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EXECUTIVE SUMMARY

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Beyond distance: The impact of local geopolitical contexts and transport modalities on international trade dynamics

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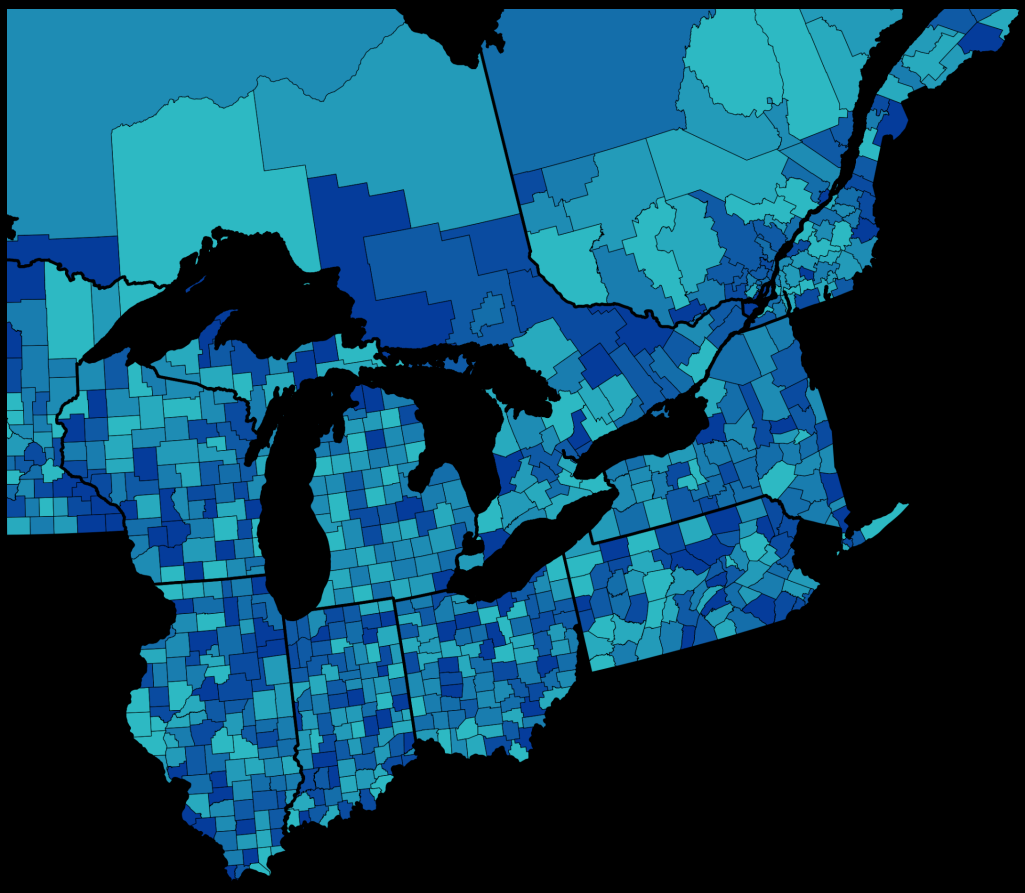

Abstract

Traditional trade models emphasize geographical distance as a primary determinant of trade costs, often overlooking the role of geopolitical tensions and transportation infrastructure. This study enhances the gravity model of trade by incorporating geopolitical distance and transport modalities—air, rail, water, and road—to assess their impact on international trade flows. Using a panel dataset spanning 2012 to 2023, we employ an augmented gravity model to investigate how geopolitical frictions and different transport modes, shaping trade dynamics over time. Our results reveal that geopolitical misalignment significantly reduces trade, with maritime trade being the most affected, whereas road and rail networks demonstrate greater resilience. Additionally, while regional trade agreements facilitate trade, their effectiveness depends on the prevailing transport infrastructure and geopolitical environment. These findings underscore the need for policymakers and businesses to integrate geopolitical considerations into trade and infrastructure planning. By moving beyond traditional distance-based models, this study provides a more comprehensive framework for understanding trade resilience in an era of increasing geopolitical uncertainty.

Introduction and Contribution

Traditional trade models primarily emphasize geographical distance as a determinant of trade costs. However, this approach overlooks the growing impact of geopolitical tensions and transportation infrastructure on trade flows. This study enhances the gravity model of trade by incorporating both geopolitical distance and transport modalities as key variables, providing a more nuanced understanding of trade costs.

Our research highlights the interplay between geopolitical frictions and transport modes—air, rail, water, and road—and how they influence trade flows. We examine how the interaction between geographical distance and transportation modalities affects trade costs, revealing that some transport modes mitigate distance-related trade barriers more effectively than others. For instance, maritime trade experiences the strongest trade-reducing effect over longer distances, while road and rail networks provide relatively stable alternatives. This insight is crucial for policymakers and businesses aiming to enhance trade resilience in an era of rising geopolitical uncertainties.

Methodology

The study employs an augmented gravity model, analyzing a panel dataset covering trade flows from 2012 to 2023. We estimate multiple model specifications, gradually introducing variables such as regional trade agreements, tariffs, and geopolitical distance to isolate their effects. Our empirical strategy consists of two key approaches:

- Cross-sectional analysis (2023 data) to capture immediate trade determinants.
- Panel data analysis (2012-2023) to examine long-term trends and stability. The inclusion of transport modalities allows us to assess how different shipping methods influence trade dynamics and mitigate the effects of geopolitical frictions. A three-year average dataset (2021-2023) further ensures robustness by reducing short-term fluctuations.

Results

1. Geographical Distance and Transport Modalities Interact to Shape Trade Costs:
    - The negative impact of geographical distance on trade varies by transport mode. Maritime trade is highly sensitive to distance, while rail and air transport exhibit greater resilience.
    - The interaction between distance and transport modes reveals that trade costs increase at different rates depending on the shipping method.
2. Geopolitical Distance Also Influences Trade Flows:
    - Countries with stronger diplomatic ties experience higher trade volumes, even after accounting for economic size and geographical distance.
    - Geopolitical misalignment negatively affects trade, with maritime trade being the most vulnerable to geopolitical tensions.
3. Tariffs and Regional Trade Agreements (RTAs):
    - Tariffs significantly reduce trade volumes, reinforcing their role as a traditional barrier.
    - RTAs generally promote trade, but their effectiveness varies depending on transport infrastructure and geopolitical stability.
4. Distance is Still a Key Factor, but its Effect is Dynamic:
    - The traditional negative relationship between distance and trade remains robust.
    - However, the trade-reducing effect of distance is moderated by transport mode selection, particularly for long-distance trade via water and rail.

Policy Implications

Our findings carry important implications for policymakers, businesses, and trade organizations:

- Infrastructure Investments: Governments should prioritize investment in resilient transport networks, especially road and rail, to mitigate distance-related trade costs.
- Trade Policy Design: Policymakers must consider both geographical and geopolitical distance when negotiating trade agreements and setting tariffs.
- Supply Chain Strategies: Businesses should diversify transport options and explore alternative trade routes to reduce exposure to trade frictions.

Conclusion

This study provides a comprehensive analysis of how geopolitical distance and transport modalities interact to shape trade flows. By moving beyond traditional distance-based trade models, we offer valuable insights into the evolving nature of international trade. Future research should further explore the role of digital infrastructure and emerging trade corridors in mitigating distance- and transportation-related trade barriers.

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