Divided We Fall: Differential Exposure to Geopolitical Fragmentation in Trade

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Motivation

Growing concern that the global economy may fracture along geopolitical lines = “geoeconomic fragmentation” (IMF, 2023)

What are the costs of geoeconomic fragmentation in trade? How are they distributed across countries?

This paper makes two contributions:

1. Estimating elasticities of sectoral trade flows to “geopolitical distance”:
   • Closer geopolitical alignment is associated with lower trade barriers
   • Effect concentrated in a few sectors (transport equipment, food/beverages, other manufacturing)

2. Using these elasticities in a quantitative trade model, to discipline trade fragmentation scenarios
   • Long-run impact of fragmentation is larger for EMDEs than AEs
   • Mainly due to their smaller size and greater geopolitical distance from both the U.S. and China
Related Literature

Geoeconomic fragmentation
Cerdeiro et al. (2021); Felbermayr et al. (2022); Goes and Bekkers (2022); IMF (2023); Attinasi et al. (2023); Bolhuis et al. (2023); Campos et al. (2023); Jakubik and Ruta (2023); WEO (April 2023); WEO (October 2023)

Trade and conflict
Pollins (1989a, 1989b); Mansfield and Bronson (1997); Morrow, Siverson, and Taberes (1998, 1999); Mansfield and Pevehouse (2000); Barbieri and Levy (1999); Anderton and Carter (2001); Keshk et al. (2004); Martin et al. (2008); Glick and Taylor (2010)

Gravity Equations and Quantitative Trade Modelling
Anderson and van Wincoop (2003); Anderson and van Wincoop (2004); Arkolakis et al. (2012); Head and Mayer (2014); Costinot and Rodríguez-Clare (2014); Ossa (2015); Caliendo and Parro (2015); Ravikumar et al. (2019); Cuñat and Zymek (2023)
Outline

1. Empirical Estimates of Sensitivity of Trade (Barriers) to Geopolitical Alignment
   • Empirical methodology
   • Data sources
   • Regression results

2. Quantitative Model and Fragmentation Scenarios
   • Model description
   • Fragmentation scenarios
   • Real income effects of trade fragmentation across countries

3. Summary and Conclusions
Empirical Methodology

STEP 1: Estimate (with Poisson Maximum Likelihood):

\[ M_{sn',n} = \exp\{\Omega_{sn'} + \Pi_{sn} + \delta_{sn'}\} \times \zeta_{sn',n}, \]

where \( M_{sn',n} \) is the value of imports by country \( n \) from \( n' \) in sector \( s \); \( \Omega_{sn'}, \Pi_{sn}, \delta_{sn'} \) are dummies.

STEP 2: Estimate (with OLS):

\[ -\tilde{\delta}_{sn'} / \theta_s = \beta_s^0 + \sum_i \beta_s^i x_{n',n}^i + \epsilon_{sn',n}, \]

where \( \theta_s \) is trade elasticity from the literature, and \( \{x_{n',n}^i\}_i \) are country-pair characteristics (such as bilateral distance, contiguous, common language, colonial history, economic treaties: WTO, EU, RTA).

In addition, include a **bilateral measure of geopolitical alignment**.
Data Sources

Sector-level bilateral expenditure flows between 185 economies from the EORA global IO tables (11 broad sectors, 2017-19 average)

Standard gravity controls from CEPII gravity dataset; trade elasticities from Caliendo and Parro (2015)

Bilateral geopolitical treaties from Alliance Treaty Obligations and Provisions (ATOP) project

- $treaty_{n'n} = 3$: defense and/or offense obligations
- $treaty_{n'n} = 2$: neutrality and/or consultation obligations (but no defense, offense obligations)
- $treaty_{n'n} = 1$: nonaggression pact (but no defense, offense, neutrality, consult. obligations)
- $treaty_{n'n} = 0$: no alliance obligation

Bilateral geopolitical alignment computed based on similarity of countries’ geopolitical treaty portfolios: values from 1 (most aligned; identical treaty obligations) to -1 (least aligned: opposing treaty obligations).
Countries with Similar Alliance Portfolios

Germany’s alliance portfolio

France’s alliance portfolio

Alignment score: \( u_{n'n}^{\text{align}} = .85 \)

Sources: ATOP, and IMF staff calculations.
Countries with Dissimilar Alliance Portfolios

Germany's alliance portfolio

Vietnam's alliance portfolio

Alignment score: $u_{n'n}^{align} = .50$

Sources: ATOP, and IMF staff calculations.
Baseline Regression Results (1/2)

Estimated Impact on Trade Barriers of One Standard Deviation Decrease in Geopolitical Alignment

- **Largest effect in** transport equipment (0.08 log points ≈ 8 percent); followed by food and beverages, and other manufacturing

- **Interpretation**: restrictions on trade in sensitive goods + higher uncertainty/lower trust trading across geopolitical divides

- **After** controlling for economic agreements!

- **Robust** to variations in sample, time period, etc.

Note: Controlling for importer and exporter effects, distance, contiguity, common language, colonial history, WTO membership, RTA membership, EU membership.
Source: IMF staff calculations.
Baseline Regression Results (2/2)

Relative Importance of Different Trade-Cost Drivers Across Sectors
(Percent of variance explained)

- Differences in geopolitical alignment currently only account for a small share of variation in bilateral trade barriers across countries.
- The quantitative importance of geopolitics is comparable with cultural variables...
- ...but less important than geography and trade agreements.

Note: Geographic variables: distance, contiguity; economic agreements: WTO membership, RTA membership, EU membership; cultural variables: common language, colonial history.
Source: IMF staff calculations.
Quantitative Model and Fragmentation Scenarios

We use the dynamic quantitative trade model from Cuñat and Zymek (2023):

• economies differ in their productivity in/reliance on many sectors → trade between sectors;
• goods are differentiated by origin → trade within sectors, sector-level “gravity equations”;
• agents make consumption, savings and investment decisions and can borrow/lend internationally.

Delivers steady-state trade patterns, per-capita capital stocks and real-incomes for given trade barriers.

Baseline fragmentation scenario:

1. “Geopolitical polarization”:
   Countries’ alignments rise within each of a U.S., China and Non-aligned “bloc”, but decline across.

2. Increased sensitivity of trade to geopolitics:
   Elasticity of trade (barriers) to geopolitical alignment rises proportionally (doubles) in each sector.
Geopolitical Polarization: Scenario

Note: Countries are allocated to blocs based on their 2018 geopolitical treaty strength vis-à-vis the U.S. relative to China. “USA”: stronger geopolitical treaties with the U.S. than with China; “CHN”: stronger geopolitical treaties with China than with the U.S.; “Neutral”: equal strength with both.
Source: ATOP and IMF staff calculations.
Geopolitical Polarization: Impacts

Change in steady-state real income per capita (Percent)

- **Small losses overall:**
  median economy steady-state real income per capita declines by 0.2 percent.

- **Some economies gain:**
  reduction in trade barriers within blocs outweigh increases between blocs (e.g., Latin America and Caribbean).

Note: Excludes outside values.
Source: IMF staff calculations.
Increased Geopolitical Sensitivity: Impacts

Change in steady-state real income per capita (Percent)

- **Larger overall losses:** median economy steady-state real income per capita declines by 1 percent.
- **Almost all economies lose:** due to more uniform rise in trade barriers.
- **Median income losses for different regions range from 0.7 percent to 1.5 percent.**

Note: Excludes outside values. Source: IMF staff calculations.
Polarization + Increased Sensitivity: Impacts

Change in steady-state real income per capita
(Percent)

- **Largest overall losses:**
  - Median economy steady-state real income per capita declines by 1.4 percent.

- **Advanced Economies lose least.**

- **Median income losses in Middle East and Central Asia, and Sub-Saharan Africa are more than twice as large as for Advanced Economies.**

- **One quarter of economies in these regions see losses > 3 percent.**

Note: Excludes outside values.
Source: IMF staff calculations.
Sources of Heterogeneity in Income Effects

Share of Variation in Baseline Income Effects Captured by “Partial” Fragmentation Counterfactuals
(Approximate percent of variance explained)

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Approximate Percent of Variation Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economy size</td>
<td>51%</td>
</tr>
<tr>
<td>Geopolitical positioning</td>
<td>22%</td>
</tr>
<tr>
<td>New trade agreements or strategic bloc membership</td>
<td>14%</td>
</tr>
<tr>
<td>Import composition</td>
<td>10%</td>
</tr>
<tr>
<td>Initial alignments</td>
<td></td>
</tr>
<tr>
<td>Alignment changes</td>
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</tbody>
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“Size” counterfactual: uniform increase in trade barriers across country pairs. “Import composition” counterfactual: increased trade sensitivity to geopolitics, assuming same bilateral alignment across all country pairs and no change in average trade barriers. “Initial alignments” counterfactual: increased trade sensitivity to geopolitics, assuming same initial sensitivity across sectors and no change in average trade barriers. “Alignment changes” counterfactual: geoeconomic polarization, assuming same initial sensitivity across sectors and no change in average trade barriers.

- **Economy size** explains about half of the differences in exposure to geoeconomic fragmentation.
- **Geopolitical positioning** (current alignment + alignment change) is the second-most important factor.
- Differences in composition of import baskets is third.
- **New trade agreements** or **strategic bloc membership** only partially offset the economic losses of “neutral” EMDEs.
Summary and Conclusion

We provide empirical evidence that can be used to discipline geoeconomic fragmentation scenarios:

• Current role of geopolitical alignment in sector-level trade patterns;
• Relative importance of geopolitics compared with other trade drivers.

Introducing this into a quantitative trade model, we show that

• Poor countries stand to lose disproportionately from geoeconomic fragmentation;
• Losses of “neutral” EMDEs are only partially offset by new trade/geopolitical treaties.

Policy implications

1. Avoid geoeconomic fragmentation if possible!
2. Compensate by intensifying bilateral/regional trade liberalization efforts (e.g., AfCFTA).
3. Anticipate growth headwinds from fragmentation: re-double domestic pro-growth efforts.