NBER WORKING PAPER SERIES

THE "PEACE DIVIDEND" OF INTERNATIONAL TRADE:
A NEW EMPIRICAL APPROACH

Ling Feng
Qiuyue Huang
Zhiyuan Li
Christopher M. Meissner

Working Paper 35078
http://www.nber.org/papers/w35078

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
April 2026, revised April 2026

We thank Robert Feenstra, Deborah Swenson, James Fearon, Soumaya Keynes, Matteo Maggiori, Robert Staiger, Lex Zhao, Peter Egger, Xican Xi, Thomas Zylkin, and participants of the Symposium on New Economic Geography, the International Symposium on Geopolitics and Global Value Chain, and the JIE-GCAP-BGS Conference for helpful discussions and comments. Zhiyuan Li appreciates the financial support by the National Social Science Foundation of China, Grant No. 23ZDA052. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

The “Peace Dividend” of International Trade: A New Empirical Approach
Ling Feng, Qiuyue Huang, Zhiyuan Li, and Christopher M. Meissner
NBER Working Paper No. 35078
April 2026, revised April 2026
JEL No. F14, F51, F69

ABSTRACT

This paper investigates the causal impact of international trade on interstate military conflicts using global bilateral data from 1962 to 2014. To address endogeneity concerns, we exploit exogenous spatial-temporal variation in international trade stemming from technological advances in air relative to maritime transport. Empirical results demonstrate a strong “peace dividend” of international trade: that is, increased trade significantly reduces the probability and intensity of conflicts between nations. This effect remains robust across specifications and withstands a wide range of potential confounders. Such findings highlight how economic interdependence shapes international conflict, a relationship that is especially relevant amid escalating geopolitical tensions and the global shift toward “decoupling”, “de-risking”, and greater trade protectionism.

Ling Feng
Shanghai University of Finance and Economics
feng.ling@mail.shufe.edu.cn

Qiuyue Huang
Fudan University
22110680005@m.fudan.edu.cn

Zhiyuan Li
Fudan University
zhyli@fudan.edu.cn

Christopher M. Meissner
University of California, Davis
Department of Economics
and NBER
cmmeissner@ucdavis.edu

1. Introduction

In the aftermath of World War II, the allies and the United Nations rebuilt the international order with the twin goals of securing peace and promoting prosperity. Institutions such as the General Agreement on Tariffs and Trade (GATT), followed by its successor the World Trade Organization (WTO), sought to reduce trade barriers and promote the expansion of global commerce. Over the decades that followed, and especially after the late 1980s, trade flows grew enormously, binding countries of all sizes and regions into an increasingly dense web of economic interdependence. From regional neighbors to distant trading partners, nations became more economically interconnected than at any other point in history. This wave of integration affirmed the "liberal trade" hypothesis that international trade not only fosters prosperity but also reduces the likelihood of political conflict.

Yet the "commercial peace" hypothesis has come under challenge in recent years. Integration remains extensive, but its role in international geo-economic relations has taken on a more strategic edge: trade and financial sanctions have been used as tools of coercion, strategic export controls are reshaping technology flows, and governments increasingly redirect commerce toward politically aligned partners under the banners of "friend-shoring" and "de-risking". These developments prompt a renewed examination of a fundamental question: can international trade play a causal role in shaping international relations?

This question is, of course, centuries old. Yet theoretical and empirical research has produced competing answers, resulting in a lack of consensus. One influential school of thought, the "liberal" view, rooted in the writings of Montesquieu ([1748] 1989), Immanuel Kant ([1795] 1983) and Norman Angell (1911) among others, argues that trade reduces the likelihood of conflict by raising its opportunity costs. A large empirical literature supports this view, documenting a negative correlation between trade and militarized disputes (e.g., Oneal and Russett, 1999; Polachek, 1980; Morrow, 1999; and Kleinberg et al., 2012).[1] Another school of thought, often referred to as

[1] Generally consistent with this perspective, Martin et al. (2008) argue that trade with third countries can reduce bilateral trade dependence, thereby lowering the opportunity cost of conflict between two countries and increasing the probability of war.

“realism”, contends that economic interdependence may create vulnerabilities to trade sanctions and embargoes, providing leverage in crises and fueling rivalry. This alternative perspective also finds some empirical support in Barbieri (1996, 2009), and is equally intuitive and compelling, as history offers plenty of examples of conflicts emerging between states with deep commercial ties.

Arriving at a definitive answer to this question has been hindered by a central empirical challenge: the endogenous relationship between trade and conflict (Fearon, 2018; Clayton et al. 2025a, Kapstein et al. 2026). The most immediate endogeneity concern is that international conflicts may themselves reduce trade flows. Beyond this direct channel, more subtle sources of endogeneity may also arise. First, countries can employ military power, or the credible threat of force, to improve their bargaining positions in trade relations. The history of colonialism and imperialism demonstrates how coercion has been used to forge and maintain trade relations. Second, other factors such as geographic proximity may simultaneously facilitate trade and increase the likelihood of conflict, while cultural proximity may both strengthen bilateral political relations and promote trade. These other factors can generate correlations between conflict risk and trade flows that are unrelated to the causal effect of interest.

The existing literature has adopted various approaches to address the endogeneity problem, such as lag structures (Martin et al., 2008; Lee and Pyun, 2016), simultaneous equations (Keshk et al., 2004; Kim and Rousseau, 2005; Hegre et al., 2010), and institutional instruments like preferential trade agreements (Mansfield et al., 2014; Hadjiyiannis et al., 2016; Vicard, 2012). These approaches, however, fall short of fully addressing the endogeneity problem. For example, lagged trade variables and the propensity to form trade agreements may themselves be endogenous. Consequently, the causal impact of trade on conflict continues to be contested.

This paper proposes a new identification strategy. Specifically, we exploit a distinctive feature of postwar globalization: aviation-driven changes that reshaped the effective geography of international trade. Since the 1960s, and accelerating in the 1980s, advances in aircraft range, cargo capacity, and logistics sharply reduced the costs of moving goods and connecting economies. Crucially, these global improvements did not translate into uniform trade-cost declines. Instead, they induced a systematic reallocation of trade across country pairs (which we shall call “dyads” hereafter) toward those for which air routes offer a large relative advantage over maritime routes. These are cases in which sea transport involves substantial detours compared with the direct air transport. We leverage these differential changes and the resulting reallocations in predicted bilateral trade which are driven by the evolving comparative advantage of air transport. These changes help us construct instruments that are orthogonal to dyad-year political shocks and reverse causality.

We implement this idea within a flexible gravity framework. First, at the aggregate dyad level, we estimate a standard gravity equation with high-dimensional fixed effects (i.e., multilateral resistance terms and pair fixed effects) in which the elasticities of trade with respect to air and sea distance are allowed to vary over time. The resulting predicted trade flows capture the component of trade variation driven solely by time-invariant geography interacted with common global transport trends. Second, we extend the framework to sectoral trade by estimating analogous gravity equations by product groups, allowing distance sensitivities to differ across industries as well as over time. This sectoral design exploits the fact that industries vary in their air shipping dependence, enabling us to better capture heterogeneous trade reallocations induced by common global aviation shocks.

Using predicted bilateral trade from the gravity equation as an instrument for actual trade, we estimate the effects of bilateral trade on militarized interstate disputes (MIDs) in a comprehensive dyadic panel spanning 1962-2014. The baseline two-stage least squares estimates indicate a statistically significant and strong pacifying effect of trade: exogenous increases in bilateral trade significantly reduce both the likelihood and intensity of militarized disputes. Despite the rarity of conflict in the post-World War II period, the magnitudes are also economically meaningful as we discuss below.

A series of validation and heterogeneity analyses support the mechanism underlying our identification strategy. The instrument generates systematic trade reallocation toward dyads with greater exposure to aviation gains, with divergence emerging as air freight becomes a central infrastructure of global commerce. Consistent with the interpretation that the relevant variation comes from aviation-induced changes in effective trade costs, our estimated pacifying effect is concentrated among dyads where air transport offers a clear geographic advantage and in periods when air cargo capacity and logistics expand more rapidly. Sectoral results sharpen this pattern further: the trade-peace relationship is disproportionately driven by trade in industries that are more air-shipping-dependent.

We also address leading threats to identification in ways that map directly to the structure of our design. For example, to ensure that our results are not driven by the impact of aviation improvements on conflict through channels other than international trade, we implement flexible controls that absorb any time-varying effects scaling with air distance, alongside controls for bilateral migration. We also show that our estimates are stable to a wide set of robustness checks designed to net out other time-varying, geography-linked forces that could co-move with our exposure measures, including land-based proximity trends, evolving post-colonial relationships, and institutional convergence through RTAs, WTO membership, and democratization. Finally, we further strengthen the credibility of our results by obtaining similar findings using an independent and plausibly orthogonal identification strategy based on the 1985 liberalization of Soviet airspace following Söderlund (2023).

Our paper relates to three strands of literature. First, from the methodology perspective, we contribute to the literature that leverages geographic characteristics to construct instruments for international trade. This approach was pioneered by Frankel and Romer (1999), who exploited cross-sectional geographic variation to estimate the effect of trade on income. To address the challenge of time-invariant confounders inherent in cross-sectional designs, subsequent research expanded this logic by exploiting technological shocks to transport systems such as the transition to steamships (Pascali, 2017), the air freight revolution (Feyrer, 2019), or the opening of critical infrastructure like the Suez Canal (Jacks et al., 2024). These approaches generate time-varying variation in bilateral trade frictions that allow for panel estimation with fixed effects. While early applications of these designs focused on economic growth, recent contributions have extended this identification strategy to political economy outcomes, examining the trade-induced transmission of democracy (Tabellini and Magistretti, 2025) or the reshaping of international political alignments (Kleinman et al., 2024). We complement this emerging agenda by applying this design to the domain of militarized interstate conflict.

Second, our research connects to the empirical literature on war and trade. A substantial body of work examines the effect of war on trade, establishing that conflict generates large and persistent reductions in bilateral flows (Glick and Taylor, 2010), spills over to non-belligerent nations via global trade networks (Qureshi, 2013), and suppresses trade through the anticipation of future hostilities even absent actual fighting (Garfinkel et al., 2026). Another strand examines the reverse relationship: whether trade influences the likelihood of war. Early contributions argued that higher dependence raises the opportunity cost of conflict (Polachek 1980), an intuition later verified by

Martin et al. (2008), who show that bilateral trade tends to reduce conflict probability while multilateral openness can weaken the effect. We complement this literature by identifying the causal channel running from trade to conflict. Unlike studies relying on correlations of contemporaneous trade values with lagged values, we exploit a shift-share approach using global aviation-driven cost shocks interacted with a geographic component that shapes the benefits of aviation vis-à-vis sea shipping. This approach provides a causal estimate of how exogenous increases in bilateral trade affect both the probability and intensity of militarized international disputes.

Finally, our findings speak to the long-standing debate regarding the security consequences of interdependence. Theoretical predictions are ambiguous: while "commercial peace" arguments emphasize that trade raises the opportunity cost of war (e.g., Deutsch, 1957), strategic perspectives highlight that interdependence can create leverage, vulnerability, and relative-gains concerns that may fuel rivalry (Hirschman, 1945; Waltz, 1979; Gilpin, 1981, Mayer et. al. 2025). This debate has recently attracted renewed attention, driven by the rapid expansion of the geoeconomics literature, which examines how states leverage economic ties as instruments of geopolitical influence (Mohr and Trebesch, 2025; Clayton et al., 2025b). Our results provide robust causal evidence that greater bilateral trade tends to reduce the likelihood and intensity of militarized disputes, suggesting that the stabilizing incentives associated with foregone economic benefits could dominate in the aggregate. In an era of heightened geopolitical tensions and renewed skepticism toward globalization, our findings help set a basis for a comprehensive understanding of the relationship between political power and economic integration.

The remainder of the paper is organized as follows. Section 2 motivates the study by documenting stylized facts on aviation, geography, and conflict. Section 3 describes the data and formalizes our gravity-based identification strategy and two-stage least squares (2SLS) framework. Section 4 reports the baseline estimates, heterogeneity evidence, and robustness checks. Section 5 concludes.

2. Background

This section provides background and descriptive evidence that motivates our empirical strategy. We first document how advances in aviation technology transformed international trade and generated asymmetric gains across country pairs due to immutable geographic differences. We then describe conflicts during our sample period and present suggestive patterns in the raw data, which indicate that conflict outcomes evolved differently for country pairs with greater potential gains from aviation development, setting the stage for the causal analysis that follows.

2.1. Aviation Development and International Trade

The decades following the 1950s witnessed a profound transformation in global aviation that reshaped international commerce.

In the early years, air cargo existed largely as a byproduct of passenger aviation: freight was carried in the belly holds of jetliners, constrained by high costs, limited capacity and the dependence on passenger routes. This pattern began to shift in the 1960s with the introduction of long-range jets such as the Boeing 707 and Douglas DC-8. Manufacturers soon developed dedicated freighters, which were stripped of passenger seating, equipped with reinforced floors and fitted with wide cargo doors. Air freight thus could move independently of passenger demand, and oversized shipments that had once been impractical could traverse oceans in days rather than weeks.

The wide-body revolution of the 1970s pushed this transformation even further. The Boeing 747, with its cavernous fuselage and distinctive nose door, made it possible to transport automobiles, heavy machinery, and containerized loads in a single lift. Standardized unit load devices became prevalent, accelerating ground handling and turning airports into high-velocity logistics hubs.

By the late 1970s and 1980s, technological advances were reinforced by new business models: FedEx pioneered the hub-and-spoke overnight system, while DHL and UPS constructed cross-border express networks. By the 1990s, dedicated cargo aircraft such as the 747-400F integrated improved fuel efficiency with substantially expanded intercontinental operating range. Concurrently, the diffusion of digital tracking technologies and the consolidation of integrated supply-chain management practices enabled just-in-time manufacturing, facilitated the emergence of global production networks, and fundamentally reshaped international trade.

Figure 1 provides some evidence of the growing role of air transport in global commerce. It reports the share of U.S. trade value carried by air from 1965 to 2004.[2]

[2] Data for Figure 1 and Figure 2 are from the US Census Bureau.

Over this period, the proportion of exports shipped by air increased from roughly 12% to nearly 60%, while the share of imports rose from about 10% to approximately 36%. This shift was not unique to the United States. Rather, it reflected a broader international trend as declining air transport costs, expanding route networks, and increasingly sophisticated logistics systems brought a widening set of countries and products within the reach of rapid delivery (Hummels, 2007).

The adoption of air transport was not uniform across industries. Figure 2 plots, for each HS 2-digit product category of U.S. exports, the average air-shipping share (horizontal axis) against the corresponding annual export value transported by air (vertical axis) over 2002-2014. The dashed lines denote the sample medians along each dimension and partition the categories into four quadrants.

Product categories located in different quadrants exhibit differences in their reliance on air transport. In the upper-right quadrant - where both the air-shipping share and the value of exports transported by air are high - we observe products such as works of art, precious stones, pharmaceuticals, and medical instruments, for which speed, security, and reliability clearly outweigh transport costs.[3] By contrast, the lower-left quadrant contains bulky, low unit-value goods such as cereals, fertilizers, and mineral fuels, for which air shipment is virtually negligible.

The remaining two quadrants capture more nuanced patterns. The upper-left quadrant contains products with relatively large absolute air-shipping values but still low air shares - such as furniture, plastics, and edible preparations - indicating industries in which a fraction of high-value varieties are shipped by air, while the majority of trade relies on slower modes. Conversely, the lower-right quadrant comprises industries with modest aggregate air-trade values yet high air shares, including silk, fur skins, and headgear. As there is only a small subset of HS 2-digit categories falls within the upper-left and lower-right quadrants, it is roughly safe to say that, in general, products exhibiting greater reliance on air transport correspond to those with relatively large values of air-shipped exports.[4]

Taken together, the aviation developments from the 1960s through the 2000s

[3] Appendix Table A1 lists the number of HS 2-digit categories included in each quadrant, together with five example products and their corresponding air-shipping values and shares.

[4] There are 26 out of 97 HS 2-digit categories which lie in the upper-left and lower-right quadrants. See Appendix Table A1. Appendix Table A2 lists the top 20 HS 2-digit categories ranked by their average annual value of U.S. air exports over the period 2002-2014. In these categories, plastic articles and vehicles are notable exceptions, exhibiting large air export values though low shares of air shipment.

transformed air shipment from a marginal adjunct to passenger travel into a central pillar of world trade. More than just making it possible to move goods across continents, these advances facilitated the emergence of global production networks, transformed business organization and management, and thus fundamentally reshaped international trade. Although these developments had heterogeneous impacts on the transportation of different products due to their own properties: some products are suitable for air shipment, while others rely more on conventional bulk shipping, the broader impacts of aviation development may have extended to the trade of all products, including those unsuitable for air shipment.

2.2. Geographic Asymmetries and Gains from Aviation Development

Although technological advances in air transport are, in principle, accessible to all countries, the benefits of global aviation expansion have not been distributed uniformly across country pairs.

A key determinant of these asymmetric gains is the immutable spatial configuration of countries, specifically, the ratio of sea route distance to air route distance between them. This geographic factor affects the relative advantage of air over sea transport. For country pairs with relatively longer sea distances, and thus relatively higher sea-shipment costs, the improvements in aircraft range, speed, and capacity translate into more substantial reductions in bilateral trade costs.

To illustrate how the sea to air distance ratio might have affected gains from aviation development, Figure 3 presents the air and sea routes for two example country pairs: Lithuania-Iraq and Germany-Norway. Shipping goods from Lithuania to Iraq by sea requires a circuitous 14,000-kilometer journey from the Baltic Sea, through the Suez Canal, and onward to the Persian Gulf. By contrast, the direct air route is less than 3,000 kilometers, implying that aviation can reduce the effective distance between the two countries by nearly 80%.

On the other hand, Germany's connection with Norway presents a very different case: the sea route from Hamburg to Oslo is under 800 kilometers, a short coastal voyage along the North Sea, and the air route is only slightly longer at roughly 1,000 kilometers. Consequently, for Germany and Norway, advancements in aviation technology provide *relatively* little additional advantage, as maritime transport is already highly efficient.

The variation in sea-to-air distance ratio across countries is substantial. Figure 4 displays the distribution of the sea-to-air distance ratio across all country pairs. A sizable share (approximately 25 percent) has maritime and air routes of comparable length, as indicated by the distribution's peak near one.[5] Another 25 percent of pairs exhibit maritime routes that are less than 20 percent longer than air routes.[6] In contrast, 43.5 percent of pairs have maritime routes more than 25 percent longer, and 22.9 percent have sea routes exceeding air routes by more than 50 percent.[7]

The pronounced cross-sectional heterogeneity in sea-to-air distance ratio indicates that country pairs differ in the benefits they derive from aviation development. Because these differences are rooted in immutable geographic fundamentals, they create systematic variation in the extent to which improvements in aviation technology reduce transport costs. Advances in air transport therefore function as a heterogeneous treatment, yielding larger cost reductions for country pairs with disproportionately long sea routes, and thus provide a natural source of differential exposure that can be exploited for econometric identification.

2.3. Conflicts

We now provide a brief introduction of interstate conflicts during the period of 1962-2014. Information on conflicts is drawn from the Dyadic Militarized Interstate Dispute dataset v4.02 (Palmer et. al., 2015). The dataset records all instances in which states threaten, display, or use military force against one another. Disputes are coded according to a five-point hostility scale reflecting the intensity of interstate action: level 1, "no militarized action"; 2, "threat to use force"; 3, "display of force"; 4, "use of force"; and 5, "war" (Palmer et. al., 2015; Maoz et al., 2019).[8] We also define a binary

---

[5] The 25th percentile of the distribution is 1.05, indicating that 25 percent of country pairs have maritime routes that are less than 5 percent longer than their corresponding air routes.
[6] The median of the distribution is 1.19.
[7] Detailed description of the measures for sea and air distance is provided in Appendix A. In general, air distances should be shorter than sea distances, since air routes are not constrained by coastlines, maritime chokepoints, or navigational detours. However, in our data, there are a small number of cases in which the opposite occurs. This arises because sea distances are measured between countries' principal ports, which are typically located on or near the coast. Air distances, by contrast, are population-weighted. For countries whose populations are concentrated far inland, the population-weighted air distance can exceed the distance from a coastal port to a foreign port. Such cases are rare, though. Only 4.7 percent of country pairs have sea-route distances that are more than 5 percent shorter than their corresponding air-route distances.
[8] According to Kenwick et al. (2013), level 2 MIDs (threat to use force) refer to actions such as threats to impose a blockade, occupy territory, or declare war. Level 3 MIDs (display of force) include actions like mobilizing forces, showcasing troops, ships, and planes, or fortifying borders. Level 4 incidents (use of force) involve actual acts such as enforcing a blockade, occupying territory, or launching an armed attack. Lastly, level 5 MIDs (war) are characterized by conflicts that result in at least 1,000 military casualties.

indicator that equals one if the hostility level is greater than 1 (i.e., at least a threat to use force), and zero otherwise to capture whether or not a country pair was involved in a conflict.

Table 1 reports the distribution of conflicts across hostility levels, with observations defined at the dyad-year level. Over the 1962-2014 period, there are 1,556 interstate conflict episodes, representing 0.46% of all dyad-year observations. Among these incidents, the majority fall under use of force (MID level 4, 0.28%), followed by display of force (MID level 3, 0.134%). Episodes escalating to full-scale war are rare, comprising only 4.9% of all conflict occurrences.

As we exploit the heterogeneous effects of aviation developments, arising from cross-country variation in the relative length of sea versus air routes, to identify their impact on interstate conflict, it is important that country pairs experiencing conflicts exhibit substantial variation in their sea-to-air distance differences for the identification strategy to work.

Table 2 shows that it is the case. From the table, it is evident that country pairs experiencing the greatest number of conflicts are also those exhibiting substantially larger variations in their sea-to-air distance ratios. Specifically, conflicts are concentrated among geographically proximate dyads, consistent with findings in international relations (Bremer, 1992; Robst et al., 2007). As shown in Column (3) of Table 2, the 0-1,000 km category, representing 237 country pairs, accounts for 489 disputes, while the 1,000-2,000 km range contributes an additional 367 conflicts despite involving more dyads. The 2,000-5,000 km categories add a further 333 conflicts, with 1666 more dyads. Together, these sets of country pairs account for more than 76% of all interstate conflicts during the 1962-2014 period. Beyond 5,000 km, the number of disputes declines sharply, confirming that interstate conflict becomes increasingly rare at greater distances.

Second, the relative advantage of air transport, measured by the sea-to-air distance ratio, exhibits its greatest magnitude precisely among the short- and medium-distance dyads that account for most interstate conflicts. Columns (5) and (6) of Table 2 show that for dyads within 1,000 km, the mean sea to air distance ratio is 1.90 and its standard deviation is 2.21. Turning to country pairs with larger air distances, we observe that both the mean and the variance of the sea to air ratio decline with direct air distance. For dyads in the 3,000-5,000 km range, the mean and standard deviation reduce to 1.69 and 0.69, respectively.

The alignment of higher conflict possibility and larger variation in sea-to-air distance ratio provides the foundation for our identification strategy. The marginal impact of advances in aviation technology is inherently stronger for geographically proximate country pairs, precisely the dyads where the potential for conflict is highest. This structure enables us to construct an instrument that exploits how global, time-varying improvements in aviation technology differentially reduce trade costs across dyads with varying sea to air distance gaps, and use it to estimate the causal effects of trade on conflicts. As the sea-to-air distance gap is a time-invariant geographic characteristic, which is orthogonal to short-run political dynamics or bilateral tensions, and improvements in aviation technology represent a global shock exogenous to country-pair attributes, their interaction is plausibly independent of factors directly influencing interstate conflict.

2.4. Gains from Aviation Development and Conflicts

Before turning to the formal analysis of whether asymmetric gains from aviation development affect countries' involvement in conflicts, we first assess whether the raw data exhibit some patterns broadly consistent with such a relationship. Our hypothesis is that advances in aviation technology may have reduced trade costs disproportionately for country pairs with more circuitous maritime routes. If this mechanism is valid, we should observe that interstate conflicts display smaller post-1980 increases (or larger decreases), particularly for dyads with greater *ex ante* exposure to aviation-induced trade gains.

Table 3 reports countries' involvement in conflict in the periods before and after the aviation revolution (circa 1980). We stratify dyads into three broad bins based on dyads' direct air distance (0-1,000 km, 1,000-2,000 km, and 2,000-5,000 km) to account for baseline differences in conflict propensity related to geographic proximity. Within each bin, we further split dyads into high- and low-exposure groups depending on whether their sea-to-air distance ratio is above or below the median within the bin. This procedure isolates variation in the relative advantage of air transport while holding the overall geographic proximity fixed.

Table 3 reveals a clear and systematic pattern whereby dyads with greater *ex ante* exposure to aviation-induced trade gains tend to experience smaller increases (or larger decreases) in interstate conflict involvement. For example, within the bin of 0-1,000 km direct air distance, and after accounting for country-year specific tendencies, country pairs with relatively lower exposure to aviation-induced trade gains (i.e., those with sea-to-air distance ratios below the group median) exhibit an increase in conflict probability.[9] In contrast, country pairs with higher exposure display a decline in conflict probability. The difference of these changes (-0.015, reported in Column (4) of Table 3) is suggestive of a role for aviation-induced trade gains in mitigating the likelihood of interstate conflict.

This pattern persists across dyads with larger direct air distances. For instance, the difference in changes of conflict probability between the high- and low-exposure groups is -0.001 for dyads in the 1,000-2,000 km range, and -0.0007 for those in the 2,000-5,000 km range. We note that, the magnitude of these differences declines with the direct air distance. This attenuation is consistent with the proposed mechanism. Country pairs separated by greater distances tend to have lower baseline propensities for conflicts, and the marginal efficiency advantage of air over sea transport diminishes as maritime routes become less circuitous relative to air routes, as shown by Table 2. Given that trade volumes are lower for more distant trading partners as predicted by standard gravity models, these facts may attenuate the scope for aviation-induced trade gains to affect conflict involvement.

Turning to the conflict intensity, as reported in Panel b of Table 3, we observe a broadly similar pattern: after controlling for country-year specific trends, dyads with higher exposure to aviation-induced trade gains tend to experience a de-escalation in hostility, whereas dyads with lower exposure exhibit an intensification of conflict. The negative difference-in-differences estimates (shown in Column (4) of Panel (b)) are suggestive of an association between aviation development and a reallocation away from more severe confrontations, particularly among more exposed country pairs. Similar to the results found in Panel (a), we also observe that the magnitude of this pacifying effect of aviation development declines with the direct air distance between countries.

When we redefine the post-development period to a later phase of aviation advancement (1990-2014 rather than 1980-2014), Table 3 further reveals that the association between aviation development and the probability and intensity of conflicts

[9] Numbers reported in Columns (1), (2), and (5) of Table 3 are mean residuals within each period, with residuals obtained from regressing the conflict dummy (Panel a) or conflict intensity (Panel b) on country*year fixed effects.

becomes more pronounced over time. Specifically, under this alternative periodization, Column (7) continues to show that dyads with greater exposure to aviation-induced trade gains experience smaller increases or larger decreases in both conflict likelihood and intensity, with these differences diminishing at greater direct air distances. Moreover, relative to Column (4), the reported difference-in-differences estimates in Column (7) are systematically larger, implying a strengthening of these associations as aviation technology continued to advance.

Taken together, these descriptive statistics provide *prima facie* evidence consistent with our hypothesis. The probability of conflict appears to decline following the expansion of aviation, particularly for dyads with relatively long maritime routes, with a stronger decline among geographically proximate pairs and in later periods. The alignment between "potential increases in trade" and "observed conflict reductions", even within narrow distance bins, suggests that these patterns may be driven by cross-sectional differences in exposure to trade cost reductions, rather than by general proximity or common time trends.

3. Data and Estimation Specification

In this section, we formalize our intuition for identification, constructing an instrumental variable to exploit the plausibly exogenous variation in the interaction between global transport development and dyadic geography, so that we may identify the causal effect of international trade on interstate conflict.

3.1. Data

We first describe our data sources and variables used in the empirical analysis. To examine the relationship between trade and conflict, we construct a comprehensive dyadic panel dataset spanning 1962-2014. Conflict data are drawn from the Dyadic Militarized Interstate Dispute dataset as described earlier, while bilateral trade data come from the Correlates of War Project Trade Dataset. We define international trade, for each dyad-year, as the average of the two mirror flows (i.e., the average of country i's imports from j and country j's imports from i).

There are specifications where we need to utilize sectoral trade data. In such cases, we use data from the NBER World Trade Database.[10] It reports bilateral trade values for approximately 1,500 four-digit Standard International Trade Classification (SITC) product categories.[11]

Geographic information for country pairs is drawn from CEPII database and Feyrer (2019). We use two distance measures: air distance, calculated as the population-weighted great-circle distance between countries, and sea distance, defined as the least-cost path by sea between countries' largest ports.[12] Because sea distance is undefined for landlocked countries, our analysis is restricted to countries with maritime access, leaving a sample of 131 countries and consequently around 8000 country pairs.

We also utilize a number of datasets from the political science and international relations literature to account for countries' bilateral political relations. The first dataset, compiled by Thompson et al. (2022), provides a measure of whether country i is considered a strategic rival of country j in year t. Rivalries are identified based on whether two countries view each other as competitors. Such perceptions are the sources of actual or latent threats, with the potential for militarization. We focus on three forms of strategic rivalry that are most directly related to interstate competition: (i) positional, centered on competition for influence, activities, or prestige; (ii) spatial, focused on disputes over exclusive territorial control; and (iii) ideological, based on conflicts contesting over competing political, economic, or religious belief systems.

The second dataset provides variables for whether country i is in a formal alliance with country j in year t from the Correlates of War Formal Alliances v4.1. This source records all formal alliances among states, mutual defense pacts, non-aggression treaties, and ententes.[13]

Third, we draw records of regional trade agreements from Mario Larch's Regional Trade Agreements Database, based on Egger and Larch (2008). The database provides a comprehensive record of multilateral and bilateral regional trade agreements (RTAs) notified to the World Trade Organization. We use the version covering agreements through 2023. We also collect each country's WTO accession year from the official

[10] The Correlates of War Project Trade Dataset and NBER World Trade Database share the same ultimate source, the United Nations COMTRADE data. When we aggregate product-level trade values from the NBER World Trade Database to the country-pair level, the resulting totals exhibit a correlation of 0.99 with the values reported in the Correlates of War Project Trade Dataset.

[11] SITC product categories rather than the Harmonized System (HS) are used in our study because our sample spans 1962-2014, while the HS classification was not available until year 1988.

[12] See Appendix A for more information.

[13] https://correlatesofwar.org/data-sets/formal-alliances/

WTO membership records. Finally, we use bilateral migrant-flow estimates from Abel and Cohen (2019), which report five-year origin-destination flows, while we convert these estimates into annual averages for use in the dyad-year panel.

Finally, we include several country-level control variables. These include GDP from the Penn World Table (version 10.01), military expenditure and the Composite Index of National Capability from the Correlates of War National Material Capabilities dataset (version 6.0).[14]

3.2. Empirical Specification

We now detail our identification strategy and estimation framework. Our approach exploits heterogeneity in the impact of transport technology shocks across country pairs with different geographic characteristics. We argue that advances in aviation technology generated larger trade-cost reductions for country pairs with disproportionately long maritime routes but relatively short air routes. As a result, these dyads experienced especially large increases in bilateral trade as air transport improved. At the global level, this process implied a reallocation of trade: away from country pairs well served by maritime transport and toward those that benefit more from air connectivity. In a gravity framework, such reallocation is reflected in a *growing* importance of air distance, relative to that of sea distance, in explaining bilateral trade flows.

To capture the evolving role of air distance in shaping trade flows and the trade reallocation induced by aviation development, we follow Kleinman et al. (2024) and Tabellini and Magistretti (2025) and estimate a flexible gravity model. The specification allows the sensitivity of bilateral trade to sea and air distance to vary over time, thereby capturing heterogeneous exposure to transport-technology shocks across country pairs. The model is estimated using a Poisson pseudo-maximum likelihood (PPML) estimator and is specified as follows:

$$trade_{ij}^{t} = exp[\gamma_a^t \, ln\left(aird_{ij}\right) + \gamma_s^t \, ln\left(sead_{ij}\right) + \vartheta_{ij} + \vartheta_i^t + \vartheta_j^t]\mu_{ij}^t \qquad (1)$$

[14] The Composite Index of National Capability (CINC) is intended to capture a state's material capabilities. It is calculated as the simple average of a country's share of the global total across six components: military expenditure, military personnel, energy consumption, iron and steel production, urban population, and total population (Singer, Bremer, and Stuckey, 2012).

where $trade_{ij}^t$ is the bilateral trade value of country i and country j in year t, and the variables $aird_{ij}$ and $sead_{ij}$ measure bilateral air and sea distances.[15]

This specification includes high dimensional fixed effects. Dyad fixed effects, ϑ_{ij}, absorb all time-invariant bilateral characteristics, including static distance, historical ties, and cultural proximity, while country*year fixed effects, ϑ_i^t and ϑ_j^t, fully control for all time-varying country-specific factors, such as GDP, the growth rate of GDP, importing tariffs, GATT or WTO membership, and "multilateral resistance" terms, etc. With these high dimensional fixed effects, the coefficients γ_a^t and γ_s^t can be viewed as time-varying distance elasticities of trade with respect to sea and air transport.

Note that, the estimates of γ_a^t and γ_s^t should not be taken as "causal estimates" of the effect of distance on trade. Instead, the two distance elasticities should be interpreted jointly rather than in isolation. Specifically, advances in air transport and the increasing reliance on air shipping imply that there are changes in the impacts of sea and air distance on trade over time. The effect of sea distances should be declining in importance, while that of air distance increases. The relative evolution of the coefficients thus captures how the sensitivity of trade flows to each transport mode changes as transport technology advances. In particular, an increasing magnitude of γ_a^t *relative* to γ_s^t reflects a growing efficiency advantage of air over maritime transport, generating differential reductions in trade costs across country pairs, depending on their geographic configuration, i.e. the sea to air distance differences.

With heterogeneous impacts of transport technology improvements on different country pairs captured by the time-varying coefficients, γ_a^t and γ_s^t, we define our instrument for bilateral trade as the logarithm of predicted bilateral trade flows, $ln\left(\widehat{trade}_{ij}^t\right)$, generated by Equation (1). Using this instrument, we estimate the following equation using two-stage least squares (2SLS):

$$conflict_{ij}^t = \beta\, ln\left(trade_{ij}^t\right) + \delta_{ij} + \delta_i^t + \delta_j^t + \varepsilon_{ij}^t \qquad (2)$$

where $conflict_{ij}^t$ denotes the interstate conflict between country *i* and country *j* in year *t*, measured either as a binary indicator or as conflict intensity.[16] The variable of

[15] The model is estimated using the Poisson pseudo–maximum likelihood (PPML) estimator rather than log-linear OLS. This is because the PPML approach permits the inclusion of zero trade observations and produces consistent estimates in the presence of heteroskedasticity, which commonly arises in gravity specifications, as demonstrated by Santos Silva and Tenreyro (2006).

[16] Conflict intensity is measured using the original hostility level reported in the Militarized Interstate Dispute dataset.

interests, $ln(trade_{ij}^t)$, denotes the logarithm of bilateral trade values.

The same high dimensional fixed effects in Equation (1) are carried through to Equation (2). Thus, country-pair fixed effects δ_{ij} absorb all time-invariant bilateral characteristics that may affect the probability or intensity of conflicts, including historical colonial ties, a shared border, cultural affinity, and static geographic distance. Country*year fixed effects (δ_i^t and δ_j^t) flexibly control for all time-varying, country-specific shocks in both the source and destination countries, such as business cycle fluctuations, domestic political transitions and changes in foreign policies.

To fully understand how our specification exploits heterogeneous impacts of aviation developments, it is important to emphasize that our empirical strategy does not rely on the full effect of transport technology improvements. Instead, it isolates only the component of these effects that varies at the dyad-year level.

The key feature here is the inclusion of country by year fixed effects in both Equations (1) and (2). To see that, note that improvements in transport technology (no matter in aviation or maritime transport) may affect international trade in a globally pervasive manner. Consider a hypothetical case that only one mode of transportation is available, then technological advances in this mode, say containerization, increases in ship size, or improvements in navigation and logistics, may reduce trade costs but only proportionally, scaling trade costs up or down in a uniform way. As a result, while absolute transport costs and trade volumes change over time, relative shipping costs across country pairs change little. These common effects are therefore absorbed by the country*year fixed effects and do not contribute to the variation we use for identification.

Even if the effects of transport technology improvements are not globally uniform but instead depend on country-specific characteristics such as geography or investment capacity, these effects would still be absorbed by the country*year fixed effects, as long as they operate at the country, rather than country pair, level. For example, country-specific investments in ports, logistics, or shipping infrastructure may raise a country's trade with all partners. When such investments affect all bilateral relationships of a given country symmetrically, their effects will be captured by the fixed effects and therefore do not confound our estimates.

Only impacts of transport technology developments that generate *dyad-year-specific* variation can contribute to our identification. The most salient case arises when countries can substitute between air and sea transport modes. Because dyads differ in the relative efficiency of air versus sea routes, captured by time-invariant differences in sea and air distances, aviation improvements generate disproportionately large trade cost reductions for dyads with relatively shorter or more direct air routes compared with maritime alternatives. These differential effects are reflected in the predicted trade flows constructed from the terms of sea and air distances in Equation (1), providing precisely the *dyad-year-specific* variation in trade that underpins our identification strategy.

Finally, because our instrumental variable is constructed from time-invariant geographic characteristics, omitted factors that vary at the dyad-year level would threaten identification only if they generate changes in conflict outcomes that are systematically correlated with the sea-to-air distance ratio and evolve differentially over time. Such patterns would require shocks that interact with fixed geographic features in a highly structured manner. Historical and institutional evidence pointing to the presence of confounding forces with these properties is limited, and we shall discuss the most plausible candidates of this type in the next section.

4. Estimation Results

This section reports our empirical results. We first present baseline estimates of the effect of international trade on interstate conflict using our gravity-based instrumental variable. We then examine how the varying effects of transport developments across industries may affect our results. We further document how advances in air transport reshape the geography of international trade and explore whether this reallocation generates heterogeneous effects on conflict. After assessing the robustness of our findings to a wide range of alternative explanations and confounding factors, we corroborate our results using an alternative identification strategy based on the Soviet airspace liberalization. Finally, we examine whether similar pacifying effects extend to perceptions of strategic rivalry between trading partners, thereby lowering expectations of hostility and, ultimately, the likelihood of militarized conflict.

4.1. Baseline Results

Table 4 reports our baseline estimates of the relationship between international trade and interstate conflict. Before presenting the instrumental variable results, Columns (1) and (5) report ordinary least squares (OLS) estimates. These estimates reveal a negative and statistically significant correlation between bilateral trade and interstate conflict: a doubling of bilateral trade is associated with roughly a 0.07 percentage point reduction in the probability of conflict and a 0.0017 reduction in conflict intensity.

While suggestive, these OLS estimates cannot be interpreted as causal. As discussed earlier, multiple sources of endogeneity may bias the estimates, and the net direction of the bias is theoretically ambiguous. For example, on the one hand, episodes of intensified economic engagement, market-opening initiatives, or omitted strategic interaction may simultaneously increase trade volumes and increase the likelihood of militarized disputes or inter-state conflict, biasing the OLS estimates toward zero and understating the magnitude of the effect of trade on reducing conflict. In this direction, Clayton et al. (2026) show that a hegemonic country can put trade partners under duress with threats of sanctions thereby facilitating international exchange but potentially raising tensions between nations. Alternatively, we note that over this period, communications technologies improved dramatically boosting trade. But these technologies also potentially put polities into greater direct contact helping to propagate frictions as discussed in Huntington (1996).[17]

On the other hand, reverse causality, whereby heightened conflict disrupts trade flows, would tend to bias the OLS estimates in the opposite direction. For these reasons, we rely on an instrumental variable strategy to isolate exogenous variation in trade and to identify the causal effect of economic integration on interstate conflict.

Our instrumental variable for bilateral trade is constructed based on the gravity estimates of Equation (1). Panel (a) of Figure 5 reports the estimated time-varying distance elasticities, γ_a^t and γ_s^t, that underpin this construction. As shown in the figure, the elasticity of trade with respect to sea distance remains relatively stable throughout the sample period. In contrast, the elasticity with respect to air distance exhibits two episodes of increasing magnitude: one in the mid-1960s and another beginning in the mid-1980s, and becomes statistically distinguishable from zero from approximately 1985 onward. While these patterns should not be interpreted as causal effects of transport technology on trade, they are consistent with the notion that changes in global

[17] Huntington (1996) emphasizes the rise of ethno-cultural conflict which often occurs at the “fault lines” or at the geographical borders where distinct cultures and “civilizations” come into close contact. Mohr and Trebesch (2025) note that wars have become increasingly localized between 1950 and 2000 which could be consistent with this channel.

transport conditions interacted with time-invariant geographic features to generate differential trade responses across country pairs. This evolving correlation structure is the source of the exogenous variation in predicted trade flows that we exploit in our instrumental variable strategy.

Columns (2)-(4) and (6)-(8) of Table 4 report IV estimates using predicted trade flows. Across all IV specifications, the estimated effect of trade on conflict remains negative and statistically significant. For conflict probability, the IV estimates range from -0.0014 to -0.0017 and for conflict intensity, the IV coefficients range from -0.0041 to -0.0051. Although the estimated coefficients are modest in absolute terms, they are large relative to the unconditional mean of conflict outcomes. A doubling of trade reduces the likelihood of conflict by roughly 30 percent and conflict intensity by 0.4 percent relative to their respective means, indicating that the pacifying effect of trade is economically meaningful despite the rarity of interstate conflict.[18]

The IV results are robust to the inclusion of additional bilateral controls. Columns (3) and (7) add differences and sums of GDP per capita and relative power measures of the pair, while Columns (4) and (8) further control for the differences and sums of military expenditures and alliance relationships (Benson, 2011). The coefficient on trade remains stable across specifications, indicating that the estimated effect is not driven by these observable economic or political factors.

The lower panel of Table 4 reports the first-stage results. The coefficient on the predicted trade is about 1.259 to 1.286 and highly statistically significant across all specifications. The Kleibergen-Paap F-statistics exceed 2,300 in all IV regressions, above conventional thresholds for weak instruments. These results indicate that the gravity-based instrument provides strong explanatory power for actual bilateral trade flows.

The IV estimates remain negative and significant, indicating that even after addressing endogeneity, greater trade still causally reduces conflict. Moreover, the IV coefficients are slightly larger in magnitude than the OLS estimates, suggesting that, among the offsetting sources of endogeneity, those biasing the OLS estimates toward zero are more important. One other factor that may have also contributed to larger IV estimates is that our 2SLS estimates identify a Local Average Treatment Effect (LATE)

[18] The binary conflict indicator has a mean of 0.0046 and a standard deviation of 0.068, while the conflict intensity measure has a mean of 1.012 and a standard deviation of 0.185.

for dyads whose trade is more responsive to the global aviation network. As illustrated in Appendix Figure A1, our instrument induces larger variation in predicted trade for geographically proximate dyads. Statistically, as reported in Table 2, these short-distance dyads are characterized by a significantly higher baseline probability of conflict compared to more distant pairs. Consequently, our estimates reflect the effect of integration on country pairs that are historically prone to conflict yet are becoming better connected. Since these high-risk dyads possess the greatest "potential gains" from peace, the marginal effect of trade may be larger than the average effect across all dyads (Average Treatment Effect, ATE), which is diluted by stable, distant pairs.

One caveat for our estimates of the effects on conflict intensity is that they might mix the impact of trade on the probability of conflict occurrence and the marginal effect of trade on conflict intensity.[19] To more explicitly assess whether the estimates reflect impacts of trade on the severity margin, conditional on conflict onset, we perform two additional exercises. First, we estimate the effect of trade on the probability of reaching different hostility thresholds, and based on these estimates, we calculate the impact of trade on the probability of having more severe conflicts conditional on conflict onset. Second, we perform a regression for the subsample of observations with conflicts, and examine whether increased trade reduces the conditional intensity within this subsample.

Table 5 reports the results. The IV estimates in Columns (1)-(4) imply that higher bilateral trade is associated with a lower likelihood of conflict occurrence (MID≥2) and, importantly, with lower probabilities of reaching more severe hostility levels (MID≥4 and MID=5). Translating these coefficients into implied effects on escalation conditional on conflict onset, we find negative point estimates for the probability of escalation to higher hostility categories.[20] Column (5) further provides complementary evidence from the conflict subsample. The coefficient is negative and statistically significant, consistent with the threshold-based evidence of reduced escalation.[21]

In order to visualize the distribution of trade's pacifying effects, we estimate, based

---

[19] Note that the MID hostility level equals 1 when no militarized action occurs.

[20] The estimates of the impacts on escalation are obtained as follows: (1) Define p_i=Pr(MID≥i), which can be calculated based on Table 1. (2) Define β_i =dp_i/dln(trade), which is the estimated effects of trade on the probability of reaching different hostility thresholds. (3) As Pr(MID≥i|MID≥2)=p_i/p_2, we can calculate the impact of trade on escalation as, d(p_i/p_2)/dln(trade)= $\beta_i/p_2 - \beta_2 p_i/(p_2)^2$. The estimates of such impacts are reported in Table 5, as the "marginal effect on conditional probability". Some of these marginal effects are estimated with limited precision, probably because wars and high-hostility disputes are rare events, and to calculate the conditional escalation effects, ratios of small probabilities are involved.

[21] The small number of observations within this subsample warrants caution in interpretation though.

on our baseline estimates, the reduction in conflict probability for each country by comparing factual 2012 conflict risks against a counterfactual scenario where bilateral trade flows are reset to their 1970 levels. Panel (a) of Figure 6 maps these estimates, revealing some geographic heterogeneity.[22] The largest "peace dividends" are concentrated in East and Southeast Asia, where major export-oriented economies such as China (CHN) and South Korea (KOR) fall into the top deciles of conflict reduction, followed by integrating economies like Thailand (THA), Myanmar (MMR), and the Philippines (PHL). This pattern aligns with the region's rapid industrialization and integration into global manufacturing value chains, suggesting that deep economic interdependence has played a pivotal role in stabilizing a historically volatile region. In contrast, nations in less integrated regions, such as parts of South America, show more modest reductions. These spatial patterns confirm that the security benefits of trade accrue most strongly to regions undergoing rapid global market integration.

We further compare our predicted trade-induced reductions in conflict against the *actual* historical reductions between the pre-integration and post-integration periods.[23] Panel (b) of Figure 6 plots the results, revealing a positive and statistically significant correlation between the predicted reduction in conflict risk and the actual reductions in conflict risk. This alignment indicates that trade-induced pacification remains a meaningful and significant component of long-term security trends, and confirms that our instrumental variable strategy captures meaningful structural shifts rather than statistical artifacts.

Taken together, these results provide consistent evidence that greater international trade causally reduces both the probability and intensity of interstate conflict.[24] By exploiting exogenous variation in trade driven by the interaction of time-invariant geography and global transport technology trends, our IV strategy isolates a plausibly causal component of economic integration, reinforcing the view that trade plays a stabilizing role in international relations.

---

[22] The country-level estimates are calculated by aggregating dyadic reductions in predicted conflict probability, weighted by bilateral trade shares. We simulate counterfactual conflict risks by holding all other variables constant and replacing 2012 trade levels with their 1970 levels.

[23] We calculate the "actual historical reduction" in conflict risk using raw MID data. For each country-year, conflict probability is defined as the number of militarized disputes involving that country divided by the total number of its potential dyads. We then compute each country's average annual conflict probability in the pre-integration period (1962-1972) and in the post-integration period (2002-2012), and define the historical reduction as the pre-period average minus the post-period average.

[24] Further, quantile regression results (Appendix Figure A2) show that trade reduces conflict across the whole distribution, with the effect stronger for higher-risk dyads.

4.2. Air Shipping Dependence across Industries

While our aggregate instrument exploits geographic asymmetries across country pairs, a complementary margin of variation exists at the sectoral level. As documented in Section 2, industries differ in their reliance on rapid delivery. This implies that a global aviation shock could induce heterogeneous trade responses across sectors, even within the same dyad. In this section, we leverage this variation and examine their implications on our results.

To exploit this additional layer of variation, we classify SITC 2-digit industries into high and low air-shipping-dependent groups (HAD and LAD, hereafter), based on their air-shipping values in the United States in 2014 relative to the median across industries.[25] We then estimate Equation (1) separately for the two groups, and generate the predicted trade flows. For comparison, we also perform the same regression for bulk commodities such as oil, coal, iron ore, and grains, which are overwhelmingly transported by sea.

The time-varying elasticities of trade with respect to air and sea distance for different product groups in these regressions, reported in Panels (b), (c) and (d) of Figure 5, reveal how the relevant spatial friction changes over time. For high air-shipping-dependent industries (Panel (b) of Figure 5), the air-distance elasticity becomes more negative between 1960 and 1970, consistent with a shift in trade toward geographically closer dyads in the early years of our sample. Thereafter, it remains consistently negative and relatively stable, suggesting that air distance is the primary binding spatial friction for these goods throughout the period.[26] Conditional on air distance, sea distance plays a limited role and is often estimated with a positive sign, which likely reflects residual compositional patterns rather than maritime transport costs for these products.

In contrast, for low air-shipping-dependent industries (Panel (c) of Figure 5), sea distance remains an important determinant of trade flows, while the elasticity with respect to air distance becomes more negative over time. This pattern is consistent with the idea that advances in aviation technology increasingly shaped the geography of

[25] U.S. air transport data are made available by US Census Bureau.

[26] Notice that, this pattern does not indicate the absence of impacts of aviation developments since year 1970. Rather, it reflects the fact that for these products, air distance has long been the primary binding spatial friction. Consequently, the effective geography of trade for high air-shipping-dependent goods was already largely shaped by aviation-related constraints by year 1970, leaving limited scope for further geography-driven reallocation over time.

trade even for goods primarily shipped by sea, so that air distance explains a growing share of cross-dyad variation in trade flows for these products.

A more revealing case is bulk commodities (Panel (d) of Figure 5). Consistent with these goods being predominantly shipped by sea, the sea-distance elasticity is negative throughout the sample and becomes more negative from the mid-1960s to around 1980, indicating that maritime distance remains a first-order determinant of trade flows in this sector. At the same time, the air-distance elasticity - while imprecisely estimated in earlier decades - turns negative and statistically meaningful from the mid-1980s onward and remains so thereafter. Although bulk commodities are rarely transported by air, this pattern suggests that air distance may proxy for broader changes in global connectivity and the organization of trade relationships that increasingly correlate with bilateral trade costs even in sectors relying on maritime shipment.

Taken together, these findings shed light on the source of variation we exploit. Advances in air transport did not simply substitute for sea transport. Instead, they reshaped the effective geography of international trade by changing which bilateral relationships could be sustained and expanded. For high air-shipping-dependent industries, this adjustment occurs early and is reflected in relatively stable elasticities thereafter, whereas for low air-shipping-dependent industries and bulk commodities, it unfolds more gradually as aviation technology advances.

Using these sector-specific predicted trade flows, we then estimate IV specifications that exploit heterogeneity in the trade response to aviation development across industries. We implement three complementary approaches. First, we aggregate the predicted trade flows for high and low air-shipping-dependent industries and use their sum as an instrument for total bilateral trade. Second, we treat HAD and LAD trade as two endogenous regressors and instrument each with its corresponding predicted trade flow. Third, we estimate specifications that include HAD trade, LAD trade, and bulk-commodity trade separately, instrumenting each with its own sector-specific prediction.

Table 6 reports the results. When we instrument total trade using the sum of predicted HAD and LAD trade flows (Columns (1) and (6)), the estimated trade effect remains negative and statistically significant for both conflict probability and conflict intensity, with magnitudes slightly larger than the baseline IV estimates.

Decomposing trade into HAD and LAD components yields a sharper pattern. In the specification that includes both HAD and LAD trade as endogenous regressors

(Columns (2) and (7)), the coefficient on HAD trade is strongly negative and precisely estimated, whereas the coefficient on LAD trade is smaller and statistically indistinguishable from zero. The single-component specifications show a consistent ranking: the negative effect remains large and highly significant when only HAD trade is included (Columns (3) and (8)), but becomes notably weaker and only marginally significant when the regression is restricted to LAD trade (Columns (4) and (9)). Finally, bulk-commodity trade (Columns (5) and (10)) is also associated with lower conflict probability and intensity, but the estimated magnitudes are smaller relative to those for HAD and LAD trade.

Taken together, these estimates reinforce the baseline finding that greater bilateral trade is associated with a lower likelihood and intensity of interstate conflict, while also shedding light on which components of trade account for this relationship. They show that the aggregate trade-conflict relationship is disproportionately driven by trade in air-shipping-dependent industries, consistent with the mechanism that aviation-induced reductions in effective trade costs play a central role in shaping interstate conflict outcomes.

4.3. Geographical Reallocation of Trade

We argue that our identification strategy exploits trade reallocation toward country pairs that are *relatively* better served by air than by maritime transport. Such reallocation, induced by advances in aviation technology, reshapes the effective geography of international trade. However, thus far we have captured this variation implicitly by using the predicted trade flows from Equation (1) as an instrument for actual trade, without documenting the underlying reallocation patterns. In this subsection, we examine whether trade reallocation occurs in the data and how cross-dyad differences in exposure to aviation development relate to our estimates.

We begin by examining how predicted trade responses to aviation development vary across country pairs depending on their exposure to the aviation shock. To do this, we measure exposure using the sea-to-air distance ratio and an indicator for whether a dyad is a non-island pair (i.e., neither partner is an island country).[27] We then regress

[27] An island country is defined as a country whose entire homeland is located on islands. Appendix Figure A3 shows that the sea-to-air distance ratio is substantially more dispersed among non-island dyads than among dyads involving at least one island country. In particular, island dyads exhibit a tighter distribution concentrated near parity between sea and air distance. This difference suggests that advances in aviation may generate more heterogeneous - and

a dyad's predicted trade level and its predicted share of world trade on interactions between these exposure measures and five-year period dummies, controlling for country-pair fixed effects and year fixed effects. The interaction coefficients would trace how predicted trade evolves across more- versus less-exposed dyads over time.

The regression results, reported in Table 7, reveal a clear pattern of trade reallocation. Prior to 1990, the interaction coefficients are small and imprecisely estimated. However, beginning in the early 1990s, the coefficients turn positive and then rise steadily in magnitude across successive five-year windows, reaching their largest values by early 2010s. This monotonic strengthening is evident both when exposure is measured by the sea-to-air distance ratio (Columns (1)-(2)) and when it is proxied by the non-island dyad indicator (Columns (3)-(4)).[28] Such a pattern suggests that aviation development is associated with an increasingly pronounced reallocation of trade toward dyads with greater relative gains from air transport, consistent with the key premise underlying our identification strategy.

Noting the trade reallocation patterns documented in Table 7, we next examine whether the geographic exposure-driven variation in trade growth translates into heterogeneous effects of trade on interstate conflict within our IV framework. To do so, we split the sample into subsamples with different levels of exposure to aviation development and re-estimate our baseline 2SLS specification within each subsample.

Table 8 reports the results. The estimates reveal substantial heterogeneity across geographic groups. When dyads are split by the median sea-to-air distance ratio (Columns (1)-(2)), the trade coefficient is small and statistically insignificant for low-ratio dyads, but becomes larger in magnitude and statistically significant for high-ratio dyads. A similar pattern emerges when comparing island and non-island pairs (Columns (3)-(4)): the estimated effect of trade is weak and imprecise for dyads involving at least one island country, whereas it is stronger and statistically significant for non-island dyads. The time split also provides another clear contrast (Columns (5)-(6)): before 1980 the estimated trade effect is at best marginal, but after 1980 it becomes large and precisely estimated for both conflict probability and conflict intensity. These results indicate that the conflict-reducing impact of trade is concentrated in the

potentially larger - effective trade cost reductions for non-island dyads, where maritime routes are more likely to be relatively indirect compared with air routes.

[28] Dyads with different exposure to aviation development actually exhibit similar trade shares at the start of our sample. For instance, in 1962, non-island dyads account for about 56% of global trade, while dyads with above-median sea-to-air distance ratios account for about 53% of global trade.

subsamples where aviation development generates more salient variation in trade, consistent with the mechanism underlying our identification strategy.

Finally, to explicitly incorporate heterogeneous exposure to aviation development into our regression framework, we slightly modify Equation (1) by replacing the sea-distance term, $ln(sead_{ij})$, with the interaction between air distance, $ln(aird_{ij})$, and the sea-to-air distance ratio. We then use the predicted trade from this alternative specification as an instrument for actual bilateral trade. Column (7) of Table 8 shows that the IV estimate remains negative and statistically significant, reinforcing our interpretation that the trade-reducing effect on conflict is driven by the component of trade variation generated by aviation-driven changes in effective trade costs interacting with time-invariant geography.

In sum, investigations in this subsection provide supporting evidence on the mechanism behind our identification strategy. Predicted trade flows show that aviation development gradually reallocates trade toward dyads that benefit more from air transport, reshaping the effective geography of international trade. Consistently, the conflict regressions indicate that trade's pacifying effect is strongest precisely where aviation-driven trade shocks are expected to be most salient. These coherent results indicate that the variation we exploit is tied to an observable and economically meaningful trade reallocation process, which is plausibly induced by advances in air transport.

4.4. Confounding Factors to Identification

We now discuss potential confounding factors that could threaten our identification. Our empirical specification exploits variation in the reallocation of trade toward country pairs that are relatively better served by air than by maritime transport. We argue that this reallocation is primarily driven by advances in aviation technology, which have reshaped both the transport mode of traded goods and the organization of cross-border economic activity.

Although plausible, this story faces several alternative explanations and some of them may threaten our identification. First, aviation development was not the only major global change during this period that could have contributed to trade reallocation across country pairs. Second, even if aviation development did drive trade reallocation, it may have affected interstate conflict through channels other than merchandise trade.

Third, even if its effects operate mainly through trade, the induced reallocation could still be correlated with other geography-related developments that influence conflict. We shall discuss these concerns in turn and present evidence examining their relevance.

For the first concern, note it does not by itself invalidate our approach. Our instrument is constructed from predicted trade flows generated by a gravity specification in which sea and air distance enter symmetrically with time-varying coefficients. As a result, any global transport innovation, whether in aviation or maritime transport, that generates differential dyad-level changes in trade costs can contribute to the predicted trade reallocation we exploit. Our identifying variation therefore rests on geography-driven reallocations in trade, rather than requiring aviation to be the sole force behind them.[29]

For the second concern, improvements in air transport may indeed influence interstate conflict through channels other than goods trade. Beyond lowering the cost of shipping goods, aviation development also reduces the cost of passenger travel and cross-border communication. Our gravity estimates for bulk commodities provide suggestive evidence of these broader effects: although such commodities are rarely shipped by air, their trade nevertheless becomes increasingly sensitive to air distance from the mid-1980s onward. This pattern is consistent with air distance proxying for broader improvements in global connectivity and the organization of trade relationships. If the aviation-driven connectivity gains directly reduce conflict, for example, by facilitating diplomatic contact or information exchange, then the exclusion restriction would be threatened and the IV estimates would be biased.[30]

To address this concern, we implement two complementary tests. First, we augment the baseline model by including interactions between a dyad's air distance and five-year period dummies. This flexible control absorbs any time-varying "direct aviation" effects that scale with air distance, so that the remaining variation comes mainly from the *relative* advantage of air versus sea geography that drives trade reallocation. Second, we control directly for bilateral migration flows, which serve as a proxy for cross-border mobility and people-to-people connections. Columns (1) and (2)

[29] That said, the timing of the distance elasticities, the strong cross-industry patterns, and the sharper reallocation among dyads with higher aviation exposure all point to aviation development as the leading driver of this reallocation process.

[30] In contrast, if aviation developments affect interstate conflict solely through the reallocation of international trade, our estimates remain valid even when such reallocation is driven by broader improvements in global connectivity - such as passenger travel - rather than by reductions in goods-shipping costs.

of Table 9 report the results of these two exercises respectively. Reassuringly, the estimated effect of trade remains negative and statistically significant and is close in magnitude to our baseline estimates, indicating that our results are not solely driven by direct connectivity channels unrelated to merchandise trade.[31]

We now turn to the third concern: the existence of other global developments that generate dyad-specific reallocations correlated with conflict through non-trade mechanisms, *and* whose evolution aligns with the same geography-based exposure measures that underpin our instrument. Columns (3)-(7) of Table 9 present a comprehensive set of robustness exercises designed to probe this type of confounding factors.

In Columns (3) to (5), we address the concern that our instrument may be picking up other geography-related changes - such as improvements in land connectivity or regional integration, that could affect conflict through channels other than trade. Column (3) augments the baseline model by interacting a contiguity indicator with five-year period dummies, allowing neighboring countries to follow their own time path in conflict propensity and absorbing any evolving border-specific dynamics (e.g., territorial frictions, road and rail infrastructure, or border management). In addition to controlling for neighbor-specific time trends, we also estimate our baseline specification after excluding contiguous dyads in Column (4). The results remain essentially unchanged.[32] Column (5) implements a broader version of this test by interacting a same-continent indicator with five-year dummies, which flexibly nets out continent-wide trends in integration or infrastructure. In both cases, the estimated effect of trade remains negative and statistically significant.

Column (6) considers the potential confounding role of historical political ties. While time-invariant colonial links are absorbed by country-pair fixed effects, the

[31] The results in Column (1) also help rule out the possibility that our estimates are driven by a direct effect of aviation development on conflict - independent of trade - such as enhanced military reach or faster troop deployment. Since these direct military effects should depend primarily on absolute air accessibility (i.e., air distance), the inclusion of air-distance*period-dummy interactions flexibly absorb this channel.

[32] Neighboring countries warrant special attention here for two reasons. First, they are disproportionately important for both trade and conflict. Hummels (2007) documents that about 23% of global trade by value occurs between countries that share a land border, and our Table 2 shows that conflicts are heavily concentrated among geographically proximate dyads. Second, trade between neighbors may operate through different transport channels than trade between nonadjacent partners. For example, evidence from U.S.-Latin America shipments suggests that trade with land neighbors is dominated by surface modes such as trucks, rail, and pipelines, with only around 10% transported by air or ocean. By contrast, trade with non-neighboring partners relies overwhelmingly on maritime and air shipping, making the aviation-based mechanism more relevant for those dyads (Hummels, 2007). Importantly, even after excluding contiguous dyads, the remaining sample retains substantial variation in conflict outcomes (854 out of 1,556 MIDs), ensuring that our estimates are not driven solely by border-specific dynamics.

nature of post-colonial relationships, spanning security guarantees, aid flows, and diplomatic alignment, can evolve over time. To account for this, we include interactions between a colonial-tie indicator and five-year time dummies, allowing for flexible, time-varying conflict trends specific to post-colonial dyads. The results are unaffected, indicating that the estimated effect is not driven by the specific trajectory of post-colonial relations.

Columns (7) and (8) further investigate whether institutionalized economic convergence could account for our results. Column (7) controls for the presence of Regional Trade Agreements (RTAs). Since RTAs may bundle trade liberalization with political coordination, failing to control for them could bias the estimates. Column (8) adds a dyad-year indicator for joint WTO membership, addressing the possibility that multilateral rules, rather than bilateral trade per se, are responsible for the reduction in conflict. Across these specifications, the trade coefficients remain stable, indicating that the estimated pacifying effect is not explained by these alternative institution channels.[33]

Overall, the robustness checks in Table 9 address the potential threats to our identification strategy. Accounting for a wide range of alternative time-varying dyad characteristics, ranging from direct aviation-related connectivity and migration, to evolving land-based proximity, historical ties, and institutional convergence through RTAs and WTO membership, the IV estimates remain robust. This consistency supports the interpretation that our identification is driven by trade variation induced by geography-based reallocations, rather than by confounding non-trade channels that happen to co-move with the same exposure measures.

4.5. Alternative Identification Setting: Soviet Airspace Liberalization

To cross-check the reliability of our results, we employ an alternative identification strategy that exploits a distinct source of variation from our baseline approach. While our primary specification relies on the gradual interaction between static geography and long-run technological trends in aviation, this alternative strategy leverages a discrete and geopolitical shock: the sudden liberalization of Soviet airspace in 1985.

[33] Appendix B provides additional robustness checks. For example, we examine whether our identifying variation is driven by major geopolitical events such as European integration or the dissolution of the Soviet Union, whether the estimated pacifying effect reflects strategic behavior by major powers such as the United States and China, etc.

During most time of the Cold War, the Soviet Union restricted overflight rights for non-Soviet airlines. Consequently, many routes connecting Western Europe and East Asia were forced into large detours and frequently required refueling stopovers, increasing total travel time. In 1985, the Soviet Union began granting broader overflight rights, which enabled airlines to operate much shorter routings and, for some key corridors, non-stop long-haul services.

This policy change caused differential impacts on dyads, depending on whether their great-circle flight paths happen to intersect Soviet airspace. Two dyads could be equidistant, yet one might be unaffected (if its optimal path naturally avoids the Soviet Union), while the other experiences a massive reduction in travel time (if its optimal path crosses Siberia, for example). These differential impacts therefore generate plausibly exogenous variation in bilateral trade, as they arise from the relaxation of a purely geographic constraint.

We capture this source of variation following Söderlund (2023) by estimating the following equation:

$$trade_{ij}^{t} = \sum_{t=1976, t\neq 1985}^{1995} \gamma^{t} \Delta Time_{ij} + \vartheta_{ij} + \vartheta_{i}^{t} + \vartheta_{j}^{t} + \varepsilon_{ij}^{t} \qquad (3)$$

where $\Delta Time_{ij}$ denotes the reduction in log travel time implied by the policy change between country i and j.[34] We normalize 1985 as the reference year. The coefficients, γ^{t}, trace out the trade response to the travel-time shock.

The estimates of γ^{t}, plotted in Figure 7, deliver two key results. Prior to 1985, the coefficients are small and statistically indistinguishable from zero, consistent with parallel trends between dyads more and less exposed to the shock. Beginning in 1986, trade rises sharply for more-exposed dyads, and the effect persists, consistent with a sustained reduction in the trade costs specifically for these country pairs. This pattern provides transparent evidence of instrument relevance and supports the identifying assumption that treated dyads were not already on a different trade trajectory prior to the shock.

Using the fitted values from Equation (3), which capture the component of bilateral trade predicted by the Soviet airspace shock, as an alternative instrument for

[34] Data for the reduction in travel time, $\Delta Time_{ij}$, come from Söderlund (2023). In this exercise, we restrict attention to a shorter window of 1976-1995, because the policy change was a one-time, abrupt event.

actual trade, we re-estimate Equation (2). Unlike our baseline instrument, which exploits how the relative importance of air versus maritime transport costs evolves over time to generate dyad-specific variation in trade, this alternative instrument directly isolates a discrete reduction in trade frictions for a treated sub-sample, driven purely by a change in geopolitical constraints on travel. Even though the two instruments draw on different sources of variation, because both of them are plausibly exogenous, we expect them to yield similar estimates of the causal impact of trade on conflict.

The estimation results using the Soviet-airspace instrument are reported in Table 10. Columns (1) and (5) present the baseline 2SLS estimates for conflict probability and conflict intensity, respectively. The remaining columns incorporate robustness checks tailored to this airspace liberalization episode. First, the estimates in Columns (2) and (6) control for interactions between log air distance and year dummies, addressing the concern that the instrument might proxy for broader improvements in global air connectivity rather than the specific "Soviet shortcut." Second, Columns (3) and (7) add bilateral migrant flows to account for the possibility that shorter travel times reduce conflict through migration-related channels rather than commercial trade. Third, Columns (4) and (8) control for RTA and joint WTO membership, absorbing institutionalized economic changes that may coincide with the shock. Across all specifications, the estimated coefficient on trade remains negative and statistically significant, with magnitudes that are stable relative to the baseline, supporting the interpretation that the Soviet airspace shock generates plausibly exogenous trade variation that translates into lower conflicts.

To sum up, exploiting an alternative identification setting, we still find strong pacifying effects of trade. This alternative identification approach does more than replicate our baseline findings. It provides a coherent mechanism check under an identification strategy that differs sharply from our main approach: it exploits a discrete geopolitical discontinuity in air travel frictions rather than gradual technological change. The fact that we obtain similar estimates under this distinct source of trade variation strengthens the case that our results reflect a causal trade-peace relationship, rather than being driven by features specific to our baseline design.

4.6. Trade and Enmity

Our analysis thus far has focused on realized militarized disputes, the cases in which tensions escalate into threats or uses of force. A natural complementary question is whether economic integration also shapes the deeper, latent structure of interstate antagonism, potentially preventing tensions from arising in the first place. In this subsection, we examine whether similar pacifying effects extend to perceptions of strategic rivalry between trading partners, which might lower expectations of hostility and, ultimately, the likelihood of militarized conflict.

To this end, we use the strategic rivalry dataset from Thompson et al. (2022). As Garfinkel et al. (2026) note, the dataset identifies country pairs whose leaders mutually perceive one another as "competitive, threatening enemies." Because strategic rivalry is defined by policymakers' expectations of potential militarized conflict, rather than actual fighting, it captures a precarious interstate relationship in which governments view the threat of war as credible enough to shape strategic and economic behavior.

Using rivalry status as the dependent variable, we re-estimate our baseline 2SLS specification, with results reported in Table 11.[35] Column (1) shows that higher bilateral trade significantly reduces the probability that countries in a dyad view each other as strategic rivals. Distinguishing rivalries by type (positional, spatial, and ideological), the estimates in Columns (2)-(4) indicate that the negative effect of trade is driven primarily by positional rivalries, while the coefficients for spatial and ideological rivalries are small and statistically insignificant. This pattern is consistent with the fact that spatial and ideological rivalries are largely localized among neighboring states. As contiguous pairs are excluded to ensure clean identification, our estimates mainly capture the pacifying effect of trade on rivalry rooted in power projection rather than localized territorial or ideological frictions.

Columns (5)-(9) of Table 11 examine the confounding factors considered earlier and confirm the robustness of the results. The negative trade coefficient remains stable and significant when we introduce flexible controls for time-varying distance effects, bilateral migration, and continent- or colony-specific time trends. The results also survive the inclusion of controls for institutional convergence, such as joint WTO membership and regional trade agreements, indicating that the effect is driven by commercial integration rather than by the political architecture that often accompanies it.

[35] Because rivalries between neighboring states are frequently driven by deep-seated territorial frictions that are difficult to disentangle from border-specific trade patterns, here we restrict the sample to non-contiguous dyads.

Taken together, these findings extend the scope of our results beyond the battlefield. The same aviation-induced trade variation that lowers the incidence and intensity of militarized disputes actually seems to reduce the likelihood of strategic rivalry. Trade appears to not only constrain realized violence but also soften the competitive posture of states in the international arena.

5. Conclusion

In this paper, we empirically examine the impact of bilateral trade on the likelihood and intensity of militarized interstate conflict from 1962 to 2014. To address the inherent endogeneity problem between trade and conflict, we construct an instrumental variable that exploits global improvements in aviation technology relative to sea transport, interacted with fixed geographic asymmetries across country pairs. This strategy allows us to isolate plausibly exogenous variation in bilateral trade and to credibly estimate its causal effect on interstate conflict.

Our results indicate that higher bilateral trade causally reduces both the likelihood and intensity of militarized disputes. This finding is robust across specifications, withstands a wide range of potential confounders, and is confirmed with an alternative identification strategy. We also show that trade lowers the probability that countries perceive one another as strategic rivals, suggesting that economic integration may dampen antagonism before it escalates into open confrontation.

Taken together, these findings highlight the enduring peace-promoting role of trade and carry important policy implications at a time of rising geopolitical tensions and renewed protectionism. By deepening structural interdependence, trade expands mutual gains and reduces incentives for militarized conflict. Thus, understanding trade as both an economic and a peace-preserving mechanism offers a critical pathway toward building a more stable and cooperative world order.

References

Abel, G., & Cohen, J. (2019). Bilateral international migration flow estimates for 200 countries. *Sci Data* 6, 82.

Angell, N. (1911). *The Great Illusion: A Study of the Relation of Military Power in Nations to their Economic and Social Advantage*, London: G. P. Putnam's Sons.

Barbieri, K. (1996), Economic interdependence: a path to peace or a source of interstate conflict, *Journal of Peace Research*, 33(1), 29-49.

Barbieri, K. (2009). *The Liberal Illusion: Does Trade Promote Peace?* Ann Arbor: University of Michigan Press.

Benson, B. (2011). Unpacking alliances: deterrent and compellent alliances and their relationship with conflict, 1816-2000. *Journal of Politics* 73(4), 1111-1127.

Bertoli, S., Goujon, M., & Santoni, O. (2016) The CERDI-seadistance database, Études et Documents, n° 7, CERDI.

Bremer, S. A. (1992). Dangerous dyads: conditions affecting the likelihood of interstate war, 1816-1965. *Journal of Conflict Resolution*, *36*(2), 309-341.

Clayton, C., Coppola, A., Maggiori, M. & Schreger, J. (2025a). Geoeconomic pressure, *working paper*.

Clayton, C., Maggiori, M., & Schreger, J. (2025b). *Putting economics back into geoeconomics* (No. w33681). National Bureau of Economic Research.

Clayton, C., Maggiori, M., & Schreger, J. (2026). *A framework for geoeconomics*. Econometrica, 94(1), 105-136.

Deutsch, K. W. (1957). *Political Community and the North Atlantic Area*. Princeton: Princeton University Press.

Egger, Peter H. and Mario Larch (2008), Interdependent Preferential Trade Agreement Memberships: An Empirical Analysis, *Journal of International Economics*, 76(2), pp. 384-399.

Fearon, J. (2018). Cooperation, conflict, and the costs of anarchy. *International Organization*, 72(3), 524-560.

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

Frankel, J. A., & Romer, D. (1999). Does trade cause growth? *American Economic Review*, *89*(3), 379-399.

Garfinkel, M., Linask, M., & Zylkin, T. (2026). Rivalries, war, and trade. *SSRN working paper*, 5387441.

Glick, R., & Taylor, A. (2010). Collateral damage: trade disruption and the economic impact of war. *Review of Economics and Statistics*, 92(1), 102-127.

Gilpin, R. (1981). *War and Change in World Politics*. New York: Cambridge University Press.

Hadjiyiannis, C., Heracleous, S., & Tabakis, C. (2016). Regionalism and conflict: peace creation and peace diversion. *Journal of International Economics*, 102, 141-159.

Hegre, H., Oneal, R., & Russett, B. (2010). Trade does promote peace: new simultaneous estimates of the reciprocal effects of trade and conflict. *Journal of Peace Research*, 47(6), 763-774.

Hirschman, A. (1945). *National Power and the Structure of Foreign Trade*. University of California Press.

Hummels, D. (2007). Transportation costs and international trade in the second era of globalization. *Journal of Economic Perspectives*, 21(3), 131-154.

Huntington, Samuel P. (1996). The Clash of Civilizations and the Remaking of World Order. New York: Simon and Schuster.

Jacks, D. Meissner, C.M. & Wolf, N. (2024). Suez. NBER Working paper 33250.

Kant, I. (1983). *Perpetual Peace and Other Essays*, (T. Humphrey, Trans.). Indianapolils: Hackett Publishing Company. (Original work published 1795).

Kapstein, E., & Sayad, M. (2026). Military allies and international trade: lessons for geoeconomics, *ESOC Working Paper,* No. 41.

Kenwick, M. R., Lane, M., Ostick, B., & Palmer, G. (2013). Codebook for the militarized interstate dispute data, Version 4.0. *Correlates of War Project*.

Keshk, M., Pollins, M., & Reuveny, R. (2004). Trade still follows the flag: the primacy of politics in a simultaneous model of interdependence and armed conflict. *The Journal of Politics*, 66(4), 1155-1179.

Kim, M., & Rousseau, L. (2005). The classical liberals were half right (or half wrong): new tests of the 'liberal peace', 1960-88. *Journal of Peace Research*, 42(5), 523-543.

Kleinberg, B., Robinson, G., & French, L. (2012). Trade concentration and interstate conflict. *The Journal of Politics*, 74(2), 529-540.

Kleinman, B., Liu, E., & Redding, S. (2024). International friends and enemies. *American Economic Journal: Macroeconomics*, 16(4), 350-385.

Lee, W., & Pyun, H. (2016). Does trade integration contribute to peace? *Review of Development Economics*, 20(1), 327-344.

Mansfield, D., Pevehouse, C., & Bearce, H. (2014). Preferential trading arrangements and military disputes. In *Power and the Purse* (pp. 92-118). Routledge.

Maoz, Z., Johnson, P. L., Kaplan, J., Ogunkoya, F., & Shreve, A. P. (2019). The dyadic militarized interstate disputes (MIDs) dataset version 3.0: Logic, characteristics, and comparisons to alternative datasets. *Journal of Conflict Resolution*, 63(3), 811-835.

Martin, P., Mayer, T., & Thoenig, M. (2008). Make trade not war? *Review of Economic Studies*, 75(3), 865-900.

Mayer T, Méjean I. & Thoenig M., (2025). "The Fragmentation Paradox: De-risking Trade and Global Safety", CEPR Working Paper 20564.

Mohr, C., & Trebesch, C. (2025). Geoeconomics. *Annual Review of Economics*, 17.

Montesquieu, C. (1989). *Montesquieu: The Spirit of the Laws*. trans. Cohler, M., Miller, B., and Stone, H. New York: Cambridge University Press. (Original work published 1748)

Morrow, D. (1999). How could trade affect conflict? *Journal of Peace Research*, 36(4), 481-489.

Oneal, J. R., & Russett, B. (1999). Assessing the liberal peace with alternative specifications: trade still reduces conflict. *Journal of Peace Research*, 36(4), 423-442.

Palmer, G. D'Orazio, V. Kenwick, M and Lane, M. (2015). The MID4 Data Set, 2002-2010: Procedures, coding rules and description. *Conflict Management and Peace Science*, 32(2), pp. 222-242.

Pascali, L. (2017). The wind of change: maritime technology, trade, and economic development. *American Economic Review*, 107(9), 2821-2854.

Polachek, W. (1980). Conflict and trade. *Journal of conflict resolution*, 24(1), 55-78.

Qureshi, M. S. (2013). Trade and thy neighbor's war. *Journal of Development Economics*, 105, 178-195.

Robst, J., Polachek, S., & Chang, Y. C. (2007). Geographic proximity, trade, and international conflict/cooperation. *Conflict Management and Peace Science*, 24(1), 1-24.

Santos Silva, J. M. C., & Tenreyro, S. (2006). The log of gravity. *Review of Economics and Statistics*, 641-658.

Singer, J. D., Bremer, S. A., & Stuckey, J. (2012). Capability distribution, uncertainty, and major power war, 1820–1965 1. In *Advancing Peace Research* (pp. 161-174). Routledge.

Söderlund, B. (2023). The importance of business travel for trade: evidence from the liberalization of the Soviet airspace. *Journal of International Economics*, *145*, 103812.

Tabellini, M., & Magistretti, G. (2025). Economic integration and the transmission of democracy. *Review of Economic Studies*, 92(4), 2765-2792.

Thompson, W., Sakuwa, K., & Suhas, P. (2022). *Analyzing Strategic Rivalries in World Politics: Types of Rivalry, Regional Variation, and Escalation/De-escalation*, Singapore: Springer.

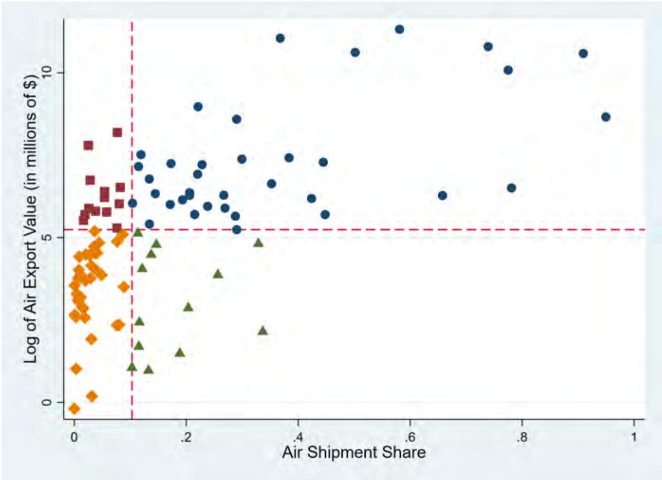
Vicard, V. (2012). Trade, conflict, and political integration: explaining the heterogeneity of regional trade agreements. *European Economic Review*, 56(1), 54-71.

Waltz, K. (1979). *Theory of International Politics*. Addison-Wesley Publishing Company.

Figure 1: Air Transported Trade in the U.S. (outside North America)

Note: Figure reports the share of U.S. trade value carried by air from 1965 to 2004. Data are from Hummels (2007), based on sources from the U.S. Census Bureau, including Statistical Abstract of the United States, U.S. Imports of Merchandise, and U.S. Exports of Merchandise.

Figure 2: Air Transport Dependence across Product Categories (US Export, 2002–2014)

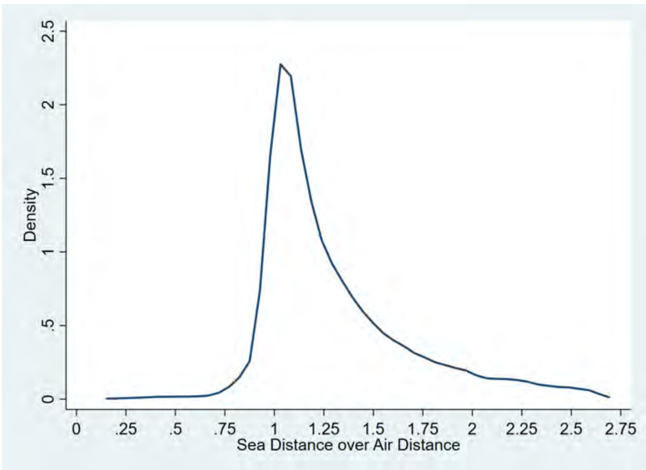


Note: Figure plots, for each HS 2-digit product category of U.S. exports, the average air-shipping share (horizontal axis) against the logarithm of the annual export value transported by air (in millions of U.S. dollars; vertical axis) over the period 2002-2014. Each point represents an individual HS 2-digit product category. The dashed lines indicate the sample medians along each dimension. Data from US Census Bureau.

Figure 3: Examples of Sea and Air Transport Routes

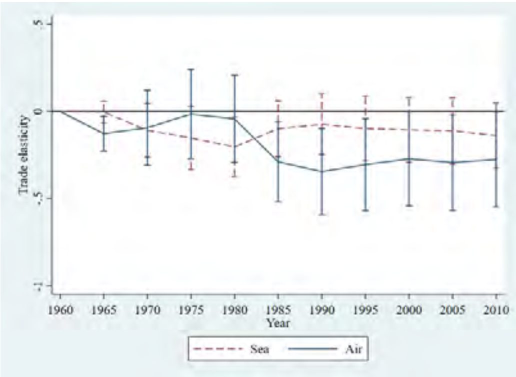
Note: Figure shows the air and sea routes for two example country pairs: Lithuania-Iraq and Germany-Norway.

Figure 4: Distribution of Sea-to-Air Distance Ratios

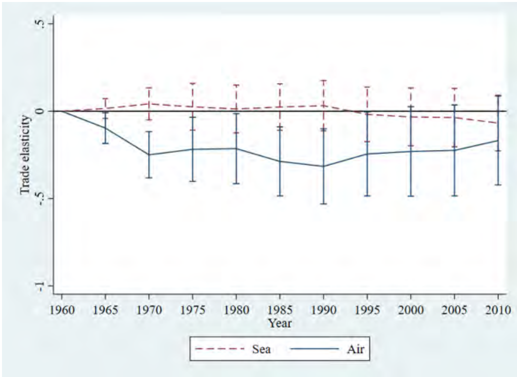


Note: Figure plots the kernel density of the sea-to-air distance ratio, defined as bilateral sea distance divided by air distance, across all country pairs. Country pairs with extremely large sea-to-air distance ratios (those above the 95th percentile, i.e., ratios greater than 2.65) are excluded from the figure. Sea distance is computed as the number of days required to complete the voyage multiplied by a constant sailing speed of 20 knots. Sea and air distance data from Feyrer (2019).

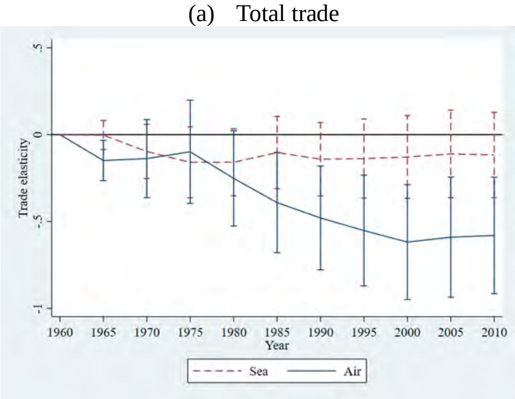
Figure 5: The Change in Elasticity of Trade with Respect to Sea and Air Distance over Time



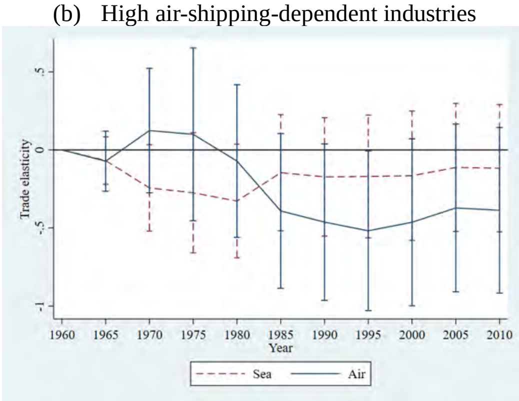
(a) Total trade



(b) High air-shipping-dependent industries



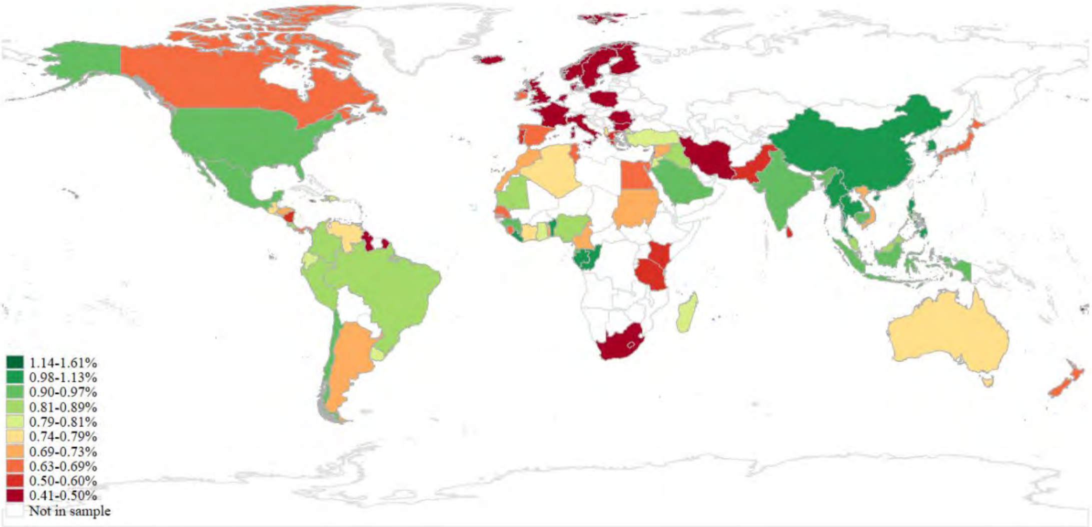
(c) Low air-shipping-dependent industries



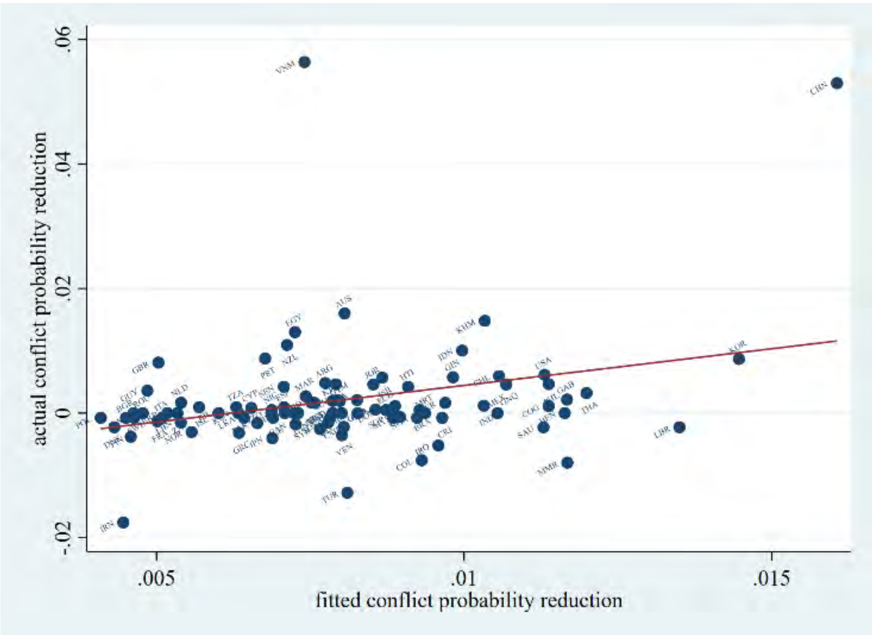
(d) Bulk commodities

Note: Figure reports PPML estimates of the time-varying sea- and air-distance coefficients in Equation (1), along with 95% confidence intervals, separately for total trade, high and low air-shipping-dependent industries, and bulk commodities (grains, metal ore, coal, and petroleum products). Coefficients are estimated in five-year intervals from 1960 to 2010, normalized to year 1960 (the omitted base period). Standard errors are clustered at the country-pair level.

Figure 6: Visualization of Trade's Pacifying Effects



(a) Predicted reduction in conflict probability



(b) Model-predicted vs. observed reduction in conflicts

Note: Figure plots the spatial distribution of the estimated trade-induced reduction in conflict risk. Panel (a) maps the country-level "peace dividend", defined as the model-predicted reduction in conflict probability due to trade integration. Panel (b) validates these estimates by plotting the calculated peace dividend (x-axis) against the actual observed decline in conflict risk (y-axis). The solid line represents the linear fit.

Figure 7: Soviet Airspace Liberalization's Impacts on Trade

Note: Figure plots year-by-year estimates of how flight-time reductions from the Soviet airspace liberalization affected bilateral trade, with 95% confidence intervals, based on Equation (3). The omitted benchmark year is 1985. Standard errors are clustered at the country pair level.

Table 1: Militarized Interstate Conflicts

Hostility level of militarized interstate conflicts	Frequency (1)	Percentage (2)
1 (No militarized action)	336,101	99.54
2 (Threat to use force)	77	0.023
3 (Display of force)	455	0.134
4 (Use of force)	947	0.280
5 (War)	77	0.023
Total	337,657	100

Note: Table reports the distribution of conflicts across hostility levels, with observations defined at the country-pair ("dyad")*year level, for the period of 1962-2014. Column 1 lists the number of dyad-year observations corresponding to each hostility level, while Column 2 presents their share relative to the full sample. Data from Dyadic Militarized Interstate Dispute dataset (v4.02).

Table 2: Distribution of Conflicts across Direct Air Distance

Air distance (km) (1)	Country pair number (2)	Conflicts number (3)	Average sea distance (km) (4)	Average sea/air ratio (5)	Std. dev. sea/air ratio (6)
0-1000	237	489	1254	1.91	2.22
1000-2000	513	367	2824	1.87	1.44
2000-3000	537	168	4324	1.73	.90
3000-5000	1129	165	6784	1.69	.68
5000-7000	1244	82	8698	1.46	.46
7000-9000	1314	72	10563	1.32	.42
9000-11000	1087	102	12071	1.21	.27
11000-13000	751	78	14545	1.21	.20
13000-15000	568	29	16940	1.22	.16
15000+	627	4	19055	1.14	.10
Total	8007	1556			

Note: Table reports the distribution of conflicts by the direct air distance for the period 1962-2014. For country pairs falling within each air-distance range listed in Column (1), Column (2) reports the number of dyads, Column (3) the number of conflicts occurring within these dyads, Column (4) the average sea-transport distance, Column (5) the average sea-to-air distance ratio, and Column (6) reports the standard deviation of this ratio.

Table 3: Conflicts before and after Aviation Development (circa 1980)

	1962-1980	1980-2014	Diff (2) - (1)	DID	1990-2014	Diff (5) - (1)	DID
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel (a): Probability of conflicts							
0-1000 km, sea/air ratio							
<Median	-0.0030	0.0028	0.0058		0.0037	0.0066	
>Median	0.0021	-0.0024	-0.0045	-0.0103	-0.0032	-0.0053	-0.0119
1000-2000km, sea/air ratio							
<Median	-0.0035	-0.0018	0.0016		-0.0007	0.0028	
>Median	0.0028	0.0017	-0.0011	-0.0027	0.0007	-0.0021	-0.0049
2000-5000km, sea/air ratio							
<Median	0.0005	0.0010	0.0005		0.0012	0.0007	
>Median	-0.0004	-0.0010	-0.0006	-0.0011	-0.0013	-0.0009	-0.0016
Panel (b): Conflict intensity							
0-1000km, sea/air ratio							
<Median	-0.0110	0.0031	0.0141		0.0047	0.0157	
>Median	0.0077	-0.0027	-0.0104	-0.0245	-0.0041	-0.0118	-0.0275
1000-2000km, sea/air ratio							
<Median	-0.0101	-0.0054	0.0047		-0.0021	0.0080	
>Median	0.0083	0.0051	-0.0032	-0.0079	0.0020	-0.0063	-0.0142
2000-5000km, sea/air ratio							
<Median	0.0008	0.0027	0.0019		0.0030	0.0022	
>Median	-0.0007	-0.0027	-0.0020	-0.0039	-0.0030	-0.0023	-0.0045

Notes: Table reports the average probability (Panel a) and intensity (Panel b) of interstate conflict for country pairs grouped by different ranges of direct air distance, before and after major developments in air transport technology in the 1980s. Within each group, dyads are divided according to whether their sea-to-air distance ratio is below or above the group median. The numbers reported in Columns (1), (2), and (5) are mean residuals within each period, where residuals are obtained from regressions of the conflict dummy (Panel a) or conflict intensity (Panel b) on country*year fixed effects. Column (3) reports the difference between post-1980 and pre-1980 values, while Column (6) reports the difference between post-1990 and pre-1980 values. Columns (4) and (7) present the difference-in-differences between the above-median and below-median groups based on the estimates in Columns (3) and (6), respectively.

Table 4: Impact of Bilateral Trade on Conflict: Baseline

Dep var:	Conflict probability				Conflict intensity			
2nd stage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln (trade)	-0.0007***	-0.0014**	-0.0017**	-0.0017**	-0.0017***	-0.0041**	-0.0048**	-0.0051**
	(0.0002)	(0.0006)	(0.0007)	(0.0008)	(0.0006)	(0.0018)	(0.0021)	(0.0022)
Diff in GDPPC			0.0057*	0.0061*			0.0154*	0.0161*
			(0.0033)	(0.0035)			(0.0090)	(0.0097)
Sum of GDPPC			0.0004	0.0004			0.0013	0.0012
			(0.0003)	(0.0003)			(0.0009)	(0.0009)
Diff of power			0.251	0.209			1.043	1.160
			(0.294)	(0.306)			(0.930)	(1.115)
Alliance				-0.0039				-0.0123
				(0.0044)				(0.0124)
Sum of mil exp				-0.0007				-0.0018
				(0.0010)				(0.0031)
Diff in mil exp				-0.0002				-0.0014
				(0.0004)				(0.0011)
1st stage	Dep var: Ln (trade)							
Ln (trade predict)		1.259***	1.286***	1.282***		1.259***	1.286***	1.282***
		(0.0241)	(0.0264)	(0.0267)		(0.0241)	(0.0264)	(0.0267)
Ctry pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry i*Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry j*Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimation	OLS	IV	IV	IV	OLS	IV	IV	IV
N	337657	337657	293575	278349	337657	337657	293575	278349
KP		2738.0	2371.1	2311.2		2738.0	2371.1	2311.2

Note: Table reports baseline estimates of the impact of bilateral trade on Militarized Interstate Conflict. Columns (1)-(4) use a conflict indicator as the dependent variable, while Columns (5)-(8) use conflict intensity as the dependent variable. Columns (1) and (5) present OLS estimates, and Columns (2) and (6) report instrumental-variable estimates. Columns (3) and (7) extend the IV specification by including bilateral economic controls, while Columns (4) and (8) further incorporate bilateral political controls. For brevity, estimated coefficients on the control variables in the first stage are omitted. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the country-pair level are reported in parentheses.

Table 5: Impact of Bilateral Trade on Conflict: Intensity

Dep var:	Conflict probability				Conflict intensity
2nd stage	(1)	(2)	(3)	(4)	(5)
	MID≥ 2	MID≥ 3	MID≥ 4	MID=5	
Ln (trade)	-0.00173**	-0.00169**	-0.00134**	-0.00036**	-0.317**
	(0.00079)	(0.00077)	(0.00064)	(0.00017)	(0.136)
Marginal effect on conditional probability		-0.0141	-0.0505	-0.0716*	
		(0.0247)	(0.0657)	(0.0392)	
1st stage	Dep var: Ln (trade)				
Ln (trade predict)	1.282***	1.282***	1.282***	1.282***	36.63***
	(0.0267)	(0.0267)	(0.0267)	(0.0267)	(7.7085)
Pr (MID≥i)	0.00390	0.00369	0.00258	0.00018	
Pr (MID≥i | MID≥2)	1	0.9475	0.6611	0.0470	
Controls	Yes	Yes	Yes	Yes	Yes
Ctry pair FE	Yes	Yes	Yes	Yes	Yes
Ctry i*Year	Yes	Yes	Yes	Yes	Yes
Ctry j*Year	Yes	Yes	Yes	Yes	Yes
Estimation	IV	IV	IV	IV	IV
N	278349	278349	278349	278349	82
KP	2311.2	2311.2	2311.2	2311.2	22.58

Note: Table examines whether trade affects the severity margin conditional on conflict onset. Columns (1)-(4) report IV estimates of the effect of trade on the probability of reaching different MID hostility thresholds. Conditional and unconditional probabilities are calculated based on the regression sample. The approach to calculate the marginal effect on conditional probability is specified in the main text. Estimates are obtained by bootstrap. Column (5) estimates the baseline specification on a subsample with conflicts. All regressions include the full set of controls and fixed effects. For brevity, estimated coefficients on the control variables in the first stage are omitted. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the country-pair level are reported in parentheses.

Table 6: Impact of Bilateral Trade on Conflict: Air Shipping Dependence

Dep var:	Conflict probability						Conflict intensity					
2nd stage	(1)	(2)		(3)	(4)	(5)	(6)	(7)		(8)	(9)	(10)
Ln (trade)	-0.0024**						-0.0067**					
	(0.0001)						(0.0029)					
Ln (HAD trade)		-0.004***		-0.0035***				-0.0102***		-0.0096***		
		(0.0013)		(0.001)				(0.00381)		(0.0029)		
Ln (LAD trade)		0.0007			-0.0019*			0.0009			-0.0056*	
		(0.0015)			(0.0011)			(0.0044)			(0.0033)	
Comm trade						-0.0012*						-0.0033*
						(0.0007)						(0.002)
1st Stage	Ln (trade)	HAD trade	LAD trade	HAD trade	LAD trade	Comm trade	Ln (trade)	HAD trade	LAD trade	HAD trade	LAD trade	Comm trade
Ln (trade predict)	1.022***						1.022***					
	(0.0294)						(0.0294)					
HAD trade pred		1.244***	0.388***	1.333***				1.244***	0.388***	1.333***		
		(0.0278)	(0.0307)	(0.0255)				(0.0278)	(0.0307)	(0.0255)		
LAD trade pred		0.194***	0.939***		1.083***			0.194***	0.939***		1.083***	
		(0.0221)	(0.0267)		(0.0252)			(0.0221)	(0.0267)		(0.0252)	
Comm trade pred						0.788***						0.788***
						(0.0161)						(0.0161)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry i*Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry j*Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimation	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV	IV
N	241934	241934	241934	243036	242432	226052	241934	241934	241934	243036	242432	226052
KP	1211.1	480.7	480.7	2730.4	1843.1	2403.0	1211.1	480.7	480.7	2730.4	1843.1	2403.0

Note: Table reports IV estimates using instruments constructed for trade in high and low air-shipping-dependent industries (HAD and LAD, respectively), and for commodity products. These instruments are constructed separately by estimating Equation (1) with corresponding industry group trade flows. Columns (1)-(5) use a binary conflict indicator as the dependent variable, while Columns (6)-(10) use conflict intensity. Columns (1) and (6) instrument total trade using the sum of the predicted trade flows for high- and low-air-dependent industries. Columns (2) and (7) instrument high- and low-air-dependent trade separately. Columns (3) and (8) include only trade of high air- shipping-dependent industries, Columns (4) and (9) include only that of low air-shipping-dependent industries, and Columns (5) and (10) focus on bulk commodities. All regressions include the full set of controls and fixed effects. For brevity, estimated coefficients on the control variables in the first stage results are omitted. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the country-pair level are reported in parentheses.

Table 7: Exposure to Aviation Development and Trade Reallocation

Exposure proxy: X=	Sea to air distance ratio		1(Non-island country pair)	
Dep var:	Pred-trade	Pred-trade share (%)	Pred trade	Pred-trade share (%)
	(1)	(2)	(3)	(4)
X*I(1965≤year<1970)	-0.0868	-0.103	-0.104	-0.114
	(0.106)	(0.101)	(0.105)	(0.0994)
X*I(1970≤year<1975)	-0.134	-0.188	-0.177	-0.216
	(0.208)	(0.199)	(0.202)	(0.193)
X*I(1975≤year<1980)	-0.0409	-0.0784	-0.100	-0.127
	(0.239)	(0.236)	(0.228)	(0.226)
X*I(1980≤year<1985)	0.0494	0.0187	-0.0337	-0.0544
	(0.244)	(0.239)	(0.233)	(0.228)
X*I(1985≤year<1990)	-0.0282	-0.0644	-0.110	-0.134
	(0.300)	(0.294)	(0.289)	(0.283)
X*I(1990≤year<1995)	0.613*	0.520*	0.507	0.437
	(0.331)	(0.313)	(0.315)	(0.297)
X*I(1995≤year<2000)	0.645*	0.548*	0.615*	0.542*
	(0.339)	(0.325)	(0.332)	(0.319)
X*I(2000≤year<2005)	0.734*	0.636	0.801*	0.726*
	(0.425)	(0.406)	(0.418)	(0.399)
X*I(2005≤year<2010)	0.791	0.694	0.975*	0.900*
	(0.509)	(0.490)	(0.499)	(0.476)
X*I(2010≤year<2015)	0.806	0.710	1.107*	1.035*
	(0.579)	(0.563)	(0.569)	(0.548)
Ctry pair FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	337657	337657	337657	337657

Note: Table reports evidence of trade reallocation across country pairs with differential exposure to aviation developments. Exposure is proxied either by the sea-to-air distance ratio (Columns (1)-(2)) or by an indicator for whether neither trading partner is an island country (Columns (3)-(4)). An island country is defined as a country whose entire homeland is located on islands. The reported coefficients come from regressions of either the predicted trade flows or their share in world trade on interactions between the exposure measure and period dummies, with period 1962-1964 serving as the baseline period. Standard errors, clustered at the country-pair level, are reported in parentheses. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 8: Impact of Bilateral Trade on Conflict: Heterogeneity in Exposure

2nd stage	Low sea/air	High sea/air	Island	Non-island	Pre-1980	Post-1980	Alt. Spec. of Equ. (1)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep var:	Conflict probability						
Ln (trade)	-0.0005	-0.0027**	-0.0006	-0.0018*	-0.0007	-0.0037***	-0.0017**
	(0.00098)	(0.00111)	(0.0011)	(0.00104)	(0.00143)	(0.00096)	(0.000785)
Dep var:	Conflict intensity						
Ln (trade)	-0.0014	-0.0077**	-0.0019	-0.0053*	-0.0051*	-0.0064**	-0.0050**
	(0.0029)	(0.0031)	(0.0033)	(0.003)	(0.003)	(0.0032)	(0.0023)
1st Stage	Dep var: Ln(trade)						
Ln (trade predict)	1.245***	1.317***	1.134***	1.356***	1.088***	1.262***	1.280***
	(0.0422)	(0.0380)	(0.0396)	(0.0380)	(0.0398)	(0.0336)	(0.0267)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry i*Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry j*Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimation	IV	IV	IV	IV	IV	IV	IV
N	139361	138442	106732	171564	74081	204251	278349
KP	894.2	1189.8	820.5	1275.8	745.6	1412.4	2302.7

Note: Table examines whether trade effects vary in different subsamples. Columns (1) and (2) use the median of the sea-to-air distance ratio to distinguish dyads. Columns (3) and (4) compare dyads that include at least one island country versus non-island dyads. Columns (5) and (6) split the sample by time, using 1980 as the cutoff to capture the acceleration of global air trade. Column (7) uses interaction of ln(*aird*) and sea-over-air distance ratio instead of ln(*sead*) in Equation (1) to predict trade. For brevity, estimated coefficients on the control variables in the first stage are omitted. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the country-pair level are reported in parentheses.

Table 9: Impact of Bilateral Trade on Conflict: Confounding Factors

	Distance	Migrants	Border	Non-contiguity	Continent	Colony	RTA	WTO
2nd stage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep var:	Conflict probability							
Ln (trade)	-0.0021***	-0.0017**	-0.0022***	-0.0014**	-0.0019**	-0.0018**	-0.0018**	-0.0017**
	(0.00074)	(0.00084)	(0.00074)	(0.00065)	(0.00077)	(0.00077)	(0.00077)	(0.00078)
Ln (migrants)		-0.00016						
		(0.00020)						
RTA							0.00179*	
							(0.00108)	
WTO								-0.00120
								(0.00145)
Dep var:	Conflict intensity							
Ln (trade)	-0.0056***	-0.0052**	-0.0058***	-0.0039**	-0.0055**	-0.0052**	-0.0053**	-0.0051**
	(0.00212)	(0.00241)	(0.00214)	(0.00185)	(0.00222)	(0.00223)	(0.00222)	(0.00224)
Ln (migrants)		-0.00064						
		(0.00054)						
RTA							0.00415	
							(0.00303)	
WTO								-0.00432
								(0.00400)
1st Stage	Dep var: Ln(trade)							
Ln (trade predict)	1.301***	1.290***	1.291***	1.296***	1.292***	1.285***	1.282***	1.281***
	(0.0272)	(0.0284)	(0.0265)	(0.0259)	(0.0269)	(0.0266)	(0.0267)	(0.0267)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry i*Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry j*Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimation	IV	IV	IV	IV	IV	IV	IV	IV
N	278349	263596	278349	273075	278349	278349	278349	278349
KP	2285.1	2060.4	2366.3	2509.9	2313.8	2322.9	2311.9	2309.2

Note: Table examines a set of alternative explanations and potential confounding factors for our identification strategy. Column (1) augments the baseline specification with interactions between log air distance and five-year period dummies; Column (2) controls for bilateral migrant flows. Column (3) includes interactions between five-year dummies and indicators for contiguity. Column (4) drops contiguous pairs. Column (5) includes interactions between five-year dummies and indicators for same-continent pairs. Column (6) accounts for time-varying post-colonial dynamics. Columns (7)-(8) control for RTA and joint WTO membership. For brevity, coefficients on the additional controls are not reported. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, and standard errors clustered at the country-pair level are reported in parentheses.

Table 10: Impact of Bilateral Trade on Conflict: Soviet Airspace Liberalization

Dep var:	Conflict probability				Conflict intensity			
2nd stage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln (trade)	-0.0080***	-0.0081***	-0.0082***	-0.0080***	-0.0233***	-0.0236***	-0.0240***	-0.0233***
	(0.0030)	(0.0030)	(0.0031)	(0.0030)	(0.0085)	(0.0086)	(0.0088)	(0.0085)
Ln (migrants)			0.00023				0.00058	
			(0.0003)				(0.00086)	
WTO				-0.00105				-0.00321
				(0.00279)				(0.00787)
RTA				0.00354				0.00891
				(0.00314)				(0.00866)
Distance*Year	No	Yes	No	No	No	Yes	No	No
1st stage	Dep var: Ln (trade)							
Ln (trade predict)	1.034***	1.033***	1.040***	1.035***	1.034***	1.033***	1.040***	1.035***
	(0.0444)	(0.0444)	(0.0454)	(0.0444)	(0.0444)	(0.0444)	(0.0454)	(0.0444)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry i*Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry j*Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimation	IV	IV	IV	IV	IV	IV	IV	IV
N	88059	88059	86131	88059	88059	88059	86131	88059
KP	543.6	541.0	525.0	543.9	543.6	541.0	525.0	543.9

Note: Table reports IV estimates using the Soviet airspace liberalization instrument. Columns (1)-(4) report results for conflict probability, and Columns (5)-(8) for conflict intensity. Columns (2) and (6) include air distance*year interactions; Columns (3) and (7) control for bilateral migrant flows; Columns (4) and (8) control for RTA and joint WTO membership. For brevity, estimated coefficients on the control variables are omitted. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the country-pair level are reported in parentheses

Table 11: Impact of Bilateral Trade on Enmity

Dep var:	Rivalry	Types of Rivalries			Rivalry				
		Position	Space	Ideology	Distance	Migrants	Continent	Colony	Institution
2nd stage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(trade)	-0.0017**	-0.0014**	-0.0004	-0.0004	-0.0010**	-0.0019***	-0.0017***	-0.0017**	-0.0017**
	(0.0007)	(0.0007)	(0.0003)	(0.0002)	(0.0005)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Ln(migrants)						-0.0002			
						(0.0001)			
RTA									-0.0018
									(0.0013)
WTO									0.0025*
									(0.0013)
1st Stage	Dep var: Ln(trade)								
Ln (trade predict)	1.296*** (0.0259)	1.296*** (0.0259)	1.296*** (0.0259)	1.296*** (0.0259)	1.306*** (0.0265)	1.306*** (0.0276)	1.304*** (0.0260)	1.298*** (0.0259)	1.295*** (0.0259)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry i* Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry j* Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimation	IV	IV	IV	IV	IV	IV	IV	IV	IV
N	273075	273075	273075	273075	273075	258442	273075	273075	273075
KP	2510.0	2510.0	2510.0	2510.0	2425.3	2239.1	2507.2	2519.0	2505.7

Note: Table examines effect of bilateral trade on the perceptions of strategic rivalry between trading partners. The dependent variable is an indicator for rivalry status, which equals one if the dyad is coded as having at least one of the three rivalry types (positional, spatial, ideological); Columns (2)-(4) use the type-specific rivalry indicators as the dependent variables. Columns (5)-(9) assess potential confounders. Contiguous dyads are excluded from the sample. For brevity, estimated coefficients on the control variables are omitted. Standard errors clustered by country pair are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Appendices

Appendix A: Sea and Air Distance Measures

The sea distance measure comes from Feyrer (2019). As introduced in Feyrer (2019), the globe is partitioned into 1° *1° grid cells, and land points are identified using gridded land-water data from the Center for Integrated Earth System Information. Each oceanic grid point is then connected to its neighboring points by edges weighted by travel time, calculated under the assumption of a vessel speed of 20 knots and adjusted for average ocean currents using data from the National Center for Atmospheric Research. Using this oceanic network, the shortest travel time between the main ports of each country pair is obtained.[41]

Besides this travel-time-converted measure, we also adopt an alternative measure of sea distance, the CERDI-sea distance data constructed by Bertoli, Goujon, & Santoni (2016), for robustness.[42] This dataset assigns each country - including landlocked ones - a "relevant port," defined as the coastal grid cell with the highest density of shipping lines, and measures sea distance as the length of the shortest navigable route connecting the relevant ports. Importantly, these routes are based on observed maritime shipping lanes rather than an algorithmic shortest-path calculation.

The air distance measure comes from the CEPII database, which reports bilateral great circle distances between countries. Several variants are available, and we use the population-weighted version, which accounts for the internal distribution of population within each country. This measure can be interpreted as the expected distance between two randomly chosen individuals, one from each country, based on population weights.

Appendix B: Additional Robustness Checks

Appendix Table A3 addresses additional concerns regarding our results. First, our sample period overlaps with major geopolitical changes that may have simultaneously affected trade and conflict. For instance, European integration could have reduced conflict risks among member states through institutional and political channels beyond trade. Likewise, the collapse of the Soviet Union may have reshaped both conflict dynamics and trade patterns through political disintegration and reorientation of

[41] One knot equals to one nautical mile per hour, and a nautical mile equals to 1.852 kilometers. Thus, one day of travel corresponds to approximately 444.48 kilometers.

[42] Results using this alternative measure are reported in Appendix B.

economic relationships. To ensure that our baseline estimates are not driven by these events, Column (1) of Appendix Table A3 excludes all dyads in which both countries are EU members and Column (2) drops all dyads involving the Soviet Union (before 1991) or its successor states (after 1991). Estimations based on these restricted samples yield results that are quantitatively similar to our baseline findings, suggesting that our estimates are not driven by these major geopolitical transitions.

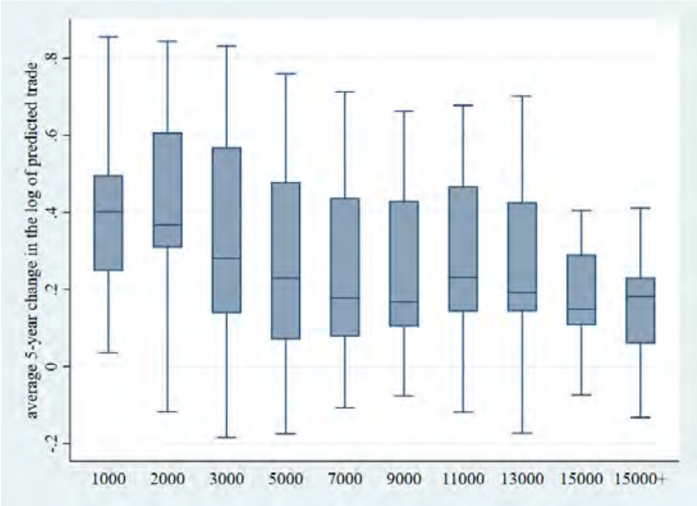
Second, great powers may shape trade and conflict through distinctive geopolitical strategies or alliance management. To ensure that our results are not driven by idiosyncratic behavior of a few major powers, Column (3) of Appendix Table A3 excludes all dyads involving the United States or China, while Column (4) further excludes dyads involving the United States, China, Russia, the United Kingdom, or France. The estimates remain stable and statistically significant, indicating that our main findings are not driven by great-power specific dynamics.

Third, our baseline specification assumes independence across dyads. However, conflict outcomes may be correlated across dyads that are linked through major military alliances. To address this concern, Column (5) allows for correlated errors among dyads involving NATO member states, while treating all other dyads as independent. The results remain robust.

Fourth, our baseline sea-distance measure is constructed using an algorithmic shortest-path calculation. To ensure that our findings are not driven by this particular distance definition, we re-estimate Equation (1) using an alternative sea-distance measure from the CERDI Sea Distance dataset, which is based on observed maritime shipping lanes. We then use the resulting predicted trade as an instrument and re-run our baseline regressions. Column (6) of Appendix Table A3 reports the estimates, which remain essentially unchanged from our main results.

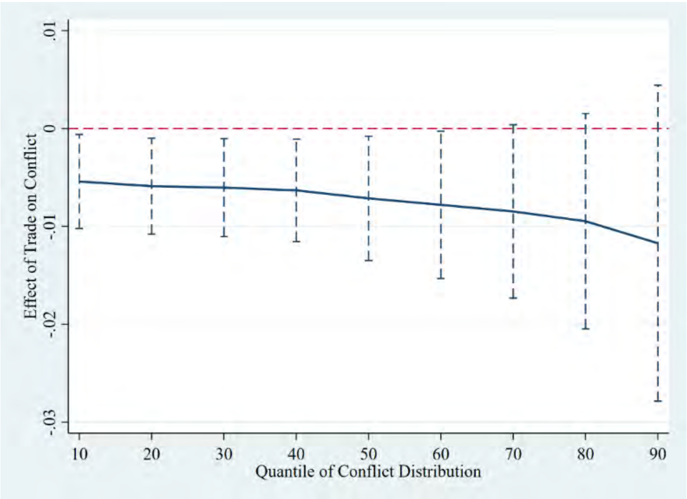
Finally, Column (7) of Appendix Table A3 uses an instrument constructed from annual, rather than five-year, variation in the estimated distance elasticities. The results remain essentially unchanged, indicating that our findings are not sensitive to the temporal aggregation of the instrument.

Appendix Figure A1: Average Change in Predicted Trade



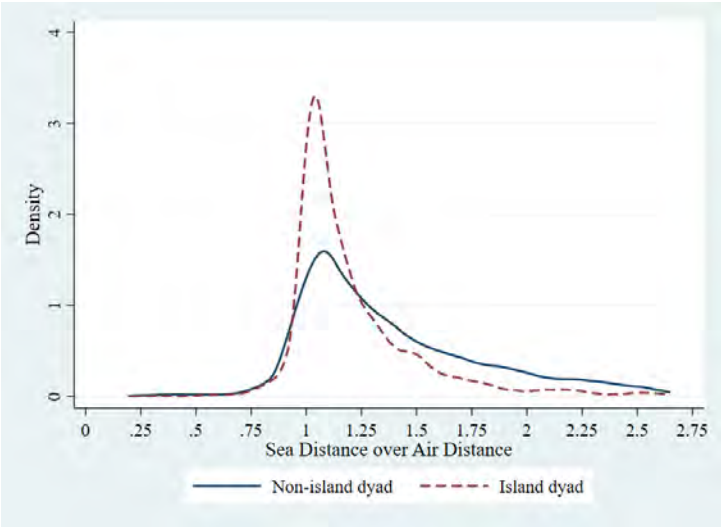
Notes: Figure reports box plots of the average five-year change in the log of predicted trade across distance bins (in kilometers). Each box shows the interquartile range, with the median indicated by the horizontal line. Whiskers extend to the most extreme values excluding outlier.

Appendix Figure A2: The Impact of Trade on Conflict (Quantile Estimates)



Note: Figure reports the estimated impact of trade (and 95% confidence intervals) across different quantiles of the conflict distribution. Standard errors are clustered at the country-pair level.

Appendix Figure A3: Sea to Air Distance Ratio Distribution (Island vs. Non-island Dyads)



Note: Figure plots kernel density estimates of the sea-to-air distance ratio for non-island dyads and for dyads in which at least one country is an island nation.

Appendix Table A1: Example Products of Figure 2

HS2	Product description	Air export value	Air export share
Upper-right quadrant (High air-trade value & high air share)			
	Number of HS2 products: 39		
97	Works of art, collectors' pieces & antiques	5769.01	94.95%
71	Natural pearls, precious stones, precious metals, coin	39664.55	90.92%
91	Clocks & watches & parts thereof	668.64	78.11%
30	Pharmaceutical products	23881.31	77.50%
90	Optic, photo etc., medic or surgical instruments etc.	531.08	73.92%
Upper-left quadrant (High air-trade value & low air share)			
	Number of HS2 products: 13		
94	Furniture; bedding, mattresses; lamps & lighting fittings	681.32	8.21%
21	Miscellaneous edible preparations	412.96	8.02%
39	Plastics & articles thereof	3603.41	7.69%
86	Railway or tramway stock etc.; traffic signal equip	198.29	7.62%
74	Copper & articles thereof	322.87	5.79%
Lower-right quadrant (Low air-trade value & high air share)			
	Number of HS2 products: 13		
50	Silk, including yarns & woven fabric thereof	8.54	33.68%
43	Fur skins & artificial fur; manufactures thereof	122.97	32.89%
65	Headgear & parts thereof	47.67	25.65%
67	Prepared feathers & down; artificial flowers	17.50	20.36%
53	Vegetable fibers, paper yarn & woven fabrics	4.39	18.84%
Lower-left quadrant (Low air-trade value & low air share)			
	Number of HS2 products: 35		
11	Milling products; malt; starch; inulin; wheat gluten	2.76	0.32%
31	Fertilizers	13.34	0.30%
10	Cereals	14.23	0.08%
27	Mineral fuel, oil etc.; bituminous substances; mineral wax	34.75	0.07%
47	Wood pulp etc.; recovered paper and paperboard	0.82	0.01%

Note: Table lists the number of HS 2-digit categories included in each quadrant illustrated in Figure 2. For each quadrant, table also provides five example products and their corresponding air-shipment values (in million dollars) and shares. Numbers are for US exports, averaged over 2002-2014. Data from US Census Bureau.

Appendix Table A2: Top 20 HS 2-digit Products Transported by Air (for U.S.)

HS2	Product description	Air export value	Air transport share
85	Electric machinery etc; sound equip; TV equip; pts	82471.66	58.10%
84	Nuclear reactors, boilers, machinery etc; parts	62962.25	36.79%
90	Optic, photo etc, medic or surgical instrments etc	48689.39	73.92%
88	Aircraft, spacecraft, and parts thereof	40951.64	50.17%
71	Nat etc pearls, prec etc stones, pr met etc; coin	39664.55	90.92%
30	Pharmaceutical products	23881.31	77.50%
29	Organic chemicals	7876.301	22.11%
97	Works of art, collectors' pieces & antiques	5769.013	94.95%
38	Miscellaneous chemical products	5381.935	29.01%
39	Plastics & articles thereof	3603.414	7.69%
87	Vehicles, except railway or tramway, and parts etc	2432.517	2.51%
73	Articles of iron or steel	1835.361	11.91%
82	Tools, cutlery etc. of base metal & parts thereof	1671.314	38.37%
49	Printed books, newspapers etc; manuscripts etc	1604.608	29.94%
93	Arms and ammunition; parts & accessories thereof	1459.975	44.47%
33	Essential oils etc; perfumery, cosmetic etc preps	1399.583	17.28%
95	Toys, games & sport equipment; parts & accessories	1354.866	22.83%
28	Inorg chem; prec & rare-earth met & radioact compd	1282.362	11.47%
70	Glass & glassware	1012.736	22.03%
32	Tanning & dye ext etc; dye, paint, putty etc; inks	877.6422	13.40%

Note: Table lists the top 20 HS 2-digit categories ranked by their average annual value of U.S. air exports over the period 2002-2014. Shares and values (in million dollars) are averaged over 2002-2014. Data from US Census Bureau.

Appendix Table A3: Additional Robustness Checks

	Non-EU pairs	Excluding Soviet Union countries	Excluding US & CHN	Excluding major powers	Cluster alliances	Alt. meas. of sea distance	Yearly variation
2nd stage	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dep var:	Conflict probability						
Ln (trade)	-0.0017**	-0.0017**	-0.0016**	-0.0012*	-0.0017**	-0.0015*	-0.0016*
	(0.0008)	(0.0008)	(0.0007)	(0.0007)	(0.0008)	(0.0008)	(0.0008)
Dep var:	Conflict intensity						
Ln (trade)	-0.0051**	-0.0051**	-0.0049**	-0.0036*	-0.0051**	-0.0048**	-0.0048**
	(0.0023)	(0.0022)	(0.0021)	(0.0020)	(0.0023)	(0.0023)	(0.0023)
1st Stage	Dep var: Ln(trade)						
Ln (trade predict)	1.289***	1.282***	1.255***	1.244***	1.282***	1.273***	1.273***
	(0.0269)	(0.0267)	(0.0267)	(0.0273)	(0.0562)	(0.0265)	(0.0265)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry i*Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ctry j*Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Estimation	IV	IV	IV	IV	IV	IV	IV
N	266292	278038	267619	254380	278349	278349	278349
KP	2298.3	2309.8	2217.9	2078.0	521.0	2312.9	2310.0

Note: Table reports additional robustness checks. Column (1) excludes dyads in which both countries are EU members; Column (2) excludes dyads involving the Soviet Union (before 1991) or its successor states (after 1991); Column (3) excludes dyads involving the United States or China; Column (4) excludes dyads involving the United States, China, Russia, Britain, or France. Column (5) accounts for cross-dyad dependence by allowing for correlated errors among dyads involving NATO member states. Column (6) uses an alternative sea-distance measure based on observed maritime shipping lanes (CERDI Sea Distance); and Column (7) constructs the instrument using annual, rather than five-year, variation in distance elasticities. For brevity, estimated coefficients on the control variables are omitted. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors clustered at the country-pair level are reported in parentheses (except for Column 5).