile of the IPD distribution in a given year; a bloc of distant country pairs, which includes country pairs in the top quartile of the IPD distribution in a given year; and a set of nonaligned country pairs, comprising the remaining economies. When comparing bloc classifications under different IPD specifications to the baseline IPD, we find that 25 percent of country pairs change blocs under 2023 IPD, 30 percent under the economic-vote IPD, and only 1.6 percent when using data since the 1990s.

This alternative bloc definition provides a more general perspective on geopolitical alignment, removing the emphasis on specific anchor countries like the U.S. and China. Using these blocs, we estimate the following

Table 3
Regression Results

Description	Baseline IPD (Complete, 2021)	All-Vote IPD (Complete, 2023)	Economic IPD (Complete, 2021)
	(1)	(2)	(3)
Panel A: Trade			
Distant x Post	-0.048	-0.090**	-0.113**
Std. Error	(0.037)	(0.036)	(0.055)
Nonaligned x Post	-0.010	0.037	0.009
Std. Error	(0.032)	(0.032)	(0.025)
Observations	387,698	387,559	383,468
Panel B: Portfolio Holdings			
Distant x Post	-0.010	-0.010	-0.019
Std. Error	(0.014)	(0.014)	(0.014)
Nonaligned x Post	-0.010	-0.001	-0.023**
Std. Error	(0.010)	(0.010)	(0.010)
Observations	230,675	227,154	230,675

NOTE: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For trade, we estimate the gravity model using PPML, using annual data from 2001 to 2023 from UN Comtrade. We include country-pair, source × time, and destination × time fixed effects. Standard errors are clustered at the country-pair level. Coefficient interpretation is the following: $\left(e^{\text{coefficient}} - 1\right) \times 100$. For portfolio holdings, we estimate the gravity model with OLS using semi-annual data for the period 2015s1–2023s2. Financial data contain bilateral data on countries' holdings of cross-border portfolio investment (equity or debt) securities, excluding FDI, from the IMF's CPIS. *Post* is a dummy that captures the period following the invasion of Ukraine and equals 1 for the years 2022 and 2023. Each column shows the results using a different IPD measure to construct the country blocs. Column 1 uses the baseline IPD measure, which is based on the 2021 values of IPDs estimated using UNGA voting data from 1946 to 2023 across all-vote categories. Column 2 uses the 2023 values of IPDs estimated using UNGA voting data from 1946 to 2023 across all-vote categories. Column 3 uses the 2021 values of the economic IPD, which narrows the focus to economic votes while maintaining historical coverage from 1971 onward.

gravity equation for different IPD specifications:

$$Y_{sdt} = \beta_1 \text{ Distant}_{sd} \times \text{Post}_t + \beta_2 \text{ Nonaligned}_{sd} \times \text{Post}_t + \delta_{sd} + \tau_{st} + \phi_{dt} + \epsilon_{sdt}, \quad (3)$$

where $Distant_{sd}$ is a dummy variable that equals 1 if the country pair *sd* belongs to the distant bloc and $Nonaligned_{sd}$ is a dummy variable that equals 1 if the country pair *sd* belongs to the nonaligned bloc.

Table 3 shows the estimation results of equation (3) for trade and changes in the portfolio holdings' share. Panel A shows the results for trade. The coefficient for the interaction term $Distant_{sd} \times Post_t$ is negative and statistically significant in columns 2 and 3, suggesting that trade flows between distant country pairs decline significantly in the post-invasion period when constructing the blocs with the latest data or when restricting to economic votes. Using the economic IPD measure (column 3), trade flows between distant pairs are estimated to be around 11 percent lower, on average, compared with aligned pairs, underscoring the heightened impact of geopolitical distance on trade fragmentation. In contrast, the baseline specification (column 1) shows a smaller and statistically insignificant coefficient, highlighting the sensitivity of the results to the choice of IPD measure and bloc definition. These findings reinforce the idea that geopolitical tensions disproportionately disrupt trade relationships between distant countries.

The coefficients for the interaction term $Nonaligned_{sd} \times Post_t$ are small and statistically insignificant across all specifications, indicating that trade flows between nonaligned pairs remain stable in the post-invasion period. This result aligns with earlier findings using U.S.- and China-centric bloc definitions, where trade relationships involving nonaligned countries were less affected by geopolitical tensions.

Panel B shows the results for the change in the share of portfolio holdings. Unlike trade, the effects of geopolitical fragmentation on financial flows appear more muted. The coefficients for the interaction term $Distant_{sd} \times Post_t$ are small and statistically insignificant across all specifications, suggesting that geopolitical distance has not led to a significant reallocation of portfolio holdings in the post-invasion period when we consider geopolitical distance in a global perspective instead of focusing on U.S.–China blocs. Similarly, the coefficients for the interaction term $Nonaligned_{sd} \times Post_t$ are also small and mostly insignificant, with the exception of the economic IPD specification (column 3), where the coefficient is negative and indicates that, when considering economic alignment, the share of portfolio holdings between nonaligned country pairs declines by approximately 2.3 percent in the post-invasion period. Taken together, these results indicate that financial flows, while responsive to geopolitical tensions, remain substantially less sensitive than trade flows, reflecting the broader economic and financial considerations that drive portfolio decisions.

However, the weaker evidence for financial fragmentation may also partially reflect the unique and dominant role of the U.S. in global financial markets. As illustrated in Figure 2, the IPD measures consistently place the U.S. in the far-right tail of the distribution, signaling its great geopolitical distance from many international counterparts. When we exclude the U.S. from the analysis in equation (3), the effects of geopolitical distance on portfolio holdings become clearer and more significant. Specifically, under the economic IPD specification, portfolio investments between distant country pairs decline significantly by about 2.5 percent following recent geopolitical shocks.[9] This finding suggests that the U.S.'s central role in global finance may mask underlying fragmentation trends, offsetting or moderating the impact of geopolitical tensions on international portfolio allocations.

4.2 Trade Fragmentation by Technology Class

Thus far, our analysis of trade has focused solely on aggregate bilateral trade flows. While the findings above suggest increasing fragmentation in international trade, recent geopolitical events—particularly Russia's invasion of Ukraine and heightened U.S.–China tensions—highlight that the reallocation of trade flows may vary considerably across sectors. Increasingly, governments are adopting strategic trade policies aimed explicitly at reducing dependencies, enhancing supply chain resilience, and reinforcing alliances through "decoupling," "derisking," and "friendshoring." To investigate how these contemporary geopolitical dynamics affect different segments of global trade, we decompose bilateral trade flows into high-, medium-, and low-tech manufacturing classes, examining each sector's evolving patterns and responses to geopolitical pressures.

For this analysis, we use BACI, a rich dataset from the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) that reconciles discrepancies in national trade statistics to construct bilateral trade flows at the country pair-year-product level. BACI spans from 1996 to 2023 and covers more than 200 countries and 5,000 product codes. To ensure symmetry with our previous analysis using UN Comtrade data, we restrict the data to the period 2001–2023. To construct technology classes, we first reclassify the products in BACI from the HS-6 level to ISIC Revision 3. From here, we make judgment-based designations of goods as high-tech, medium-tech, low-tech, or other. Our categorizations for each technology class can be found in Appendix Table A10.

We begin by reestimating equation (1) using the segmented IPDs interacted with our *Post* indicator. We run separate gravity equations for each technology class. Table 4 presents the estimation results of geopolitical distance on tech-based trade flows across different IPD measures and technology classes. Using the baseline IPD measure to construct the blocs, we observe a negative coefficient for each tech class, suggesting that in the post-invasion period, trade flows between countries of different geopolitical blocs were lower on average than those between countries within the same bloc for each respective tech class. The effects vary in magnitude, with the decrease in trade flows being the largest for low-tech goods (15.2 percent) and the smallest for high-tech goods (9.3 percent). Our results are significant at the 1 percent level for high- and low-tech goods and at the 5 percent level for medium-tech goods.

Across nearly all specifications and technology classes, the coefficients for $Nonaligned_{sd} \times Post_t$ are statistically insignificant except for specification (2) for low-tech goods. One possible explanation is that nonaligned countries may have experienced shifts in trade patterns for low-tech goods due to increased uncertainty, supply chain disruption involving sanctioned or geopolitically distant economies, or opportunistic redirection of exports toward politically neutral markets. As such, we would expect these shifts in trade flows to be more pronounced for low-tech goods as they typically have fewer barriers to shifting suppliers or markets compared with medium- or high-tech goods, even among nonaligned countries. Moreover, low-tech goods trade may be more affected by geopolitical distance than high-tech trade primarily due to their higher elasticity of substitution. Unlike high-tech products, which typically require specialized inputs, advanced infrastructure, and stable long-term supplier relationships, low-tech goods are relatively standardized and their production processes are less capital intensive. Consequently, when geopolitical tensions rise, it is substantially easier—and less costly—for countries to rapidly shift sourcing or redirect exports of low-tech goods away from geopolitically distant markets, amplifying their sensitivity compared with high-tech goods.

Consistent with our results from Table 1, the effect strengthens with the 2023 IPDs for all tech classes, particularly for medium-tech goods. There is a notable increase in the magnitude of trade fragmentation for medium-tech goods when we consider 2023 IPDs. The particularly pronounced fragmentation observed in

9. See Appendix Appendix 0.1.2 for detailed results.

Table 4
Regression Results

Description	Baseline IPD (Complete, 2021) (1)	All-Vote IPD (Complete, 2023) (2)	Economic IPD (Complete, 2021) (3)	All-Vote IPD (Subsample, 2021) (4)
Panel A: High-Tech Trade				
Between Bloc × Post	-0.098***	-0.209***	-0.075**	-0.098***
Std. Error	(0.037)	(0.056)	(0.035)	(0.038)
Nonaligned × Post	-0.133*	-0.076*	0.041	-0.141
Std. Error	(0.078)	(0.045)	(0.058)	(0.074)
Observations	291,816	291,702	290,284	291,831
Panel B: Medium-Tech Trade				
Between Bloc × Post	-0.135**	-0.330***	-0.074	-0.134**
Std. Error	(0.055)	(0.069)	(0.052)	(0.055)
Nonaligned × Post	-0.060	-0.116	-0.026	-0.045
Std. Error	(0.100)	(0.101)	(0.085)	(0.098)
Observations	255,976	255,815	254,711	255,995
Panel C: Low-Tech Trade				
Between Bloc × Post	-0.165***	-0.213***	-0.151***	-0.176***
Std. Error	(0.033)	(0.039)	(0.0289)	(0.034)
Nonaligned × Post	-0.076	-0.151***	-0.066	-0.072
Std. Error	(0.051)	(0.041)	(0.054)	(0.050)
Observations	288,982	288,913	287,500	289,006

NOTE: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For each tech class, we estimate the gravity model using PPML, using annual data from 2001 to 2023 from the CEPII. We include country-pair, source × time, and destination × time fixed effects. Standard errors are clustered at the country-pair level. Coefficient interpretation is the following: $\left(e^{\text{coefficient}} - 1\right) \times 100$. *Post* is a dummy that captures the period following the invasion of Ukraine and equals 1 for the years 2022 and 2023. Each column shows the results using a different IPD measure to construct the country blocs. Column 1 uses the baseline IPD measure, which is based on the 2021 values of IPDs estimated using UNGA voting data from 1946 to 2023 across all-vote categories. Column 2 uses the 2023 values of IPDs estimated using UNGA voting data from 1946 to 2023 across all-vote categories. Column 3 uses the 2021 values of the economic IPD, which narrows the focus to economic votes while maintaining historical coverage from 1971 onward. Column 4 uses the 2021 values of IPDs estimated using a subsample of votes after the Cold War (1990–2023) while maintaining all-vote categories.

medium-tech goods when using the updated 2023 IPD measure may reflect significant recent disruptions to trade in petroleum products and related commodities due to sanctions on Russia. Additionally, weaker and less significant fragmentation effects identified with economic-vote-based IPDs reinforce the interpretation that geopolitical, rather than purely economic, alignments primarily drive these observed trade disruptions.

In the appendix, we reestimate equations (2) and (3) separately for each technology class and find results consistent with those presented in Tables 2 and 3. These estimations further highlight the heterogeneity across technology classes. Although trade flows decrease among geopolitically distant country pairs for all technology categories, the magnitude of this decline differs significantly. This variation aligns intuitively with the distribution and substitutability of trade across sectors. For instance, high-tech trade, dominated by complex products such as computers, electrical equipment, machinery, and chemicals, is highly concentrated within a few key countries such as the U.S., China, Taiwan, and major Euro-area economies.[10] Consequently, rebalancing trade flows for these goods in response to geopolitical shocks, such as Russia's invasion of Ukraine, may be economically challenging or practically infeasible. Conversely, production of low-tech goods, like textiles, can be reshored or decoupled more easily, leading to more pronounced trade reallocation in this category.

5. ECONOMIC POLICY FRAGMENTATION

Given the evidence from previous sections that trade and financial flows have fragmented along geopolitical lines, it is important to examine whether deliberate economic policies may further incentivize or exacerbate

10. Since Taiwan is not a UN voting member, IPDs for Taiwan cannot be calculated despite the availability of trade data.

this fragmentation. Indeed, geopolitical fragmentation increasingly manifests not only as shifts in economic flows but also through targeted policy interventions explicitly aimed at reshaping cross-border economic interactions. These include tariffs, subsidies, export controls, and regulatory measures intended either to protect domestic interests or strategically limit foreign commercial activities, reflecting underlying geopolitical motives or strategic considerations. Such policies could directly reinforce fragmentation patterns observed in global trade and financial markets.

To explore this policy-driven dimension of geopolitical fragmentation, we empirically analyze detailed records from the Global Trade Alert (GTA)—specifically the Newly Implemented Policy Outcomes (NIPO) database—which systematically documents economic policy interventions adopted globally.[11] This section evaluates the extent to which economic policy interventions align with geopolitical blocs defined by various IPD specifications, thus complementing and extending our earlier analysis of trade and financial fragmentation.

5.1 Data on Policy Interventions

We use the GTA NIPO database, which provides detailed records of economic policy interventions ("acts") implemented globally since 2017. The GTA NIPO systematically classifies interventions as either distortive or liberalizing. Distortive interventions explicitly discriminate against foreign commercial interests, either by restricting market access or by providing preferential subsidies to domestic firms. Conversely, liberalizing policies are characterized by nondiscriminatory interventions that enhance market access.

Our analysis specifically focuses on interventions where the implementing jurisdiction and affected jurisdictions differ, restricting attention exclusively to individual countries. Consequently, we exclude interventions enacted by supranational entities such as the European Union, leaving their inclusion as an avenue for future research.

Given that most interventions simultaneously affect multiple jurisdictions, we first transform the data into a dyadic format. Specifically, if a single policy intervention affects multiple countries, we record it separately for each affected country, whereby each restriction is counted once per impacted jurisdiction. In doing so, we assign each intervention to geopolitical blocs based on the geopolitical distance of the involved country pair, using both the baseline and alternative IPD measures. This dyadic structure enables a more detailed examination of policy dynamics across geopolitical lines.

For the remainder of the article, we focus on dyadic relationships defined by the baseline IPD and the bloc classification into aligned, nonaligned, or distant, as outlined in Section 4.1.1. Results obtained using alternative IPD measures are presented in the appendix, while results for bloc classification within the U.S.–China spectrum are available upon request.

The GTA database also classifies a subset of interventions as "NIPO interventions," explicitly reflecting strategic economic or geopolitical motivations. Specifically, a NIPO intervention is associated with at least one of six predefined strategic motives: (i) National Security, covering policies aimed at safeguarding national security interests, such as export controls on sensitive technologies; (ii) Resilience and Security of Supply, referring to measures ensuring stable domestic access to essential nonfood products and raw materials, such as critical minerals; (iii) Strategic Competitiveness, involving actions that promote domestic innovation and competitiveness in strategically vital sectors; (iv) Climate Change Mitigation, capturing interventions explicitly targeting reductions in carbon emissions and facilitating transitions toward renewable energy; (v) Geopolitical Concerns, which includes measures directly addressing threats posed by particular countries or geopolitical blocs, notably economic sanctions (e.g., sanctions imposed after Russia's invasion of Ukraine); and (vi) Digital Transformation, encompassing policies designed to support the adoption and expansion of digital technologies and infrastructure. By analyzing NIPO interventions separately from general distortions, we obtain deeper insights into the explicitly strategic or geopolitical intentions underlying economic policy actions.

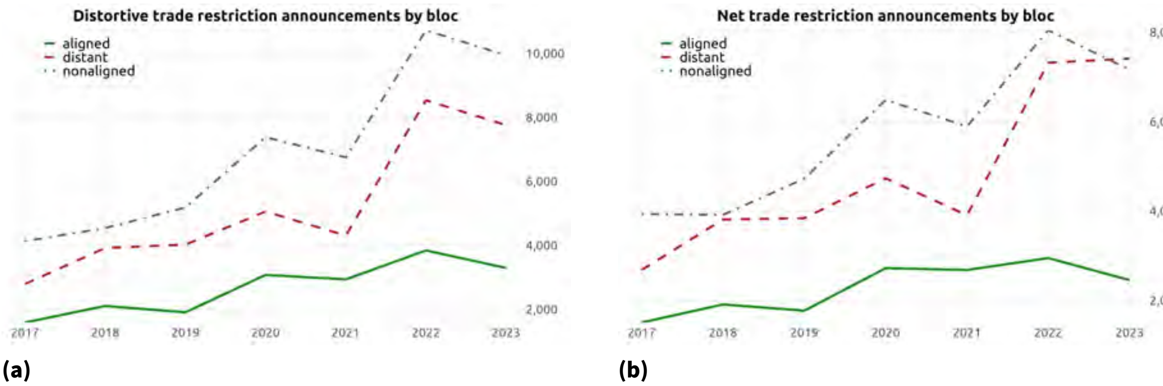
5.2 Empirical Evidence on Fragmentation in Economic Policy

We first examine total distortive announcements by geopolitical blocs, using our baseline IPD measure. In figure 4 panel (a), we observe a substantial increase in distortive announcements after Russia's invasion of Ukraine in 2022, particularly evident in interactions between countries belonging to distant and nonaligned geopolitical blocs. Notably, the sharp rise in discriminatory interventions post-2022 suggests that geopolitical fragmentation is increasingly reflected through targeted economic policies.

Analyzing net distortive announcements (distortive minus liberalizing interventions) provides additional clarity. The net measure exhibits a pronounced rise after 2022, emphasizing intensified fragmentation primarily driven by distortive measures outweighing liberalizing initiatives. The divergence between aligned and nonaligned/distant net discriminatory announcements suggests significant geopolitical realignments in economic policy.

11. For details on the GTA NIPO database, see Evenett et al. (2024).

Figure 4
Distortive and Net Trade Restriction Announcements by Bloc



NOTE: Panel (a) shows the sum of distortive trade restriction announcements by year and bloc, and panel (b) shows the sum of net trade restriction announcements by year and bloc, calculated as the difference between distortive and liberalizing. Aligned, nonaligned, and distant blocs are constructed using the baseline IPD, constructed using all votes, in 2021.

The suggestive evidence on geoeconomic fragmentation in economic policies holds regardless of the IPD measure used to classify countries into blocs. However, the relative importance of trade restrictions between distant countries increases significantly, especially in recent years, when we allocate countries into blocs using the 2023 IPD measure, using all votes. In contrast, when we focus on the economic-vote IPD measure, we observe a wider difference between the number of trade restrictions between nonaligned and distant countries, with the nonaligned ranking first for all measures.[12]

5.2.1 Motives and Sectoral Distribution of Restrictions

Figure 5 highlights how geopolitical blocs differ significantly in terms of policy interventions when we focus on measures explicitly driven by strategic NIPO motives. Compared with the broader set of distortive interventions, these strategically motivated actions show even clearer distinctions across blocs, with notably more pronounced differences in both total distortive and net distortive interventions (panels (a) and (b), respectively). This suggests that geopolitical considerations play a particularly important role in shaping policy actions when strategic economic or security-related motives—such as national security, resilience, or geopolitical concerns—are explicitly involved.

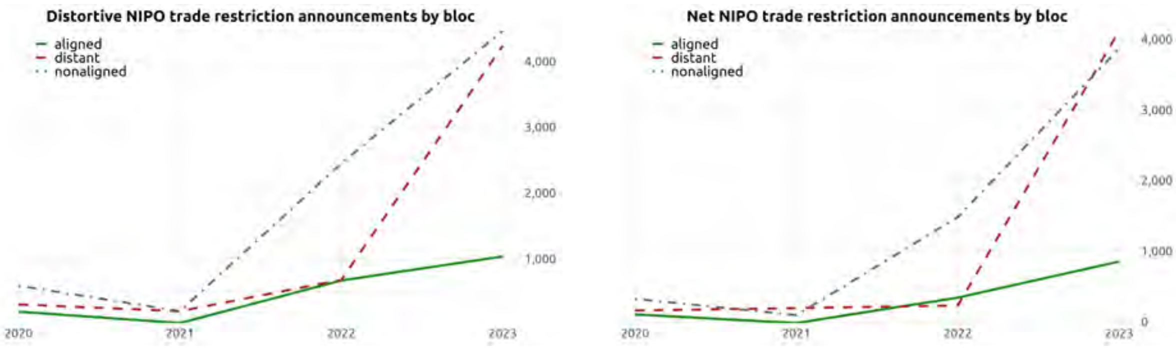
The detailed classification by motive thus provides deeper insight into how geopolitical factors increasingly influence national economic policies, reinforcing global fragmentation dynamics.

Figure 6 illustrates the evolution of distortive interventions by motive and geopolitical bloc from 2020 to 2023. The figure highlights a substantial increase in distortive interventions, primarily driven by policies motivated by national security, resilience and security of supply, and geopolitical concerns, particularly in 2023. However, the trends vary across geopolitical blocs. Distant blocs exhibit a sharp rise in interventions, predominantly justified by national security and resilience motives, reflecting growing concerns over strategic autonomy and resource security. Nonaligned blocs also show significant increases, but these are primarily driven by geopolitical concerns and resilience-related policies, suggesting a more nuanced positioning in the geopolitical landscape. In contrast, aligned blocs display a more moderate increase in distortive interventions, likely reflecting more stable policy coordination within the bloc rather than a reactive escalation of economic measures.

The sectoral analysis presented in Figure 7 provides deeper insights into the strategic nature of economic policy interventions. Distortive interventions are heavily concentrated in key sectors, particularly critical minerals, dual-use products, advanced technology, and industrial raw materials, with a marked increase following 2022. However, the extent of intervention varies across geopolitical blocs. Distant and nonaligned blocs have intensified interventions in these sectors, likely as part of broader efforts to secure technological leadership and essential resources. In contrast, aligned blocs also have increased interventions but at a relatively more moderate pace, potentially reflecting a different approach to industrial policy rather than direct strategic competition. These trends highlight the sector-specific nature of economic policy fragmentation and suggest that interventions are not only a response to geopolitical tensions but also part of broader economic security strategies.

12. See Appendix 0.3 for additional results.

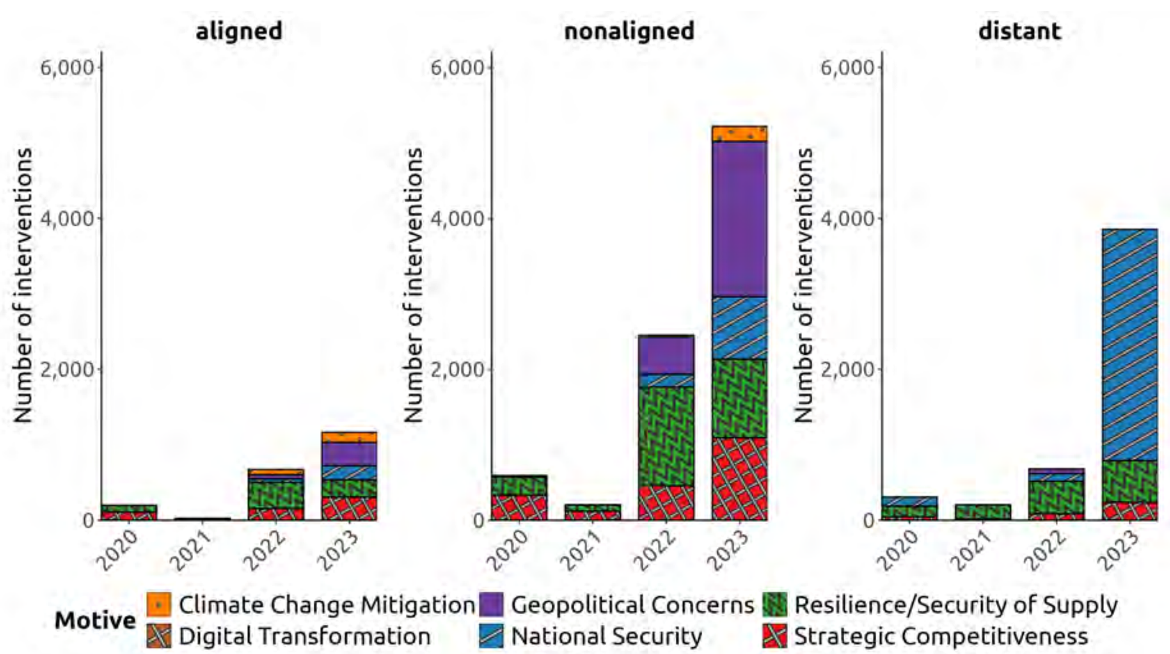
Figure 5
Distortive and Net NIPO Trade Restriction Announcements by Bloc



(a) **(b)**

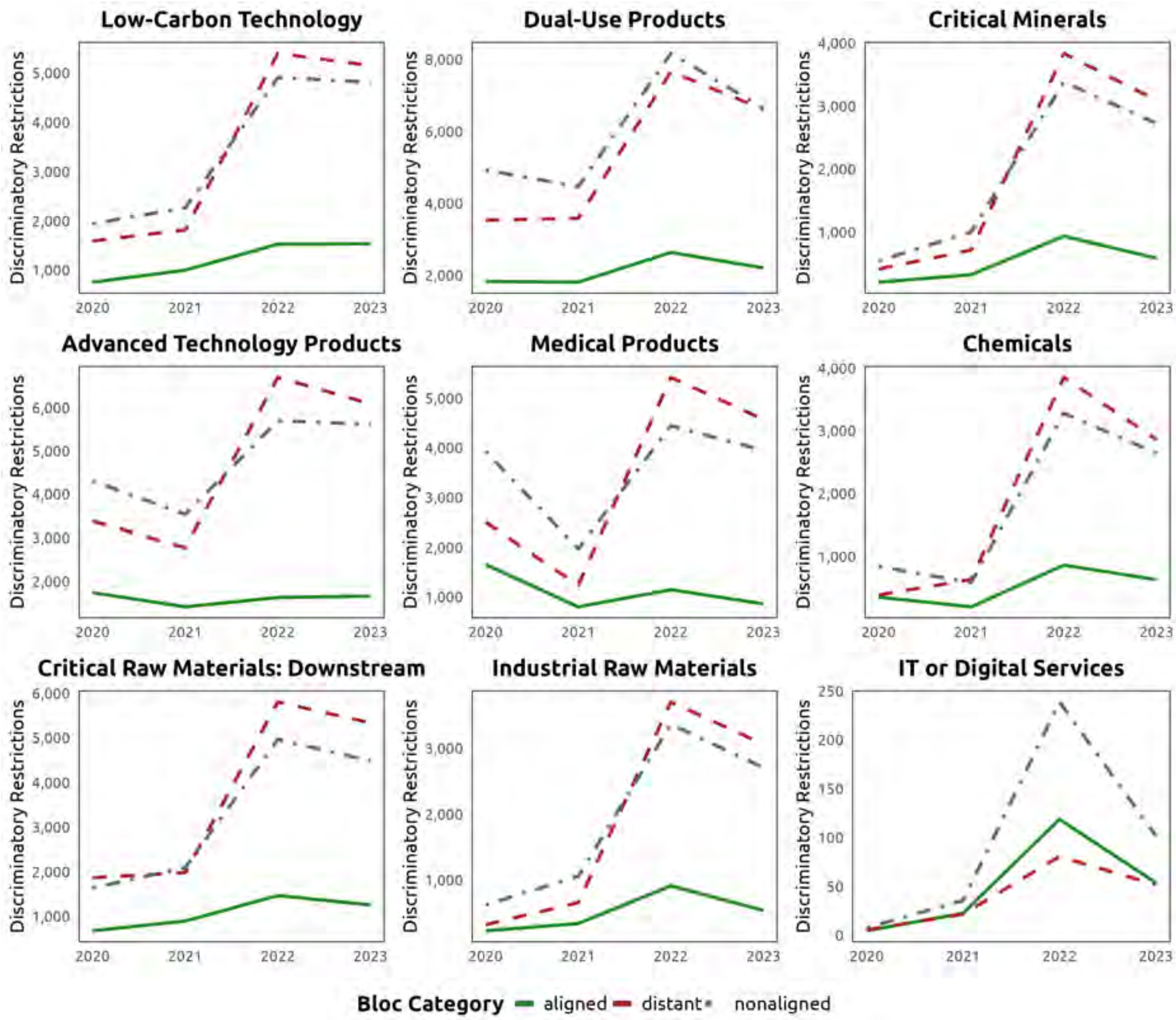
NOTE: Panel (a) shows the sum of NIPO distortive trade restriction announcements by year and bloc, and panel (b) shows the sum of NIPO net trade restriction announcements by year and bloc, calculated as the difference between distortive and liberalizing. An act is classified as NIPO if it mentions at least one of the following motives: strategic competitiveness, national security, digital transformation, resilience/security of supply, geopolitical concerns, or climate change mitigation. Aligned, nonaligned, and distant blocs are constructed using the baseline IPD, constructed using all votes, in 2021.

Figure 6
Distortive Interventions by Motives and Bloc



NOTE: Distribution of NIPO distortive interventions by motive and bloc. Aligned, nonaligned, and distant blocs are constructed using the baseline IPD, constructed using all votes, in 2021.

Figure 7
Discriminatory Interventions by Bloc and Sector



NOTE: Distribution of NIPO distortive interventions by sector and bloc. Aligned, nonaligned, and distant blocs are constructed using the baseline IPD, constructed using all votes, in 2021.

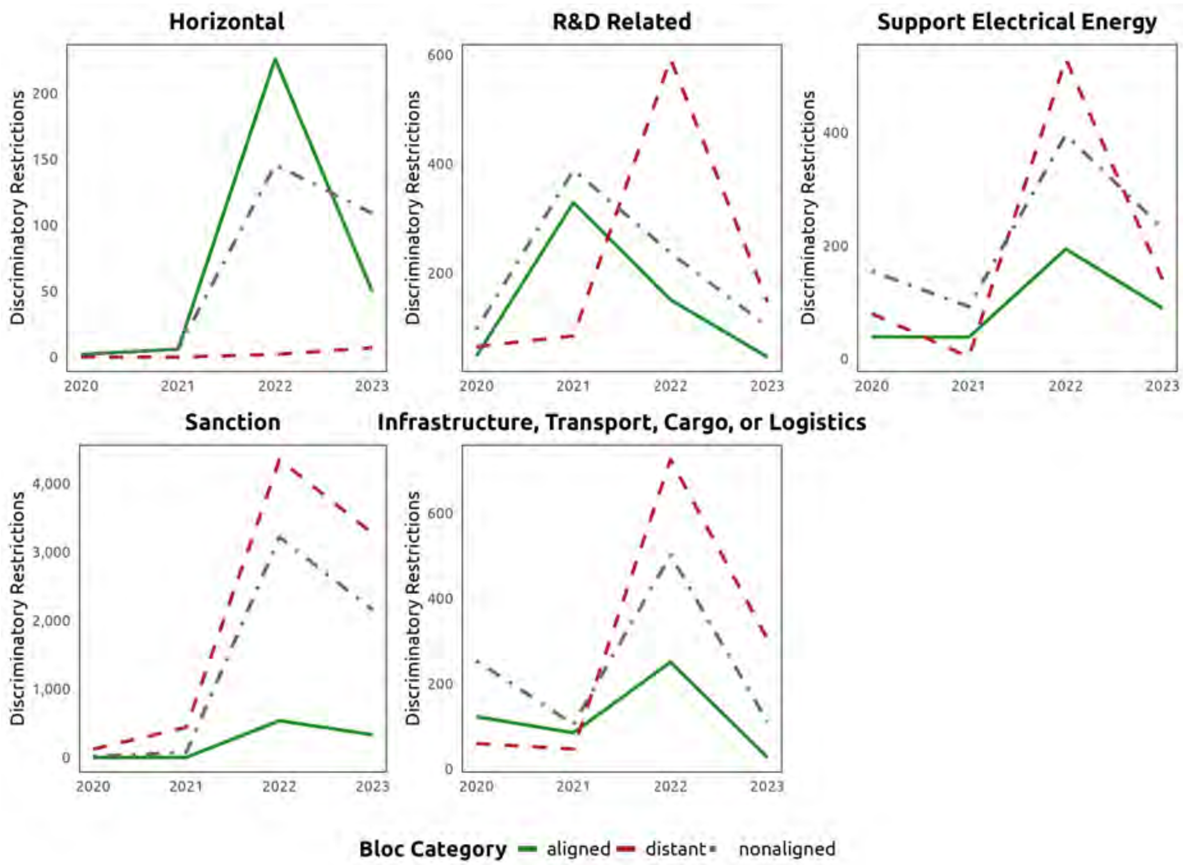
Overall, the clear strategic differentiation across geopolitical blocs, driven by both motive and sector-specific interventions, underscores the deep strategic and geopolitical dimensions shaping economic policy fragmentation. These dynamics have critical implications for the future structure of global markets and international economic cooperation.

5.2.2 Types of Policy Interventions

Finally, in Figure 8 we analyze the distribution among types of distortive interventions. In the GTA NIPO database, each intervention is classified into one of the following categories. First, "Horizontal" implies that the policy applies broadly across all sectors within a country. Second, "R&D Related" refers to interventions that target research, innovation, or R&D activities. Third, "Infrastructure, Transport, Cargo or Logistics" refers to policies related to industrial and transport infrastructure, cargo handling, and logistics. Fourth, "Support Electrical Energy" includes industrial policies related to electricity generation and supply. Fifth, "Recycling Service" involves policies related to recycling activities. Sixth, "FDI Screening Mechanism" denotes procedures assessing, investigating, authorizing, conditioning, prohibiting, or reversing inward or outward FDI. Finally, "Sanctions" includes trade-related sanctions imposed in security or foreign-policy contexts. We omit "Recycling Service" and "FDI Screening Mechanism" from the analysis, as no distortive interventions were identified in these categories in the period under analysis.

The analysis reveals significant heterogeneity across intervention types and geopolitical alignments. No-

Figure 8
Distortive Interventions by Type and Bloc



NOTE: Distribution of NIPO distortive interventions by type and bloc. Aligned, nonaligned, and distant blocs are constructed using the baseline IPD, constructed using all votes, in 2021. We omit Recycling Service and FDI Screening Mechanism from the analysis, as no distortive interventions were identified in these categories in the period under analysis.

tably, sanctions have surged dramatically after 2022, predominantly among distant and nonaligned blocs, illustrating their increased reliance on economic measures explicitly aimed at isolating geopolitical rivals. Interventions related to infrastructure, transport, cargo, or logistics and support for electrical energy also show notable increases, again largely concentrated among distant and nonaligned blocs, highlighting strategic attempts to control critical infrastructure and energy resources.

Horizontal and R&D-related restrictions display differing patterns: Horizontal restrictions (broad policy measures not sector-specific) significantly increased in aligned and nonaligned blocs, indicating broader-based policy actions aimed at reshoring or reinforcing intra-bloc cooperation. In contrast, R&D-related restrictions spiked sharply among distant blocs, reflecting intensified strategic competition in innovation and technological advancement.

These patterns emphasize that geopolitical blocs strategically choose intervention types that align closely with their broader economic and security objectives. The pronounced use of sanctions and targeted interventions related to infrastructure, R&D, and energy among distant blocs indicates increasingly explicit geopolitical contention. These strategic intervention patterns further deepen global economic fragmentation, reflecting a policy environment shaped by intensified geopolitical rivalry.

5.3 Regression Estimation Results

Table 5 presents the estimation results of equation (3), analyzing how geopolitical fragmentation—captured by alternative measures of geopolitical distance (IPDs)—influences the frequency of distortive economic policy interventions. We use PPML estimations, which are well suited for count-data structures. This regression analysis complements the descriptive evidence presented in previous sections, providing a robust quantitative assessment of the extent of economic policy fragmentation associated with geopolitical alignment.

Table 5

Regression Results: Distortive Interventions

Description	Baseline IPD (Complete, 2021) (1)	All-Vote IPD (Complete, 2023) (2)	Economic IPD (Complete, 2021) (3)	All-Vote IPD (Subsample, 2021) (4)
Total Distortive Interventions				
Distant Bloc × Post	0.029	0.283***	0.025	0.262***
	(0.030)	(0.049)	(0.025)	(0.047)
Nonaligned × Post	-0.028	0.163***	-0.017	0.070
	(0.023)	(0.046)	(0.023)	(0.046)
Pseudo R^2	0.607	0.435	0.606	0.434
Observations	15,665	15,665	15,606	15,606

NOTE: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The table reports estimation results of equation (3) using PPML, using annual data from 2017 to 2023 from GTA NIPO. We include country-pair, source × time, and destination × time fixed effects. Standard errors are clustered at the country-pair level. Coefficient interpretation is the following: $\left(e^{\text{coefficient}} - 1\right) \times 100$. *Post* is a dummy that captures the period following the invasion of Ukraine and equals 1 for the years 2022 and 2023. Each column shows the results using a different IPD measure to construct the country blocs. Column 1 uses the baseline IPD measure, which is based on the 2021 values of IPDs estimated using UNGA voting data from 1946 to 2023 across all-vote categories. Column 2 uses the 2023 values of IPDs estimated using UNGA voting data from 1946 to 2023 across all-vote categories. Column 3 uses the 2021 values of the economic IPD, which narrows the focus to economic votes while maintaining historical coverage from 1971 onward. Column 4 uses the 2021 values of IPDs estimated using a subsample of votes after the Cold War (1990–2023) while maintaining all-vote categories.

The baseline IPD measure (column 1) yields a positive but statistically insignificant coefficient for *Between Bloc* × *Post* (0.029), indicating limited evidence of increased distortive interventions between geopolitically distant blocs following Russia's 2022 invasion of Ukraine under this specification. In contrast, alternative IPD measures that better capture recent geopolitical realignments yield stronger and statistically significant results. Specifically, when employing the 2023 IPD (column 2) or the subsample IPD (column 4), the estimated coefficients increase markedly to approximately 32.7 percent and 30 percent, respectively. These results imply that after the invasion, geopolitically distant country pairs implemented, on average, roughly 30 to 33 percent more distortive policy interventions against each other compared with aligned country pairs, reflecting substantial policy-driven fragmentation. Conversely, the IPD based exclusively on economic votes (column 3) yields no statistically significant results, suggesting that observed policy fragmentation is driven more strongly by broader geopolitical tensions rather than purely economic alignment. Further robustness checks with alternative fixed effect structures are provided in Table A11 of the appendix.[13][14]

Overall, these findings strongly support the interpretation that deliberate policy measures, such as tariffs and sanctions, directly contribute to reinforcing geopolitical fragmentation observed in trade and financial markets. The analysis underscores the importance of methodological transparency, as conclusions regarding economic policy fragmentation are substantially influenced by how geopolitical distances are measured.

6. CONCLUSION

Our study highlights significant methodological sensitivities in measuring geoeconomic fragmentation and underscores distinct economic impacts across trade flows, financial portfolios, and economic policy interventions. Trade relationships display robust and consistent fragmentation along geopolitical lines, particularly evident in strategic technology sectors and policy interventions driven by national security and geopolitical concerns. Medium- and low-tech trade sectors exhibit especially pronounced responses. In contrast, financial portfolios appear comparatively resilient, with weaker and context-sensitive fragmentation effects, suggesting that financial markets may mitigate some impacts of geopolitical tensions through market-based mechanisms.

These results emphasize the critical importance of methodological transparency in constructing geopolitical distance measures, as seemingly minor methodological decisions materially influence conclusions. For immediate policy concerns, IPD measures incorporating recent geopolitical events (such as the 2023 IPD) are most

13. Replacing source-year and destination-year fixed effects with simple time fixed effects amplifies the fragmentation effects further. Under these specifications, the largest fragmentation effect occurs with the 2023 IPD measure (approximately 39.8 percent), highlighting an even stronger increase in targeted distortive interventions post-invasion. Additionally, coefficients for *Nonaligned* × *Post* become significantly positive (16.1 percent), indicating intensified policy interventions also among nonaligned country pairs.

14. Estimation results of equation (3) using net interventions and estimation results of equations (1) and (2) for both dependent variables are available upon request.

informative. For structural and long-term analyses, economic-vote IPDs or post-Cold War measures provide additional stability and insight. Policymakers should therefore carefully consider methodological choices to accurately assess risks and design strategic responses that balance economic integration, security, and resilience in an increasingly fragmented world economy.

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APPENDIX

Appendix 0.1 Fragmentation in Financial Markets: Robustness Analysis

In this section we perform several robustness checks of our analysis of the degree of fragmentation in financial markets.

Appendix 0.1.1 International Financial Centers

International financial centers (IFCs) can blur the geopolitical distances between recipient and ultimate investor countries, as shown by the literature.[15] In our portfolio holdings analysis, we do not include well-known financial centers, such as Bermuda, the British Virgin Islands, the Cayman Islands, and Hong Kong SAR, as source countries. In this section, we present a robustness check where we further exclude other countries frequently identified as IFCs, including Ireland, Luxembourg, the Netherlands, and Singapore.

Tables A1, A2, and A3 show the estimation results for equations (1), (2), and (3), respectively, when we exclude IFC from the sample. The overall pattern of the results remains consistent, with only minor changes in magnitude and significance. This pattern suggests that financial centers play a role in channeling investments across geopolitical blocs, but their exclusion does not fundamentally alter the observed fragmentation trends in portfolio holdings.

Table A1
Regression Results of Equation (1), Excluding IFC

	Baseline IPD (Complete, 2021)	All-Vote IPD (Complete, 2023)	Economic IPD (Complete, 2021)	All-Vote IPD (Subsample, 2021)
	(1)	(2)	(3)	(4)
Portfolio Holdings				
Between Bloc × Post	-0.018	-0.012	0.001	-0.018
Std. Error	(0.016)	(0.012)	(0.012)	(0.016)
Nonaligned × Post	-0.014	-0.004	-0.017	-0.014
Std. Error	(0.020)	(0.019)	(0.021)	(0.020)
Observations	214,165	214,577	214,184	214,165

NOTE: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A2
Regression Results of Equation (2), Excluding IFC

Description	All-Vote IPD	Economic IPD	All-Vote IPD	Economic IPD
	IPD × Post		IPD	
	(1)	(2)	(3)	(4)
Portfolio Holdings				
β Coefficient	-0.071*	-0.063*	-0.057	0.037
Std. Error	(0.037)	(0.037)	(0.063)	(0.037)
Observations	106,503	105,544	106,503	105,544

Note: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

15. See, for instance, Coppola et al. (2021).

Table A3

Regression Results of Equation (3), Excluding IFC

Description	Baseline IPD (Complete, 2021)	All-Vote IPD (Complete, 2023)	Economic IPD (Complete, 2021)
	(1)	(2)	(3)
Portfolio Holdings			
Distant x Post	-0.011	-0.011	-0.014
Std. Error	(0.014)	(0.014)	(0.014)
Nonaligned x Post	-0.006	-0.001	-0.017**
Std. Error	(0.007)	(0.008)	(0.008)
Observations	213,286	209,899	213,286

NOTE: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Appendix 0.1.2 The Role of the United States in Financial Markets

In this section we show the important role played by the U.S. in international financial markets when considering general blocs of geopolitical distance, defined by the country-pair measures. The IPD measures position the U.S. in the right tail of the distribution, indicating that it is distant from most of its international counterparts, as discussed in our analysis of Figure 2. When we exclude the U.S. from the estimation regressions in equation (3) for portfolio holdings, the effect of geopolitical distance becomes negative and statistically significant at the 1 percent level under the economic IPD specification. Specifically, portfolio holdings between distant country pairs decline by 2.5 percent in the post-invasion period. These results are reported in Table A4. We obtain similar results if we include country-pair and time fixed effects instead of country-pair, source × time, and destination × time fixed effects.

Table A4

Regression Results of Equation (3), Excluding the United States

Description	Baseline IPD (Complete, 2021)	All-Vote IPD (Complete, 2023)	Economic IPD (Complete, 2021)
	(1)	(2)	(3)
Portfolio Holdings			
Distant x Post Coefficient	-0.014	-0.009	-0.025***
Std. Error	(0.010)	(0.010)	(0.010)
Nonaligned x Post Coefficient	-0.009	0.002	-0.021**
Std. Error	(0.010)	(0.009)	(0.010)
Observations	226,246	222,751	226,246

NOTE: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Appendix 0.1.3 Alternative Definitions

In this section we explore the use of two alternative definitions for the dependent variable to study the degree of fragmentation in financial markets: portfolio share and financial flows (in billions of USD). To evaluate the robustness of our findings, we estimate three alternative specifications of the gravity model: a bloc-based approach (equation 1), a model that uses continuous geopolitical distance (IPD) measures (equation 2), and a specification based on distant and nonaligned bloc classifications (equation 3). Each specification is estimated separately for both financial measures. The corresponding regression results are reported in Tables A5–A7.

Our sensitivity analysis further confirms the nuanced impact of geopolitical fragmentation on financial integration. Using alternative measures such as portfolio shares and financial flows, we find that financial fragmentation effects remain sensitive to IPD specifications. While portfolio share fragmentation appears weak and mostly insignificant, financial flows measured in dollar terms show a clear negative and statistically significant response in most specifications, indicating a decline in financial flows between geopolitically distant country pairs following Russia's invasion of Ukraine. The magnitude and significance of these results vary considerably across IPD definitions, highlighting a stronger and more consistent effect when employing recent geopolitical distance metrics, notably the 2023 IPD. This pattern reinforces the conclusion from our main analysis: Geopolitical fragmentation has more pronounced and robust effects on trade and economic policies, whereas financial integration shows weaker and more context-sensitive responses.

Table A5

Regression Results: Portfolio Share and Financial Flows — Bloc-Based Specification

Description	Baseline IPD (Complete, 2021)	All-Vote IPD (Complete, 2023)	Economic IPD (Complete, 2021)	All-Vote IPD (Subsample, 2021)
	(1)	(2)	(3)	(4)
Panel A: Portfolio Share				
Between Bloc × Post	0.001	-0.028	-0.139*	0.002
	(0.075)	(0.099)	(0.084)	(0.075)
Nonaligned × Post	-0.182	-0.132	-0.114	-0.187
	(0.214)	(0.117)	(0.196)	(0.213)
Observations	119,859	120,071	119,934	119,859
Panel B: Financial Flows				
Between Bloc × Post	-1.807***	-2.244***	-0.652	-1.807***
	(0.632)	(0.714)	(0.531)	(0.632)
Nonaligned × Post	-2.722***	-2.522***	-0.199	-2.724***
	(0.723)	(0.786)	(0.808)	(0.723)
Observations	234,212	234,746	234,343	234,212

NOTE: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A6

Regression Results: Portfolio Share and Financial Flows — IPD-Level Specification

Description	All-Vote IPD	Economic IPD	All-Vote IPD	Economic IPD
	IPD × Post		IPD	
	(1)	(2)	(3)	(4)
Panel A: Portfolio Share				
β Coefficient	**-0.050**	**-0.051**	**-0.111**	**-0.039**
	(0.033)	(0.037)	(0.093)	(0.045)
Observations	58,355	58,204	58,355	58,204
Panel B: Financial Flows				
β Coefficient	**-1.152*** **	**-1.049*** **	**0.268**	**1.554** **
	(0.342)	(0.318)	(0.649)	(0.614)
Observations	115,142	114,129	115,142	114,129

NOTE: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A7

Regression Results: Portfolio Share and Financial Flows — Distant/Nonaligned Bloc Definition

Description	Baseline and Economic IPD			
	Baseline IPD (Complete, 2021)	All-Vote IPD (Complete, 2023)	Economic IPD (Complete, 2021)	All-Vote IPD (Subsample, 2021)
	(1)	(2)	(3)	(4)
Panel A: Portfolio Share				
Distant Bloc × Post	**-0.066**	**-0.062**	**-0.187****	**-0.057**
	(0.083)	(0.075)	(0.081)	(0.084)
Nonaligned × Post	**0.033**	**0.068**	**0.036**	**0.028**
	(0.064)	(0.057)	(0.058)	(0.064)
Observations	233,475	229,879	233,475	233,475
Panel B: Financial Flows				
Distant Bloc × Post	**-1.392***	**-1.853*****	**-1.929*****	**-1.306**^^
	(0.838)	(0.613)	(0.638)	(0.840)
Nonaligned × Post	**-0.128**	**0.156**	**0.251**	**-0.159**
	(0.258)	(0.225)	(0.308)	(0.251)
Observations	233,475	229,879	233,475	233,475

NOTE: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Appendix 0.2 Trade by Technology Class: Robustness Analysis

In this section we conduct robustness checks for our gravity equations of geopolitical distance on trade by technology classification. Similar to Table 3, in Table A8, we generalize our analysis to the full distribution of $IPD(s, d)$ instead of only working on the segmented distribution. Our results indicate that when using the distribution of geopolitical distance, trade flows between distant countries for all goods classes declined significantly in the post-invasion period when we use the latest IPD values and declined for low- and high-tech goods when only economic votes are used. Additionally, we observe small and statistically insignificant relationships for nonaligned countries in the post-invasion period. These results are consistent with Table 3 as well our larger finding that the results are sensitive to the choice of IPD measure and bloc definition.

Table A8
Regression Results

Description	Baseline IPD (Complete, 2021)	All-Vote IPD (Complete, 2023)	Economic IPD (Complete, 2021)	All-Vote IPD (Subsample, 2021)
	(1)	(2)	(3)	(4)
Panel A: High-Tech Trade				
Distant × Post Coefficient	-0.0261	-0.095***	-0.156**	-0.050
Std. Error	(0.038)	(0.036)	(0.066)	(0.042)
Nonaligned × Post Coefficient	0.012	0.016	0.011	0.017
Std. Error	(0.024)	(0.031)	(0.025)	(0.024)
Observations	270,157	261,452	267,739	270157
Panel B: Medium-Tech Trade				
Distant × Post Coefficient	-0.098*	-0.182***	-0.031	-0.086
Std. Error	(0.055)	(0.062)	(0.071)	(0.058)
Nonaligned × Post Coefficient	-0.083*	-0.089*	-0.007	-0.0864**
Std. Error	(0.040)	(0.046)	(0.037)	(0.037)
Observations	232,540	225,038	230,788	232,540
Panel C: Low-Tech Trade				
Distant × Post Coefficient	-0.0827**	-0.109***	-0.121***	-0.119***
Std. Error	(0.032)	(0.034)	(0.039)	(0.033)
Nonaligned × Post Coefficient	-0.010	0.020	-0.010	-0.016
Std. Error	(0.021)	(0.026)	(0.022)	(0.021)
Observations	267,022	259,244	264,616	267,022

NOTE: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In Table A9, we replicate our estimation results from equation (2) with our trade by technology class. Across all specifications and technology classifications, we find negative and statistically significant relationships between geopolitical distance and trade flows both in the post-invasion period and over the full sample period. Consistent with Table 2, the effect is slightly weaker when using economic IPDs to generate blocs. The diminishing effect of geopolitical distance on trade as technology class increases is also evident in our results.

Table A9
Regression Results with IPD

Description	All-Vote IPD	Economic IPD	All-Vote IPD	Economic IPD
	IPD × Post		IPD	
	(1)	(2)	(3)	(4)
Panel A: High-Tech Trade				
β Coefficient	-0.078***	-0.072***	-0.088***	-0.075***
Std. Error	(0.020)	(0.019)	(0.027)	(0.024)
Observations	292,042	292,042	290,161	292,042
Panel B: Medium-Tech Trade				
β Coefficient	-0.106***	-0.098***	-0.123***	-0.106***
Std. Error	(0.027)	(0.025)	(0.034)	(0.031)
Observations	256,506	256,506	256,506	256,506
Panel C: Low-Tech Trade				
β Coefficient	-0.082***	-0.076***	-0.090***	-0.075***
Std. Error	(0.014)	(0.013)	(0.021)	(0.020)
Observations	288,251	288,251	288,251	288,251

NOTE: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A10
ISIC Revision 3 Technology Classifications

High-tech
30, 33: Computer, electronic, and optical products
31-32: Electrical equipment
24: Chemicals and pharmaceuticals
29: Machinery and equipment
34-35: Transport equipment
Low-tech
15-16: Food, beverages, tobacco
17-19: Textiles, apparel, leather
20-22: Wood products
36: Furniture & other manufacturing
26: Non-metallic mineral products
Medium-tech
27-28: Basic metals and metal products
25: Rubber and plastics
23: Petroleum products

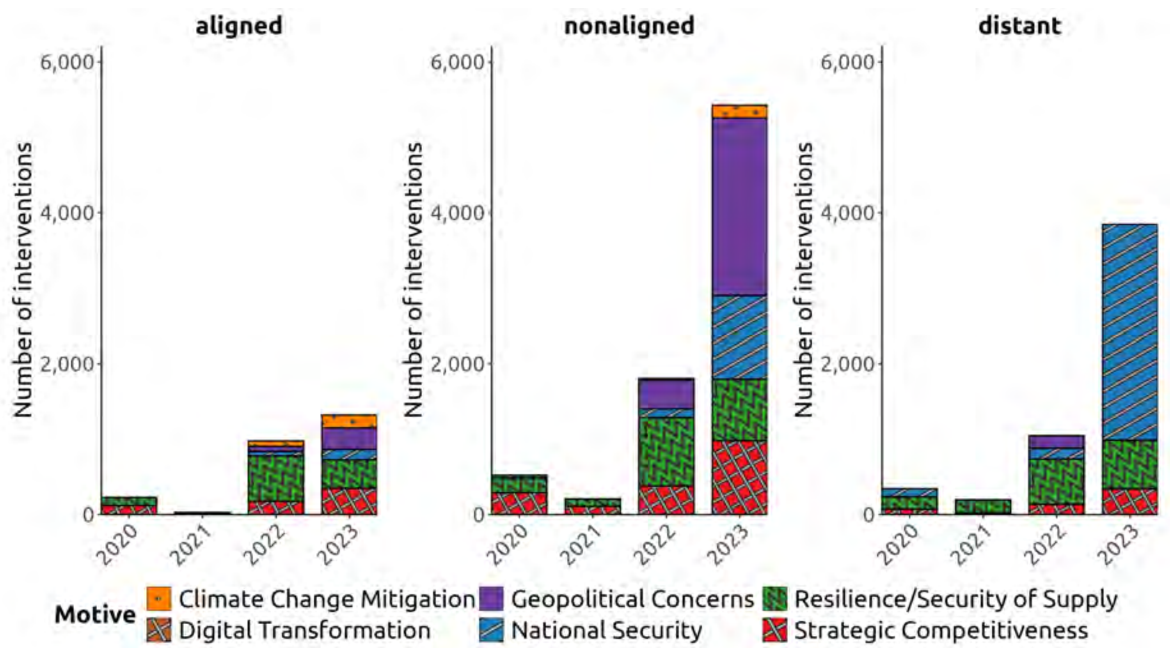
Appendix 0.3 Economic Policy Fragmentation

Appendix 0.3.1 Motive Distribution of Restrictions

For completeness, in this section we present the distribution of distortive interventions by motive and bloc, under alternative IPDs. Figure A1 presents results that classify countries into aligned, nonaligned, and distant using the 2023 IPD with all votes, while Figure A2 uses only economic votes.

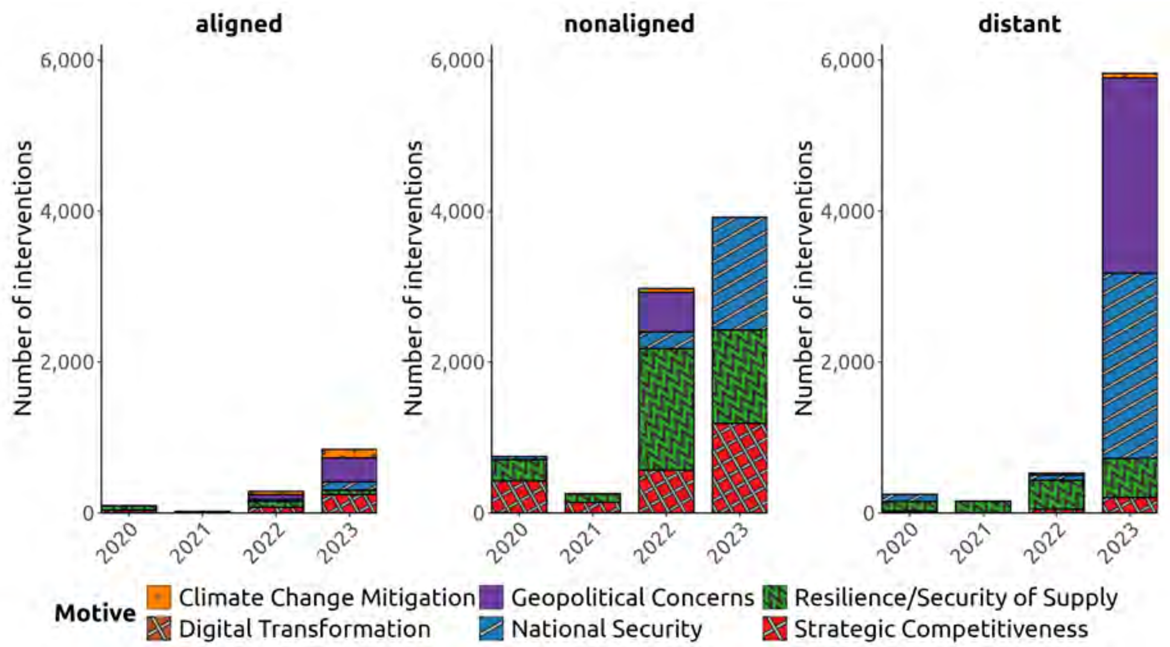
Figure A1

Distortive Interventions by motives and blocs - 2023 IPD All Votes



NOTE: Distribution of NIPO distortive interventions by motive and bloc. Aligned, nonaligned, and distant blocs are constructed using the IPD, constructed using all votes, in 2023.

Figure A2
Distortive Interventions by motives and blocs - 2021 IPD Economic Votes



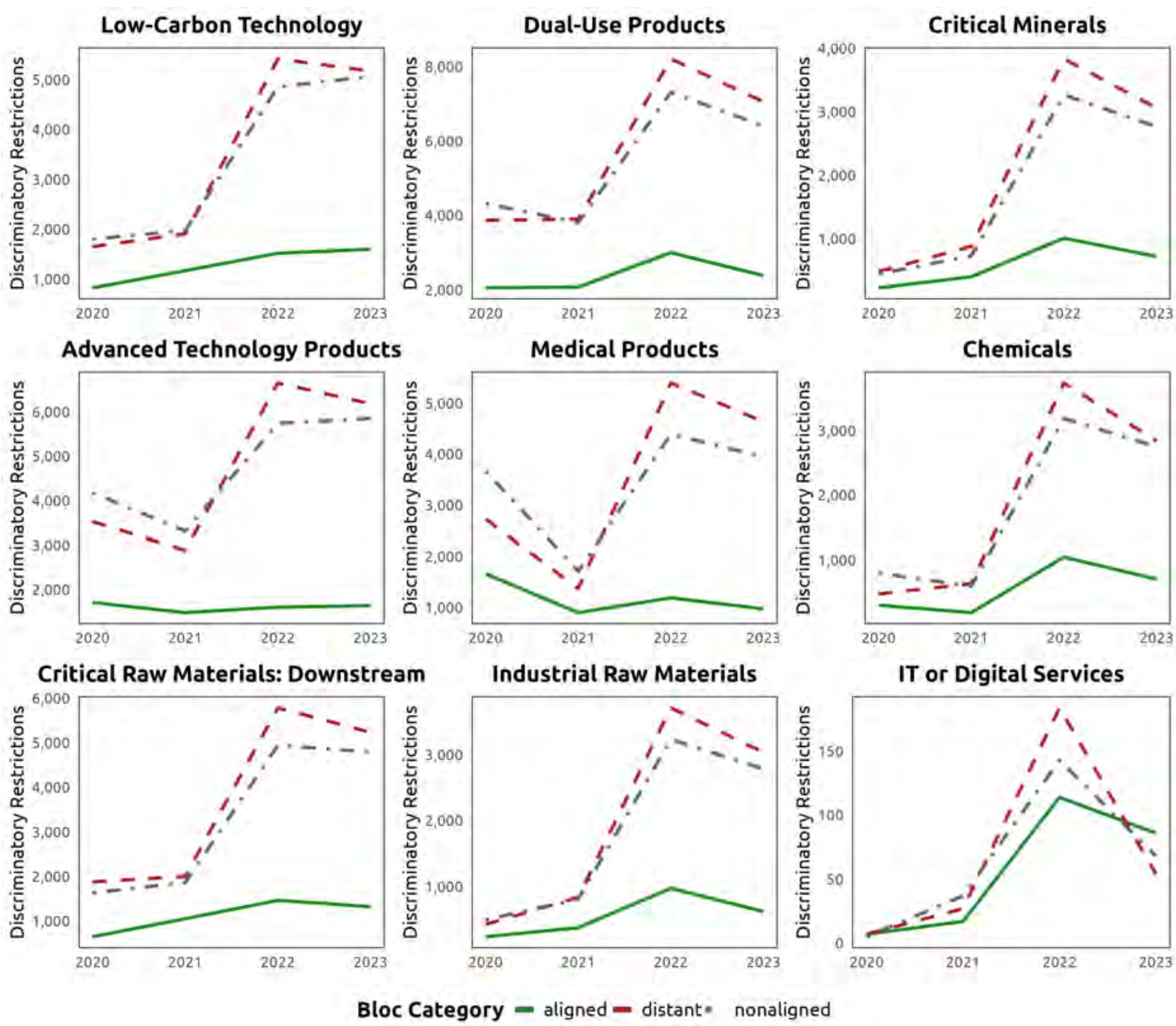
NOTE: Distribution of NIPO distortive interventions by motive and bloc. Aligned, nonaligned, and distant blocs are constructed using the economic IPD, constructed using economic votes, in 2021.

Reclassifying country blocs with alternative IPD metrics does not fundamentally alter the conclusions from our main analysis but highlights important nuances. Using the 2023 IPD, distortive interventions related to national security, resilience, and geopolitical concerns become more prominent among distant blocs, reflecting recent geopolitical realignments. Conversely, when employing the economic-vote IPD, interventions driven explicitly by economic motives such as resilience and strategic competitiveness gain relative importance. These findings reinforce that methodological choices in defining geopolitical blocs affect not only the observed magnitude but also the strategic composition of economic policy fragmentation.

Appendix 0.3.2 Sectoral Distribution of Restrictions

Figure A3 shows the sectoral results that classify countries using the IPD 2023 with all votes, while Figure A4 uses only economic votes. This analysis further confirms our main conclusion regarding the strategic targeting of economic policy interventions, though differences emerge when varying IPD definitions. The sectoral distribution of policy interventions remains broadly consistent across IPD specifications, with critical minerals, dual-use products, advanced technology, and industrial raw materials consistently targeted by geopolitically distant and nonaligned blocs. However, notable differences arise depending on the IPD measure chosen: Using the 2023 IPD, the concentration of interventions in advanced technologies and critical sectors is particularly pronounced among distant blocs, highlighting recent shifts toward intensified strategic competition. In contrast, when using the economic-vote IPD, the sectoral focus appears less sharply differentiated between blocs, suggesting that economic-voting-based alignment captures broader and less polarizing sectoral interventions. Overall, the core findings regarding sectoral targeting persist, though their intensity and polarization vary with IPD methodological choices.

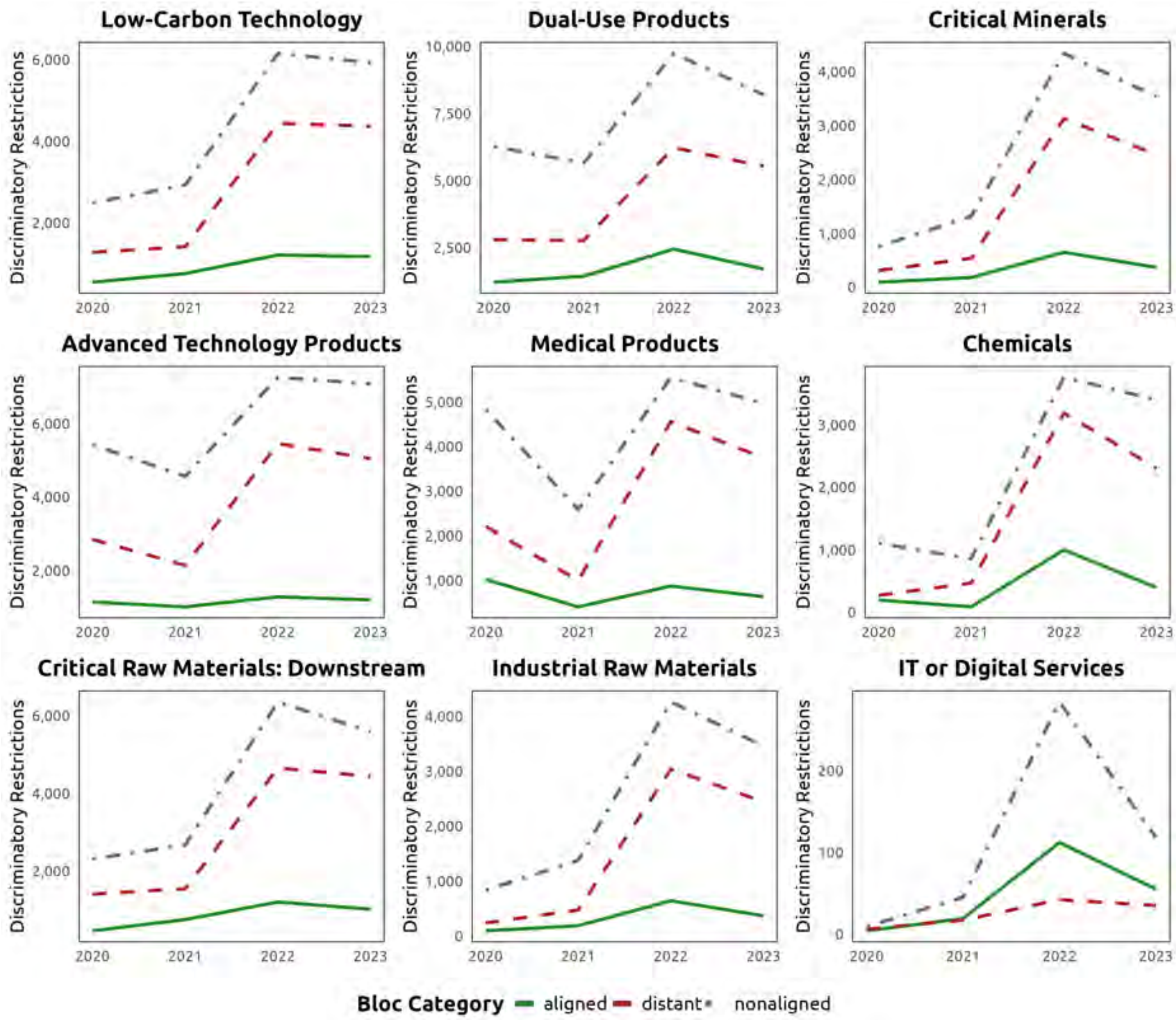
Figure A3
Country Blocs Defined Using the 2023 IPD with All Votes



NOTE: Distribution of NIPO distortive interventions by sector and bloc. Aligned, nonaligned, and distant blocs are constructed using the IPD constructed using all votes, in 2023.

Figure A4

Country Blocs Defined Using the 2021 Economic IPD



NOTE: Distribution of NIPO distortive interventions by motive and bloc. Aligned, nonaligned, and distant blocs are constructed using the economic IPD, constructed using economic votes, in 2021.

Appendix 0.3.3 Additional Results

Table A11 shows the sensitivity of the estimation results of equation (3) on distortive interventions to the inclusion of different sets of fixed effects. Removing source-year and destination-year fixed effects and adding simple time fixed effects (columns 5–8) further amplifies fragmentation effects. Under these specifications, the largest observed fragmentation effects occur with the 2023 IPD specification (approximately 39.8 percent), suggesting an even greater increase in targeted distortive interventions post-invasion. Additionally, the *Nonaligned* × *Post* coefficients become significantly positive (16.1 percent), indicating that nonaligned countries also intensified their policy interventions.

Table A11

Regression Results: Distortive Interventions

Description	Baseline IPD (Complete, 2021)	All-Vote IPD (Complete, 2023)	IPD economic (Complete, 2021)	All-Vote IPD (Subsample, 2021)	Baseline IPD (Complete, 2021)	All-Vote IPD (Complete, 2023)	IPD economic (Complete, 2021)	All-Vote IPD (Subsample, 2021)
(I) Total Distortive Interventions								
Distant Bloc × Post	0.029	0.283***	0.025	0.262***	0.073**	0.335***	0.021	0.293***
	(0.030)	(0.049)	(0.025)	(0.047)	(0.033)	(0.052)	(0.030)	(0.049)
Nonaligned × Post	-0.028	0.163***	-0.017	0.070	0.006	0.149***	-0.038*	0.164***
	(0.023)	(0.046)	(0.023)	(0.046)	(0.024)	(0.048)	(0.022)	(0.045)
Pseudo R^2	0.607	0.435	0.606	0.434	0.607	0.435	0.607	0.435
Observations	15,665	15,665	15,606	15,606	15,604	15,604	15,665	15,665
Country-Pair FE	Y	Y	Y	Y	Y	Y	Y	Y
Time FE	N	N	N	N	Y	Y	Y	Y
Source × Year FE	Y	Y	Y	Y	N	N	N	N
Destination × Year FE	Y	Y	Y	Y	N	N	N	N

NOTE: Significance thresholds: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The table shows estimation results of equation (3) using Poisson pseudo-maximum likelihood (PPML), using annual data from 2017 to 2023 from GTA NIPO. Standard errors are clustered at the country-pair level. Coefficient interpretation is the following: $\left(e^{\text{coefficient}} - 1\right) \times 100$.