

# From Economic Competition to Military Combat: Export Similarity and International Conflict

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## Abstract

The vast majority of the extant literature on trade and conflict focuses on bilateral trade to determine whether commerce has a pacifying effect upon pairs of states. We argue that this focus neglects a critical role of international trade: creating tension between states that sell similar goods to the global market. We consider this role explicitly and operationalize its effects empirically. Using commodity-level trade data from 1962 to 2000, we show that countries that produce and sell similar goods are generally more likely to fight, even after we take into account their bilateral trade ties and institutional membership in the global economic system. Our findings are robust to numerous alternative specifications and suggest a strong relationship between economic competition in the global market and military conflict between states.

## Keywords

conflict, trade, militarized interstate disputes, international security, dyadic conflict

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International trade has long been thought to facilitate peace among nations (Kant [1795] 1970). A voluntary exchange of goods that leaves both parties better off inherently raises the value of each side to the other, increasing the cost of conflict. The belief that economic interaction can ignite a positive dynamic of cooperation and reduce conflictual behavior is so intuitive and widespread that some political pundits have even heralded free trade as the path to world peace (see, e.g., Griswold 1998; Boudreaux 2006). The conventional wisdom within the international relations literature (e.g., Oneal and Russett 1997; Gartzke, Li, and Boehmer 2003; Polachek and Xiang 2010) reinforces these claims, having found consistent empirical (and theoretical) links between trade and peace.

At the same time, however, there is certainly evidence that trade can exacerbate rivalry and conflict between states. Throughout history, states have fought their competitors for advantage (i.e., access to inputs and markets) in the global marketplace. For instance, in his authoritative account of the Anglo-German rivalry before World War I, Kennedy (1980, 464) concludes that “the most profound cause [of the conflict], surely, was *economic*”. More specifically, the cause was “the detectable increase in Anglo-German trade rivalry since Bismarck’s time as the latter country steadily became more competitive.” Moreover, while modern empirical international relations research has largely come down on the side of the neoliberals, it has not been monolithic. Indeed, numerous studies by Barbieri (1996, 2002) have demonstrated that increased trade actually has the potential to aggravate tensions between states.

These inconsistencies in both the historical and analytical records raise questions about the simplicity of the link between trade and conflict. Additionally, the vast majority of previous work considers only the bilateral effects of trade, neglecting the way in which trade between two actors can affect a third. We remedy this oversight by analyzing the effects of trade competition, arguing that the tension produced by export competition can be an important source of international conflict. More specifically, we highlight that economic actors who face foreign competition have an incentive to use military power to gain an advantage in international markets. These domestic actors can use their economic power to influence their nation’s political elites and increase the likelihood that economic conflict erupts into war. We support this theoretical argument with several well-established historical cases including the seventeenth-century Dutch-English commercial rivalry, the pre-World War I Anglo-German rivalry, and the 1990 invasion of Kuwait by Iraq. Our argument suggests that, although trade can have a pacifying direct effect at the dyadic level, it also has strong indirect effects, which can be conflict aggravating.

We test this argument using commodity-level trade data from 1962 to 2000. We measure each country pair’s portfolio similarity along nearly 1,300 commodity categories and test the effect of this variable on several indicators of international conflict. Our results strongly support our claim that countries that produce and export similar goods are significantly more likely to fight, even taking into account their bilateral trade. These findings are robust to several checks on model specification

as well as alternative explanations. We also show that our findings are not driven by oil or other strategic resources and that they hold for both raw and manufactured goods. In light of these results, we are confident that we have identified a significant and practically important cause of war.

The article proceeds as follows. We begin by critically reviewing the previous research on trade and war. Next, we present our model of international conflict and export competition and make explicit our hypotheses. We then analyze these hypotheses empirically, using disaggregated commodity trade data. Finally, we draw conclusions and suggest some paths for future research.

## Bilateral Trade and International Conflict

The idea that trade and interstate conflict are linked in some way dates back centuries, at least, to the early classical liberals. Most famously, Immanuel Kant ([1795] 1970) argued that free trade was a means of perpetuating a peace built upon the foundation of a confederation of republican states. The following century saw the French economist, Frédéric Bastiat, write that there would be no need for “large standing armies and powerful navies if trade were free” (Bastiat [1845] 1996, 50) and liberal British MP, Richard Cobden, claims that free trade would “unit[e] us in the bonds of eternal peace” (Thorold [1841] 1908, 218). Underlying each of these arguments was a supposition that trade could function not only as a substitute for war—both war and trade can be means of acquiring goods—but could be a substitute that was simultaneously more efficient and egalitarian (Rosecrance 1986).

In this vein, contemporary scholarship has focused on the role of *bilateral* trade in international security and posited that either an opportunity cost mechanism (e.g., Polachek and Xiang 2010) or a signaling mechanism (e.g., Morrow 1999; Gartzke, Li, and Boehmer 2003) dampens the prospects for war among states. According to proponents of the former, the fact that states tend not to trade with one another during militarized conflicts suggests that dyads with higher levels of economic interdependence have more to lose when they go to war. The latter argument holds that trading relationships change the context in which international relations occur, enabling states to send credible signals about resolve without resorting to war. In both cases, the observable implication is the same: higher levels of trade should translate into lower probabilities of war. Notably, this implication has been challenged by scholars who claim that, rather than encouraging peaceful interaction, trade actually provides states with *additional* issues over which they can fight (Hirschman 1945; Keohane and Nye 1977; Barbieri 1996; Barbieri and Levy 1999; Barbieri and Schneider 1999; Barbieri 2002), or that the effect of trade on war is an illusion, created by the fact that war reduces dyadic trade (Keshk, Pollins, and Reuveny 2004). More recent work has moved beyond a simple focus on aggregate trade levels, looking at factors such as types of goods traded (Dorussen 2006), financial flows (Gartzke 2007; Busmann 2010), and exit costs (Barbieri 1996; Crescenzi 2003, 2005; Peterson and Thies 2012; Peterson 2014). While the results are still

broadly suggestive of the fact that economic interactions are pacifying, they demonstrate a number of caveats.

Despite the large number of studies on the topic, controversy remains. In addition to the quantitative dispute on the aggregate effect of bilateral trade, there are important historical episodes that are not easily explained by the commercial peace theory and merit further study. For instance, Gartzke and Lupu (2012) and McDonald and Sweeney (2007, 370) note that the eruption of World War I at the peak of the first era of globalization “stands out as the Achilles’ heel of liberal international relations theory.” In response, they argue that the liberal hypothesis does not apply to this episode, either because the war was initiated by less-integrated, peripheral states (Gartzke and Lupu 2012) or because the growing trade in this period was not “free” (it was beset by high tariffs), which should be the core explanatory factor of the liberal peace (McDonald and Sweeney 2007). Our findings speak to these debates by highlighting an additional factor: economic competition in the global marketplace between the United Kingdom and Germany. We argue that in the run-up to war, the economic forces for peace identified by the liberal peace theory were overwhelmed by the forces for war.

By moving our focus beyond dyadic trade relations, our article is related to a new but important strand of research on multilateral trade. One set of works in this area (e.g., Kleinberg, Robinson, and French 2012; Dorussen and Ward 2010; Lupu and Traag 2013) adopts a network approach, exploring the conditions under which third parties will intervene in disputes in order to protect their own trade interests with the disputants. Dense trade networks link actors together, making them more likely to come to one another’s aid if attacked. Thus, multilateral trade can have a deterrent effect. A second strand of this literature (e.g., Peterson 2011, 2015) examines the competitive effects of multilateral trade showing that trade diversion can evoke hostility, especially for pairs of states that view one another as potential threats. Our framework is complementary to these works and closely related to the second group, as it highlights the conflict-promoting effect of trade. We diverge from Peterson’s work, however, in that we focus on competition for export markets, rather than trade diversion. In other words, we are less interested in the particular third parties that disputants trade with and more interested in whether these disputants are selling similar goods to the rest of the world in general.

Thus, we contribute to the literature on the important question of how trade affects conflict by focusing on its extradyadic strand, presenting a novel cause of strife, and testing it using disaggregated trade data. We hypothesize that international trade in a broad sense can provide states with an issue over which to fight; in particular, we argue that export-driven competition can be a source of dyadic conflict.

## **Export Competition and the Incentive to Fight**

We ground our theory of how export competition can create tensions that ultimately lead to conflict in a bargaining model of war, in which the occurrence of war

depends on the ability of a pair of states to find a mutually-acceptable agreement *ex ante* (Fearon 1995). We begin by explaining how export similarity can produce interstate disputes over economic inputs, buyers, and market power. In particular, we highlight that export competition creates domestic interest groups with incentives to use the state's military power to gain an advantage against foreign competitors. We posit three mechanisms through which economically motivated disputes can escalate to interstate conflict. First, well-known issues of uncertainty over capabilities and resolve may lead to escalation. Since asymmetric information and incentives to misrepresent are endemic in international relations, a proliferation of disputes means a higher risk that at least some of those disputes will lead to war. Second, states may fear that concessions to a rival today will make the rival stronger militarily, resulting in even larger demands tomorrow. The inability to make a credible commitment to an agreement over economic resources may prevent successful negotiations and cause the dispute to escalate to war. Third, we argue that export competition produces domestic groups who stand to gain significantly from a military victory but pay only a small share of the costs of fighting. When these concentrated and motivated groups lobby for aggressive foreign policies, the bargaining space narrows, making it especially difficult to avoid war. These three problems—information asymmetries, commitment problems, and domestic political capture—help us to establish a theoretical link from economic competition to military conflict.

The disputes engendered by export competition may arise in at least three different ways. First is the generally accepted premise that competition for scarce resources can be a source of conflict. We posit that this axiom can be extended to include the scarce resource of consumer demand. Earlier work has noted that reduced gains from international trade can generate crises and that reduced gains may occur when states compete for the same trade and “hence the same pool of economic rents” (Polachek 2010, 5). Export-oriented domestic industries may push for force against their competitors in another state in order to inhibit their ability to trade. It is important to note that producers are a highly-motivated and concentrated interest group. When concentrated interests back aggression while diffuse interests (e.g., consumers benefiting from imports) support peace, collective action theory would suggest that pro-war groups should be more successful at influencing policy (Olson 1965).

The tensions in this instance arise when quasi-mercantilist attitudes blend economic power with military might. While mercantilism as a school of thought was largely eclipsed by classical economics in the eighteenth and nineteenth centuries, many of its tenets are alive and well among politicians and members of the public alike. Although the age of imperialism has come to an end, countries such as Japan and China have embraced neo-mercantilist policies characterized by high tariff rates, currency manipulation, the hoarding of foreign money, and export subsidies. Research by Mayda and Rodrik (2005) shows that protectionist trade measures are generally popular among the mass public in all cases for which the relevant data

exist. Moreover, such tactics have only increased in popularity with the relative success of the the export-led growth models in East Asia (Krugman 1984; Brander and Spencer 1985; Marin 1992).

Even in the United States, concerns about mercantilist concepts—such as the balance of trade—have been expressed by a number of influential figures including Warren Buffett (Buffett and Loomis 2003) and President Obama (Obama 2010). While economists have generally agreed upon the value of free trade, many policy makers and pundits still view trade largely as a zero-sum game. A key example comes from China's 2010 (near-)monopoly on rare earth minerals. These minerals are strategically important because they are vital to many modern technologies including computers, advanced transportation, and defense. *New York Times* columnist, Paul Krugman (2010), attacked the Chinese position “on national security grounds,” claiming that “the affair highlight[ed] the fecklessness of U.S. policy makers, who did nothing while an unreliable regime acquired a stranglehold on key materials.” In writing about the crisis four years later, *Marginal Revolution's* Alex Tabarrok (2014) noted how quickly so many “nominal free traders and internationalists merged into war hawks”. This behavior is not unique to pundits, however. Policy makers' feelings toward trade competition affect their behavior on security matters as well. Kleinberg and Fordham (2013) show, for instance, that US Congress members from districts with exporters that compete with Chinese goods are more likely to support measures that criticize Chinese policies or treat the country as a security threat. Indeed, as Levy (1999, 172-73) posits, “the phenomenon of the militarization of commercial rivalries may again become important” in the coming years. Given the focus on exports by modern leaders (such as Obama's 2010 promise to double US exports by 2015), we suggest that competition for export markets may once again be an important cause of international tensions.

Second, and relatedly, states that export similar goods are likely to need the same inputs, as is the case with rare earth minerals and high-tech goods. Thus, they may attempt to secure the source of these inputs for their own industries and deny them to their foreign competitors. This is effectively what took place during Europe's imperialist era between the fifteenth and nineteenth centuries. Many of the conflicts between colonial powers during this time were wars for colonies that simultaneously provided natural resources and markets for manufactured goods. There is significant evidence, for example, that the series of wars fought between the British and the Dutch during the seventeenth century were a result of a growing “commercial rivalry” (Levy 1999, 31; see also Wolf 1970; Kennedy 1976). The end of the military rivalry in 1674 came about largely because of the rise of the French, who posed both a military and a market threat to England. The similar locations of the French and British colonies in the New World, being situated in North America, meant that each posed an imperialist threat to the other. Moreover, it meant that the colonies were endowed with relatively similar natural resources, and thus the two countries produced competing goods, such as English rum and French brandy (Findlay and O'Rourke 2007). This economic rivalry, driven by

imperialist and (again) mercantilist concerns about primacy in international trade, touched off a series of wars between the two empires lasting more than a century in total.

A related case—the Anglo-German rivalry preceding World War I—is both historically important and demonstrative of several of our key theoretical claims. Most significant is the political hostility resulting from Germany’s rapid industrialization and its emergence as an economic competitor to Britain, between 1870 and 1900. As others have noted (e.g., Kindleberger 1975), following its (first) unification, Germany became an economic powerhouse and its trade with Britain increased rapidly. However, focusing only on the increasing quantity of trade overlooks the concurrent *qualitative* change in this relationship. Initially, the two economies complemented each other: Germany supplied raw materials, while Britain was the foremost exporter of manufactured goods both to Germany and the rest of the world (Kennedy 1980, 46–47).<sup>1</sup> By 1900, however, Germany had become the leader in industrial exports such as chemicals, machinery, and ironware and had made gains at British expense in Latin America, Asia, and Europe (Kindleberger 1975, 483). Germany and Britain remained important trade partners, but they had also become competitors. In 1890, Britain’s steel production was greater than Germany’s (3.6 million tons to 2.3 million), but by 1914, Germany had surpassed the British, exporting 14 million tons to Britain’s 6.5 million. Both the countries responded to this commercial rivalry by seeking new colonies, but the pro-imperialist groups were especially successful in influencing policy in Germany (Kennedy 1980, 214). They created powerful political organizations, the most important of which was the Pan-German League, which gained an influential position in German politics through its connections with the middle class and the media and advocated expansionist policies that militarists like Admiral Tirpitz were glad to support. A coalition formed by Germany’s heavy industrialists and agriculturalists used nationalist myths to justify expansionist policies, claiming that Britain had “trade envy” and was trying to stifle Germany’s worldwide economic expansion (Snyder 1991, 76). Contemporary observers also saw trade competition as a source of political rivalry. For instance, according to the Austro-Hungarian ambassador to Germany at the time, “[t]he rivalry for world markets, opposing interests in their colonial policy, and the traditions of the Bismarckian political school [...] have prepared the terrain for the hostile feeling towards England which has manifested itself here with unusual unanimity” (Kennedy 1980, 221). These expansionist strategies led to an arms race and to several incidents, such as the Moroccan Crises and, eventually, World War I.

In addition to clashing over commodities and raw materials themselves, states may compete over *access* to these inputs. This is particularly likely with respect to sea-based resources, such as fish, and tends to be especially problematic as marine borders tend to be much less clearly defined than land borders. One of the most famous such disputes is the Cod Wars, a series of clashes between British and Icelandic fishing boats in the mid-twentieth century. While British fishermen had been using the waters around Iceland for decades, the Icelandic economy was

heavily reliant upon the export of fish and the exploitation of the surrounding fisheries (Jóhannesson 2004). Moreover, the Icelanders feared overfishing by the British and other Western powers (Mitchell 1976). In an attempt to assert exclusivity of access to the fisheries, Iceland gradually and unilaterally expanded the waters over which it claimed sovereignty from four nautical miles, prior to 1958, to 200 nautical miles, after 1976. The Icelandic coast guard attempted to cement each expansion by patrolling the waters and firing on or cutting the nets of British trawlers that continued to fish the area. The British Royal Navy responded by sending vessels to protect the fishermen. This mobilization, driven by Iceland's desire to protect what it believed to be its own natural resource, and Britain's attempt to protect the livelihood of a group of its citizens, spiraled into a series of conflicts that were a significant expense for both countries, resulting in costly damages to ships on both sides, and at least one death. Other cases of maritime disputes abound, including that of the Senkaku Islands, which are also home to rich fishing waters (and, potentially, mineral wealth) and are claimed simultaneously by China, Japan, and Taiwan. While no clashes over the Senkakus have yet arisen, numerous actors have sought to militarize the immediate area, with the effect of significantly raising tensions among the disputants.

Finally, strained relations may come about because of demand-based issues. The actions of one exporter—especially if they flood the market with relatively cheap commodities—can alter prices, affecting gains for others. Thus, states' utilities are more directly affected by the actions of those who export similar goods, which can put stress on interstate relations. The 1990 invasion of Kuwait by Iraq is one example of this mechanism at work. Petroleum exports accounted for more than 85 percent of either country's foreign trade during the preceding year, with Iraq exporting more than US\$12 billion worth of petroleum products and Kuwait exporting nearly US\$10 billion.<sup>2</sup> Although the pair's joint membership in the Organization of the Petroleum Exporting Countries (OPEC), a cartel for oil producers, might normally be expected to alleviate any potential competition-induced animosity, the circumstances of this case rendered it ineffective. Following the cessation of the Iran-Iraq War at the end of 1988, Iraq was left with significant foreign debt and a need for greater revenue, leading then-President Saddam Hussein and his Foreign Minister, Tariq Aziz, to lobby for a reduced quota, in order to increase per barrel prices by nearly 40 percent (Long 2004). This proposal met resistance from Kuwait and the United Arab Emirates, who were less concerned with prices (Musallam 1996). Indeed, Kuwait not only pushed for a 35 percent *increase* in its quota (set at just over one million barrels per day) but actually increased its exports well beyond even its own proposed limits to more than 1.7 million barrels per day (Khadduri and Ghareeb 1997). Kuwait's overproduction of oil was a key component behind the 33 percent drop in oil prices during the first half of 1990, hindering Iraq's ability to generate much-needed revenue. The enmities drawn forth by this "economic war of aggression" (Alnasrawi 1992, 342) were a key factor in the Iraqi government's decision to launch its military campaign against the Kuwaitis later that year.

These three pathways have the potential to generate disagreements between states. However, in his seminal 1995 article, Fearon showed that the mere existence of disagreements is not sufficient to explain interstate conflict. Thus, we establish the link between export competition and military conflicts through three mechanisms related to what Fearon calls the “rationalist explanations for war.” First, as McDonald and Sweeney (2007, 377) points out, for war to occur, “states must first possess some political dispute and then fail to reach a peaceful resolution . . . [they] do not face a bargaining crisis in which war looms unless they first possess some political disagreement.” Disagreements, then, are necessary conditions for conflict. Once a disagreement exists, war may break out between rational unitary actors due to private information and incentives to misrepresent or commitment problems (Fearon 1995).<sup>3</sup> Commitment problems often stem from the potential for economic transfers to influence states’ future bargaining power (Fearon 1996). A state may fear that conceding markets or resources to an economic rival will allow that rival to become stronger militarily, and to make greater demands in the future. This inability to credibly commit to a settlement can result in war. Examples of this mechanism include most disputes among European powers over colonial territories. Information problems can also cause economic disputes to escalate to war. In negotiations over economic disputes, states have clear incentives to misrepresent their resolve to defend their interests, implying that there will generally be a nonnegligible possibility of bargaining failure. Disagreements over export competition, like other disputes, run the risk of bargaining breakdown due to such information problems. The war between Iraq and Kuwait is one such case. Iraq likely would not have invaded Kuwait if Saddam Hussein had not underestimated US resolve to liberate Kuwait from the Iraqi Republican Guard (Mearsheimer and Walt 2003). However, that bargaining failure would not have resulted in war if there had not been an underlying economic dispute between Iraq and Kuwait in the first place. In other words, the occurrence of war requires both an underlying disagreement and a failure to resolve it through negotiation. Export similarity raises the overall probability of war by increasing the number of interstate disputes.

A third, more direct pathway to war is through domestic politics. Similar to McDonald and Sweeney (2007), we claim that global export competition has differential effects on domestic groups’ expected costs and gains from fighting. These differences matter because if key decision makers in a state stand to benefit disproportionately from a war, which is to say that they will gain more from victory than an average citizen but pay only a small share of the cost of war, then bargaining failure and war are much more likely even under complete information (Jackson and Morelli 2007). A common feature of our historical evidence above is that export similarity between states motivates domestic groups to advocate for the use of their state’s military power, to gain an advantage over their foreign competitors. The domestic groups can gain such influence over foreign policy either because the same elites dominate both the country’s economic and political power, as in Saddam’s Iraq, or because the elites transform their economic power into political influence via

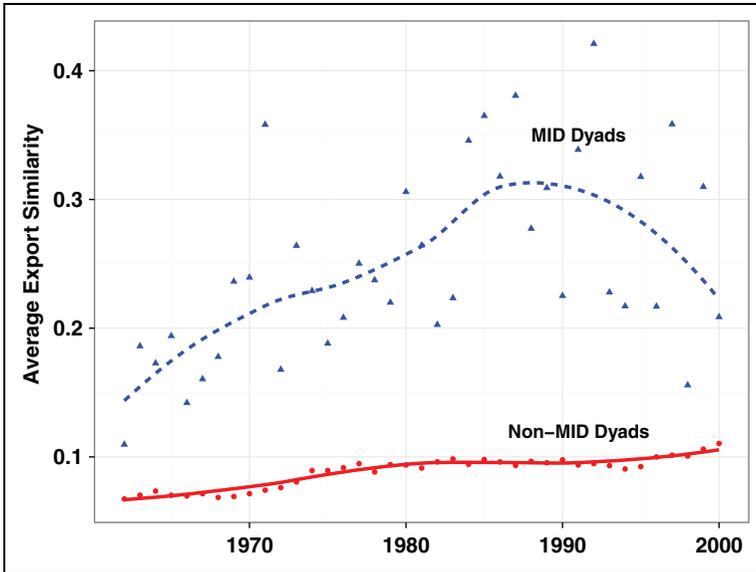
financial contributions and organizations like the Pan-German League in pre-World War I Germany. As export competition gives such concentrated and motivated interest groups greater incentives to lobby for aggression in the international arena, the bargaining space for peaceful resolution narrows and conflict becomes more likely. Here, as in the other two mechanisms, we do not argue that commercial rivalry inevitably leads to war; we simply suggest that it can precipitate a hostile environment, in which war can more easily erupt. Thus, we hypothesize that export similarity should be associated with more antagonistic dyadic behavior, increasing the likelihood of militarized dispute onset.

## Research Design

We examine our hypothesized link between similarity and conflict using undirected dyad year data, drawn from the militarized interstate disputes (MID) data set (Ghosn, Palmer, and Bremer 2004). Our dependent variable measures conflict onset, taking a value of one if a conflict occurs between a pair of states in a given year, and a value of zero otherwise. Our main analyses include the set of all dyads, but our results are unaffected by including only “politically relevant dyads” (see Maoz and Russett 1992).<sup>4</sup> To focus on MID onset, we drop observations that had an ongoing MID at the beginning of the year and experienced no new MID onsets. Relaxing these constraints does not weaken our results.

We operationalize disputes in three different ways: all MID, fatal MID (in which at least one fatality occurred), and hostile MID (in which at least one side used force against the other). We choose to include the latter two categories, as they can exclude minor disputes in which no costly military action was taken. We find the third category especially important, because it includes several significant events, including the Cuban Missile Crisis, in which two states came to the brink of war but were able to resolve it without suffering fatalities. This serves as a valuable robustness check. Due to limitations on data availability (primarily with respect to commodity trade data), our data set consists of all dyads between 1962 and 2000.

Our key independent variable is a measure of the similarity of a dyad’s export portfolios. We compute this value using data on commodity trade from the United Nations’ (UN) Standard International Trade Classification (SITC) Revision 4 at the four-digit level (Feenstra et al. 2005) and a technique similar to those used by Polillo and Guillén (2005) and Elkins, Guzman, and Simmons (2006).<sup>5</sup> For each country-year, we first calculate the proportion of total commodity exports accounted for by each of  $k$  different commodities.<sup>6</sup> This is useful, as it helps us to capture the relative industry salience to leaders: an industry that accounts for a relatively large proportion of a state’s economy is likely to be especially important to a leader, regardless of total economy size. Then, for every pair of states  $a$  and  $b$ , in a given year, we calculate the correlation between the two vectors using Pearson’s  $r$ . For a given year, the similarity score equals one for any pair of states with an exactly identical export portfolio; it equals negative one for a pair of states that collectively exports all  $k$  goods, with



**Figure 1.** Average levels of export similarity for militarized interstate disputes (MID) and non-MID dyads, 1962–2000.

no overlap across categories. Because states often export only a relatively small subset of the  $k$  goods, large negative scores do not occur in the data. Empirically, our measure varies from a minimum of approximately  $-0.05$  to a maximum of 1. We expect this value to be positively related to the likelihood that a fatal MID occurs.

It may be helpful to the reader to consider some empirical examples and their placement on this scale.<sup>7</sup> Although no pairs of states achieved perfect similarity of export portfolios, a number came quite close. These tend to be pairs of states that generally specialize in the same commodity. Within our data, very similar portfolios ( $\text{Sim}(a,b) > 0.99$ ) tend to be found primarily among pairs of OPEC countries, especially in the late 1960s and early 1970s. Qatar and Libya, for example, record scores greater than 0.999 through 1982 and maintain a similarity score greater than 0.92 during the entire sample. High scores are not limited exclusively to oil producers, however. Canada and Germany, for example, score greater than 0.85 in 1998 and 1999. Dyads with especially low scores tend to be pairs of states in which each member specializes heavily in something significantly different from its partner. Thus, we tend often to see advanced industrial countries from North America and Europe paired with poorer countries, such as those in Latin America or Africa. Our most distant dyad is that of the United Kingdom and Paraguay, whose similarity score is consistently negative throughout the data set, and attains a low at  $-0.047$  in 1963.

Figure 1 provides an encouraging first look at the data based on the measure of export similarity proposed above. The triangles and circles represent average

portfolio similarity levels for dyads that experience MID onset and dyads that do not, respectively, in a given year. We also plot the locally smoothed curves that best fit the data. The raw data are consistent with expectations: in every year, warring dyads have more similar export portfolios, on average, than dyads that are at peace. The curve fitted to the MID data is also significantly higher than the curve fitted to the non-MID data across all four decades. The visualization of raw data presented in Figure 1 provides initial support for our hypothesis on the war proneness of export competing dyads and suggests that a more in-depth analysis would be worthwhile.

In addition to our variable of interest, we control for a number of potentially confounding variables and several different model specifications. We begin by estimating models that include a series of control variables found throughout most of the conflict literature: the greater level of trade dependence in the dyad,<sup>8</sup> whether the two states are contiguous, the distance between them (in logged miles),<sup>9</sup> the affinity score measuring the similarity of the two states' UN votes (Gartzke, Jo, and Tucker 1999), whether both states are European and whether they are strategic rivals (Thompson 2001). As regime type is an important predictor of conflict, we control for jointly democratic dyads. We also capture dyadic power differences by controlling for the ratio of the stronger country's Composite Index of National Capability (CINC) score to the total dyadic CINC score (Singer 1988) and the dyadic power configuration (dummy variables for major power dyads and major–minor dyads, with minor power dyads as the omitted category). Finally, we believe that time trends and the size of the global market may matter for the value of competition. For example, in times of global expansion, countries export more, which may exacerbate the conflict-inducing effect of competition. Accordingly, we include decade-level fixed effects in each of the models. In addition, we estimate a second specification for each dependent variable, which includes additional controls, based on trade and economic performance. The second set of controls include: whether the states were both members of the General Agreement on Tariffs and Trade or the World Trade Organization in the previous year, the smaller per capita gross domestic product (GDP) in the previous year (in logged constant dollars), and the lower degree of openness to trade in the dyad (operationalized as the quotient of the state's total trade and its total GDP for a given year). Further robustness checks are discussed below.

Given the dichotomous nature of our dependent variable, we conduct our analysis using a standard logit framework. In each model, we lag the variables of interest (to minimize potential problems from endogeneity and reverse causality) and we control for the effect of temporal dependence using a cubic polynomial for time since last conflict (Carter and Signorino 2010).<sup>10</sup> To account for potential interdependence across units, we cluster standard errors on dyad. In addition to the specifications mentioned above, we employ a number of methodological alternatives, to ensure that our results are robust. These alternative specifications are discussed below and their results are included in the online appendix.

## Analysis

Our object of interest is the effect of overall export similarity on conflict initiation. This is a measure of dyadic similarity across all commodities in the data set. We assess this variable's effects on all MIDs, on only fatal MIDs, and on only hostile MIDs.

Table 1 provides the results for six models of conflict initiation.<sup>11</sup> It is encouraging to note that, across all models, the control variables generally tend to have the expected effects, suggesting that our model is plausible. Turning to our main variable of interest, in all models, export similarity has a positive coefficient and is significant at least at the  $p < 0.5$  level, suggesting that increased portfolio similarity makes MID onset more likely. This finding provides support for our hypothesis. However, it is not sufficient to find that a relationship exists; we must also ascertain the strength of the relationship between similarity and conflict. Thus, we turn to an examination of the substantive effect of similarity.

Figure 2 displays the estimated probability of MID onset for a hypothetical case, as we vary export similarity from its empirical minimum (approximately  $-0.047$ ) to its empirical maximum (just under 1), with other variables held at reasonable values.<sup>12</sup> The predicted likelihood of conflict is given by the solid line, while the shaded regions indicate the 95 percent confidence interval. The substantive effect of similarity is strong and positive. At the minimum observed level of similarity, the predicted probability of conflict is just under 0.13. At the maximum level, it nearly doubles to approximately 0.25. Our result, then, is not merely a statistical artifact but represents a powerful factor that underlies conflict behavior.<sup>13</sup>

## Robustness Checks

While the results above strongly support our thesis, it is important to demonstrate that they are not a function of a particular specification. Thus, we include a number of robustness checks in the online appendix. We find that our results tend to hold across a variety of different models. We describe these alternative specifications below.

In order to confirm that our results are not due to the modeling assumptions made above, we first consider a number of relatively minor tweaks to our core models. These include computing similarity at the two-digit, rather than four-digit SITC level; analyzing only politically relevant dyads; dropping extreme values of trade and portfolio similarity from the sample; excluding major powers; removing all control variables, except for trade, contiguity, capability ratios, and the cubic polynomial for time; including a dummy variable for the Bretton Woods (pre-1972) era; and replacing the affinity score with an alliance dummy. In all cases, our substantive results for trade and similarity remained unaffected.

We also consider the possibility of reverse causality between export similarity and conflict but reject this for theoretical and empirical reasons. Given that the similarity

**Table 1.** Export Similarity and International Conflict.

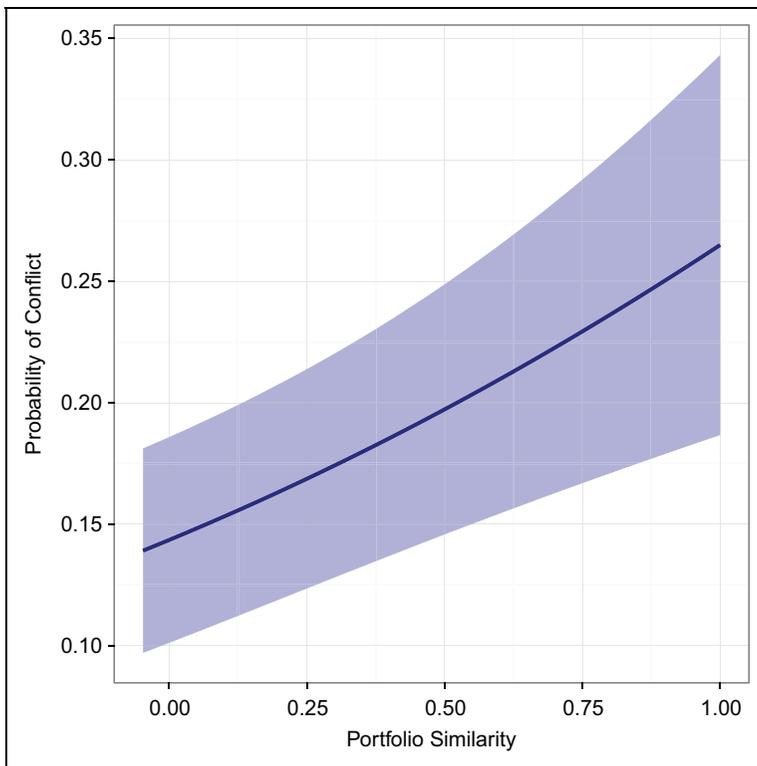
	All MIDs		Fatal MIDs		High host MIDs	
	Baseline	Expanded	Baseline	Expanded	Baseline	Expanded
Export similarity <sub>t-1</sub>	0.766*** (0.189)	0.777*** (0.188)	0.503** (0.230)	0.578** (0.228)	0.830*** (0.209)	0.831*** (0.210)
Trade dependence <sub>t-1</sub>	-0.023 (0.057)	-0.044 (0.058)	-0.321* (0.176)	-0.246 (0.166)	-0.076*** (0.038)	-0.105*** (0.037)
Contiguity	0.632 (1.056)	0.087 (1.003)	0.449 (1.465)	-0.534 (2.028)	1.308 (0.949)	0.649 (1.005)
Distance (logged)	-0.317*** (0.132)	-0.369*** (0.125)	-0.427*** (0.180)	-0.532*** (0.250)	-0.266*** (0.114)	-0.334*** (0.122)
Capabilities ratio <sub>t-1</sub>	-0.771* (0.431)	-0.859** (0.428)	-0.594 (0.621)	-0.628 (0.661)	-0.741 (0.484)	-0.799* (0.482)
Both democracies	-0.494*** (0.190)	-0.565*** (0.180)	-0.924*** (0.345)	-0.824** (0.354)	-0.247 (0.199)	-0.306 (0.192)
UN vote similarity <sub>t-1</sub>	-1.477*** (0.174)	-1.477*** (0.185)	-1.611*** (0.235)	-1.704*** (0.252)	-1.553*** (0.185)	-1.550*** (0.200)
Both major powers	1.726* (1.048)	1.643* (0.979)	0.258 (0.547)	0.048 (0.544)	0.759 (0.878)	0.918 (0.918)

(continued)

Table 1. (continued)

	All MID's		Fatal MID's		High host MID's	
	Baseline	Expanded	Baseline	Expanded	Baseline	Expanded
Major-minor dyad	1.393*** (0.196)	1.299*** (0.193)	1.161*** (0.274)	1.114*** (0.300)	1.272*** (0.212)	1.181*** (0.208)
Rivalry <sub>t-1</sub>	1.307*** (0.182)	1.178*** (0.176)	1.865*** (0.232)	1.781*** (0.237)	1.362*** (0.201)	1.184*** (0.197)
Both in Europe	-0.448** (0.218)	-0.578*** (0.216)	-1.477*** (0.415)	-1.388*** (0.477)	-0.676*** (0.251)	-0.740*** (0.265)
Lower GDP per capita <sub>t-1</sub>		0.142** (0.062)		-0.133 (0.090)		0.116 (0.069)
Joint GATT/WTO members <sub>t-1</sub>		0.028 (0.112)		-0.114 (0.193)		0.109 (0.130)
Lower openness <sub>t-1</sub>		-0.561 (0.617)		-0.155 (1.248)		-0.549 (0.797)
Constant	-0.476 (1.116)	-0.765 (1.215)	-1.327 (1.597)	0.776 (2.275)	-1.551 (1.062)	-1.491 (1.214)
N	300,623	278,517	300,623	278,517	300,623	278,517
Log likelihood	-4,120.967	-3,762.653	-1,884.174	-1,721.551	-3,108.385	-2,833.184

Note: Robust standard errors clustered by dyad in parentheses. Decade dummies and  $t$ ,  $t^2$ ,  $t^3$  included in all models. MID = militarized interstate disputes; UN = United Nations; GATT = General Agreement on Tariffs and Trade; WTO = World Trade Organization; GDP = gross domestic product.  
 \* $p < .10$ . \*\* $p < .05$ . \*\*\* $p < .01$ . All tests are two-tailed tests.



**Figure 2.** Effect of export similarity on the probability of militarized interstate disputes onset.

of two countries' export portfolios is determined by what each country sells to the whole global market (more than 150 trade relations for each country), there is no reason that a country's military relations with a particular trade partner should have a significant impact on the type and quantity of commodities sold to the rest of the world. Furthermore, reverse causality can account for the positive correlation between export similarity and conflict only if one believes that after military conflict, the winning and losing sides become even more similar in their portfolios, which is unlikely. If a relationship does exist, the victor should force the loser out of some markets *reducing* portfolio similarity. Although it is empirically impossible to prove the absence of a relationship between export similarity and previous disputes, we present evidence in the online appendix that suggests that one does not exist.

We also check that our contribution is distinct from those in a number of related papers. Lupu and Traag (2013) and Dorussen and Ward (2010) focus on the links between trade networks and interstate conflict. Mousseau (2013) argues that an important factor is whether states have contract-intensive or contract-poor economies. Finally, according to Peterson and Thies (2012), it is intraindustry trade

between two states and, not all dyadic trade in general, that pacifies relations. In each case, one could make a plausible argument that the preferred variable may be correlated with export similarity and thus pose a threat to inference. To show that our findings complement theirs, we rerun our analyses accounting for their theories by including each of their variables in our models. Our results remain robust and demonstrate that the effect of global economic competition on conflict cannot be fully explained by these alternative theories.

Finally, as with all trade data, the United Nations Conference on Trade and Development (UNCTAD) data set is missing some observations. However, this problem is not severe compared to other historical data sets, as the UNCTAD is limited to the more recent era. Nevertheless, we assess the robustness of our findings to multiple imputation of missing observations using Amelia II (Honaker, King, and Blackwell 2008). This increases our sample size by about 23.5 percent. Our results are generally robust to imputation and continue to hold for imputed values of politically relevant dyads, and relevant, non-major power dyads as well.

In addition to examining the estimated effects of our variables with respect to our hypotheses, we also checked the goodness of fit for our models. When looking at the receiver operating characteristic curves (see, Zeng and King 2001; Ward and Gleditsch 2002), we find that all models reach relatively high area under the curve (AUC) levels (greater than 0.9), which indicates that the models are relatively good at separating observations with conflict from those without.

## **Separating Goods by Type**

The analysis above covers export similarity as a function of all goods exported by either member of a dyad. As Dorussen (2006) points out, however, certain types of goods could have a bigger impact on interstate conflict than others. Goods can vary in the opportunity costs of trade disruption as well as their appropriability. For these reasons, we disaggregate the export portfolio into different types of goods, calculate dyadic similarity values for these goods separately, and include both of them in our analyses. All analyses are presented in Table 2. To conserve space, we only present results for all MIDs and the main set of variables. We show results for the other dependent and control variables in the online appendix.

We begin by separating oil, an especially problematic type of natural resource, from other commodities. As Colgan (2013, 150) argues, trade in oil is particularly conflict prone because oil is not only the most valuable commodity in global markets but is also a strategic resource that lacks a convenient substitute. At the same time, however, crises between oil producers are especially costly for the global economy, and thus may attract more third-party intervention, aiming to maintain peace and ensure a constant oil supply. For these reasons, we calculate countries' portfolio similarities in and dependence on oil-related (SITC codes beginning with 33) and non-oil-related commodities separately and include both sets of variables in our models. Column 1 provides the results of this estimation. We find that export

**Table 2.** Separating Goods by Type.

	Oil and nonoil goods	Strategic and nonstrategic Goods	Raw and manufactured goods
Oil trade dependence <sub><i>t</i>-1</sub>	0.066 (0.048)		
Non-oil trade dependence <sub><i>t</i>-1</sub>	0.181 (0.117)		
Oil export similarity <sub><i>t</i>-1</sub>	0.172 (0.131)		
Non-oil export similarity <sub><i>t</i>-1</sub>	0.624*** (0.239)		
Strategic trade dependence <sub><i>t</i>-1</sub>		0.287 (0.329)	
Nonstrategic trade dependence <sub><i>t</i>-1</sub>		-1.495 (0.964)	
Strategic export similarity <sub><i>t</i>-1</sub>		0.404 (0.281)	
Nonstrategic export similarity <sub><i>t</i>-1</sub>		1.842** (0.909)	
Raw goods trade dependence <sub><i>t</i>-1</sub>			0.148 (0.100)
Manufactured goods trade dependence <sub><i>t</i>-1</sub>			-0.301** (0.124)
Raw goods export similarity <sub><i>t</i>-1</sub>			0.501*** (0.191)
Manufactured goods export similarity <sub><i>t</i>-1</sub>			1.021*** (0.208)
<i>N</i>	208,153	295,420	300,284
Log likelihood	-3,380.850	-4,098.849	-4,102.924

Note: Robust standard errors clustered by dyad in parentheses. Decade dummies and  $t$ ,  $t^2$ ,  $t^3$  included in all models.

\* $p < .10$ . \*\* $p < .05$ . \*\*\* $p < .01$ . All tests are two-tailed tests.

similarity and trade, with respect to non-oil commodities, behave in essentially the same way that they did in our primary model. On the other hand, while we expect countries that sell similar oil products or dyads whose bilateral trade is composed mainly of oil to be slightly more likely to fight, the difference is not statistically distinguishable from zero ( $p \approx .19$ ).<sup>14</sup> Arguments regarding oil and conflict may apply to a larger set of strategic commodities as well. For that reason we adopt a categorization by Goenner (2010) that distinguishes between “strategic” and “nonstrategic” goods where strategic goods are those that are important for economic and military security.<sup>15</sup> From column 2, it is clear that export similarity in nonstrategic

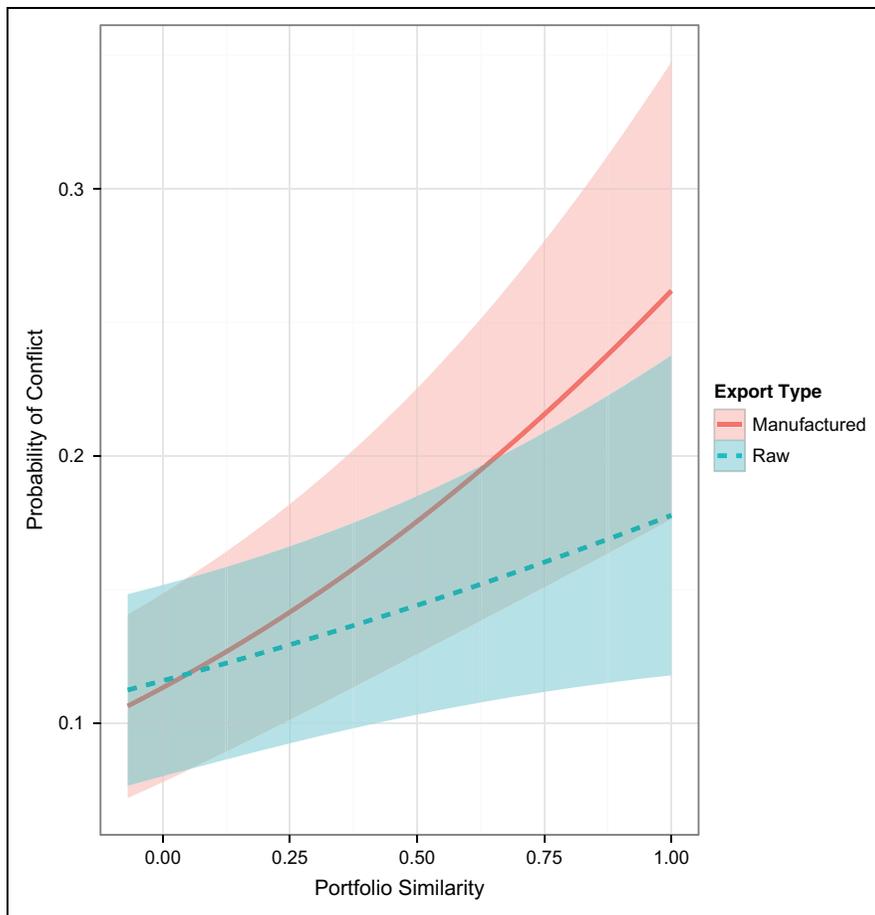
commodities is strongly related to conflict, while similarity in strategic exports is positive but nonsignificant ( $p \approx .15$ ). Our results do not necessarily indicate that trade in oil and strategic goods does not affect international conflict at all. Rather, they show that competition between producers of oil and strategic goods are not driving the results from Table 1.

Next, we distinguish between raw goods and manufactured goods.<sup>16</sup> Raw goods in general, and mining goods in particular, are more easily appropriable than manufactured goods and that may make them more appealing targets for military aggression by competitors (Dorussen 2006).<sup>17</sup> Market structures of the two types of goods differ as well. In the period under study, prices of primary commodities have been generally more volatile than and declined relative to the prices of manufactured goods (Jacks, O'Rourke, and Williamson 2011; Harvey et al. 2010). Competitors may be less willing to fight over markets for commodities whose values are uncertain and steadily declining. Finally, dyads that produce similar manufactured goods may be especially violent because they compete over a larger number of issues. Specifically, they compete over access to input goods (e.g., rare earth minerals) *in addition to* markets for their final products. Column 3 shows that export similarity in both raw and manufactured goods increases the likelihood of conflict. As Figure 3 demonstrates, the estimated effect size is larger for manufactured goods (though the 95 percent confidence intervals overlap), which may indicate the importance of market structure and the fact that manufactured goods may cause disputes over a larger range of issues. Finally, separating trade dependence in raw and manufactured goods reveals a negative and significant effect for trade dependence in manufactured goods on conflict (and no effect for trade dependence in raw goods), implying that bilateral trade in manufactured goods is pacifying.

This analysis demonstrates, then, that not only does export similarity affect international conflict, but that its component parts (raw and manufactured goods) also have independent effects. These effects are the strongest for manufactured goods, though we find a positive and significant relationship for primary commodities as well. Additionally, we have demonstrated that this relationship is not driven by strategic commodities such as oil and armaments. This lends additional support to our claim that trade competition can play a major role in fanning the flames of conflict.

## Conclusion

Proponents of international trade view it as a potential solution to global ills, asserting that interdependence fosters peace by increasing its relative value. Our argument suggests that this claim needs to be reexamined: when it leads to trade competition, greater interdependence can, in fact, fuel international conflict. While bilateral trade can be pacifying at the dyadic level, it can raise tensions more broadly. By introducing a new measure of the degree to which states compete in the global market, we are able to show the conditions under which trade dampens or facilitates international conflict.



**Figure 3.** Effect of raw and manufactured similarity on the probability of militarized interstate disputes onset.

The analysis presented above significantly deepens our understanding of how trade and conflict are related. From a practical perspective, although we find a relationship between dyadic interdependence and peace, we also highlight trade’s potential to induce conflict among competitors. We believe that our results are especially relevant with respect to the rise of China as a global economic power. In the years between Mao’s death (1976) and the end of our data set (2000), Chinese and US export similarity increased by more than 700 percent (from 0.034 to 0.259). At the same time, the rivalry between the two powers (and between China and the West, more generally) has accelerated rapidly. In recent years, China has exploited its endowment of labor to build a strong manufacturing sector, eventually branching out from consumer to capital goods. Meanwhile Western countries, such as the United

States and many European Union states, have declined in terms of manufacturing jobs and in share of global output, as they move increasingly toward service-oriented industries. If this shift into different areas of specialization continues, China and the West not only reduce the need to compete but also increase the degree of gains from trade (as the West can sell high-end services to China who can sell its manufactured commodities on Western markets). This has the potential to ameliorate the nascent military rivalry between the two. However, our results suggest caution to President Obama and other policy makers who would seek to revitalize the fading production of the manufacturing sector. Such a strategy has the potential to erase any gains from trade and to stimulate the rivalry between China and the United States, risking a spillover into military conflict.

From an academic perspective, we move the debate over the relationship between trade and conflict forward by considering the role of economic competition in the global marketplace and demonstrating its explanatory power. Previous analyses of bilateral trade have been too simplistic and have neglected its externalities, which we attempt to capture here. Future studies should make use of this knowledge in determining when states are likely to engage in conflict with one another.

One potential limitation of our study is its short time frame. Our cases begin in the early 1960s and end in 2000. An advantage to the use of a relatively short timespan is that it increases the likelihood that our theory and measures are applicable across the entire period being examined (see Rosenbaum 1999). However, it would be interesting to examine the data over a broader time frame. This is especially important as globalization marches onward and the costs of and barriers to trade continue to fall. In the present era, as economies are finding ways to do more with less and as the transition to service-based economies make natural resource endowments less relevant, it is important to extend this analysis forward, examining the ways in which the effects of trade and competition that we have uncovered here operate with respect to more modern economies.

### **Authors' Note**

Authors' names are listed in alphabetical order to denote equal contributions.

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## Supplementary Material

Supplementary material is available for this article online.

## Notes

1. In 1860, for example, Germany's chief exports to Britain were wheat and wood, whereas Britain mostly sold cotton yarns and ironware to the Germans. In 1870, manufactured goods made up 88 percent of Britain's total exports but only 40 percent of Germany's.
2. In 1989 US dollars; data drawn from Feenstra et al. (2005).
3. Powell (2006) points out that Fearon's third mechanism—issue indivisibility—is simply a type of commitment problem.
4. Analyzing only politically relevant dyads—those that are contiguous or involve at least one major power—is potentially problematic. Contiguous states usually have similar resource endowments and thus they will export similar goods. At the same time, they are significantly more likely to fight (Vasquez 1995). Therefore, examining only politically relevant dyads raises the risk of spurious correlation.
5. Classification information for the Standard International Trade Classification data can be found at <http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=28>.
6. In our primary analysis, in which we use the four-digit classification,  $k = 1,298$ . Our results, however, are robust to a specification at the two-digit level, in which  $k = 94$ .
7. A visualization of similarity scores over time for a set of significant dyads is included in the online appendix.
8. We operationalize trade dependence as  $\frac{\text{trade}_{jt}}{\text{trade}_t}$ . This is similar to Barbieri's (1996) *trade share* measure. Our results are robust to using the Oneal and Russett (1997) measure,  $\frac{\text{trade}_{jt}}{\text{GDP}_t}$ . We present results with the gross domestic product-based measure in the online appendix.
9. We follow Hegre, Oneal, and Russett (2010) in including controls for both distance and contiguity; however, our results are robust to using either and omitting the other.
10. As we are treating temporal dependence as a nuisance parameter, estimates for  $t$ ,  $t^2$ , and  $t^3$  are not displayed in the tables below. The same is true of our decade-level fixed effects.
11. The results presented here are robust to the inclusion of a number of auxiliary control variables. As the substantive results were unaffected, we omit these controls from the analysis, but include them in the online appendix.
12. Specifically, we choose a contiguous dyad, which has been at peace for one year, with the stronger power having 80 percent of dyadic material capabilities, United Nations voting similarity set to 0.67, and trade dependence at 0.12. These three values are near the median for dyads that experienced conflict onset. All remaining binary variables—including decade dummies for the 1960s, 1970s, and 1980s—are set to zero.

13. We also present the predicted probabilities for counterfactuals using profiles of actual cases in the online appendix.
14. Including possible mediators of the oil-conflict relationship, such as revolutionary leaders (Colgan 2010), does not affect our main findings.
15. Strategic goods include energy, nonferrous metals, chemicals, electronics, nuclear materials, and armament.
16. We distinguish between these using the coding rules outlined in the United Nations Conference on Trade and Development product groupings. See, <http://unctadstat.unctad.org/EN/Classifications.html>.
17. But see also, Liberman (1998) on conquest in industrialized societies.

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