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Mars or Mercury redux: the geopolitics of bilateral trade agreements

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Abstract

We analyze the role of economic and security considerations in bilateral trade agreements. We use the pre-World War I period to test whether trade agreements are governed by pecuniary factors, such as distance and other frictions measured by gravity covariates, or by geopolitical factors. While there is support for both hypotheses, we find that defense pacts boost the probability of trade agreements by as much as 20 percentage points. Our estimates imply that were the U.S. to alienate its geopolitical allies, the likelihood and benefits of successful bilateral agreements would fall significantly. Trade creation from an agreement between the U.S. and E.U. countries would decline by about 0.6 percent of total U.S. exports.

Key words: international trade agreements, alliances, geopolitics

JEL classification: F13, N20

Non-technical summary

International trade and international relations have always been joined at the hip. Governments negotiate trade agreements for economic reasons but are also drawn to trade agreements for geopolitical reasons. In turn, geopolitical alliances make trade ties stronger. Understanding the link between geopolitics and trade is topical now that the U.S. has embarked on a foreign trade policy centered on bilateral engagement. It has done so amidst growing uncertainty as to whether America will remain a predictable ally of its geopolitical and commercial partners.

In a world where multilateralism and the global rules cease to exist – or at least are weakened – what would be the role of economic and security considerations for trade agreements? Answering this question is complicated by the fact that causality between trade agreements and geopolitics may run in both directions. Multilateral trade negotiations and regional trade agreements are also potential confounders, since multilateral and regional trade negotiations are correlated with bilateral trade agreements in post-1945 data sets. Multilateral trade negotiations are also correlated with geopolitics, insofar as global trade talks since World War II have been conducted among nations tied together in military alliances, not least with a view to cementing the alliances in question.

This paper turns to history to address these challenges. We focus on the years prior to World War I. Insofar as there was no GATT or WTO, the period is well suited for focusing on the determinants of bilateral trade agreements absent the confounding effects of multilateral negotiations and of the current global rules-based order. Evidence from this period is likely to be informative for identifying the impact of economic factors on trade negotiations insofar as those economic factors were not just present but growing stronger. The period is also a promising one for identifying the role of geopolitical factors, since it saw a proliferation of military and strategic alliances, alliance politics featuring prominently among the factors heightening tension in the run-up to World War I.

We analyze a data base of 271 bilateral trade agreements among 44 countries in the period 1871-1913. We measure pecuniary factors using gravity-model covariates familiar to the literature. We measure geopolitical motives using military alliances, including defense pacts, non-aggression treaties, neutrality treaties, and ententes. We address endogeneity concerns with propensity score matching estimates of the average treatment effect among countries with defense pacts. We also

implement an instrumental variable strategy, where the instrument for defense pacts is the presence and rank of diplomats.

The results verify the importance of both economic and geopolitical factors. We find that defense pacts raised the probability of a trade agreement within a pair of countries by as much as 20 percentage points. Were the U.S. to alienate its geopolitical allies, our estimates imply, the likelihood and benefits of successful bilateral agreements would diminish. Expected trade creation from an agreement between the U.S. and EU countries, for instance, would decline by 0.6 percent of total U.S. exports.

1. Introduction

International trade and international relations have always been joined at the hip. Governments negotiate trade agreements for economic reasons – they see them as enhancing the access of producers to foreign markets and giving them a leg up in international competition. But they are also drawn to trade agreements for political reasons.[1] They see the more extensive trade as fostering ties with geopolitical allies.[2] They see bilateral trade agreements as heightening their interdependence with and influence over those partners. Conversely, geopolitical alliances make international trade ties stronger.[3] To paraphrase a recent paper on international finance, governments see international trade as being from "Mars," not "Mercury."[4]

Understanding the link between geopolitics and trade is topical now that the Trump Administration has embarked on a foreign trade policy centred on bilateral engagement. It has done so amidst growing uncertainty as to whether America will remain a predictable ally of its geopolitical and commercial partners. The administration's approach to trade emphasises bilateralism, reciprocity and zero-sum logic. It is sceptical of multilateralism and of the rules-based global order. Its

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[1] The literature on the economic benefits of free trade agreements, which goes back at least to Viner (1950), is too vast to be summarised here. We would be remiss however not to note such influential studies as Krugman (1991), Baldwin and Venables (1995) and Frankel et al. (1996). A short survey is Baier and Bergstrand (2006a).

[2] As Martin, Mayer and Thoening stress, the Liberal Peace argument, which posits that bilateral trade flows reduce the probability of a bilateral war by increasing the opportunity cost of conflicts, dates back to Kant (1795); see Martin, Mayer and Thoening (2018a). As they also recall, the E.U. itself, while now more than a free trade agreement, can be seen as illustrating the importance of political factors in impelling trade negotiations, insofar as the initial impetus was to draw its European members more closely together politically and make another war in Europe "inconceivable." Likewise, Mercosur was launched in 1991 to mitigate tensions between Argentina and Brazil over competing claims on natural resources. Empirical analyses of the Liberal Peace argument include Polachek (1980); Oneal and Russett (1999); Mansfield and Pevehouse (2000), Martin, Mayer, and Thoenig (2008a); Hegre, Oneal, and Russett (2010), Spolaore and Wacziarg (2016).

[3] There is evidence that violence or conflicts between countries can be enormously disruptive of economic activity, especially international trade (Blomberg and Hess 2006; Glick and Taylor 2010). Martin, Mayer, and Thoenig (2012) document complementarities between economic and political determinants of the geography of regional trade arrangements between 1950 and 2000, with country pairs having higher frequency of past wars being more likely to sign trade agreements, the more so the larger the trade gains. Baldwin and Jaimovich (2012) and Vicard (2012) consider military alliances as one potential determinant of free trade agreements in the modern era.

[4] See Eichengreen, Mehl and Chițu (2019), also courtesy of John Gray's book *Men Are from Mars, Women Are from Venus* (Gray 1992). In Roman religion and myth, Mercury was the god of commerce while Mars was the god of war. There is also a literature that shows that geopolitical considerations matter more broadly for trade. For instance Berger et al. (2013) provide evidence that increased US political influence, arising from CIA interventions during the Cold War, was used to create a larger foreign market for American products, while Fuchs and Klann (2013) show that political compliance matters for healthy trade relations with China, i.e. that officially receiving the Dalai Lama reduces exports to China.

emphasis on bilateral engagement was signalled by President Trump's decision on his first day in office to withdraw from the Trans-Pacific Partnership (TPP) negotiations. Trump denounced the 24-year old North American Trade Agreement as a "disaster" and the "worst trade deal maybe ever" and pressed ahead with separate bilateral negotiations with Canada and Mexico, ultimately tabling the USMCA (US-Mexico-Canada) trade agreement as a potential replacement. He called for correcting the U.S. bilateral trade deficits with its major trade partners while imposing tariffs on Chinese products.[5] He blocked the appointment of new judges to the appeal chamber of the World Trade Organization (WTO), sparking concern of a return to a pre-WTO era when nations, instead of following globally-agreed rules, used national leverage to negotiate the best possible deal as judged from a domestic standpoint.[6]

Meanwhile, uncertainty has developed as to whether America will remain a reliable geopolitical ally. The Trump Administration criticized America's NATO partners for failing to shoulder a fair share of the defense burden, dismissing the alliance as obsolete. It reneged on commitments to fight against global security threats, withdrawing from the Joint Comprehensive Plan of Action on Iran's nuclear program in May 2018 over the objections of France, Germany and the United Kingdom.[7] On 1 June 2018 it levied tariffs on imports of steel and aluminum from longstanding military allies, including Canada and the European Union (EU), citing national security concerns.[8] By then refusing to sign the joint communiqué of G7 Leaders at Charlevoix on 8-9 June 2018, President Trump raised fundamental questions about the future of a forum traditionally seen as comprising Washington's closest geopolitical allies.[9] After Mr. Trump called the EU a "foe" on trade, Donald Tusk, president of the European Council, spoke candidly of transatlantic relations: "With friends like Mr. Trump, who needs enemies?"[10]

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[5] See Swanson (2018).

[6] See Miles (2018).

[7] In addition, the U.S. withdrew from the Paris agreement on climate change mitigation in June 2017 on the ground that it would undermine the U.S. economy and put it as a disadvantage.

[8] Canada's Prime Minister Justin Trudeau made clear that being labelled a national security threat to the U.S. was an offence to Canada: "For 150 years, Canada has been America's most steadfast ally […] From the beaches of Normandy to the mountains of Afghanistan, we have fought and died together […] That Canada could be considered a national security threat to the United States is inconceivable."(quoted in *Financial Times* 2018a).

[9] It has been argued that, by isolating the U.S., this decision raised concerns as to whether the G7 should now be seen as the G6+1 forum and no longer as a club of nations sharing common values, such as democracy or market economy principles (Financial Times, 2018b). On that occasion, Germany's Chancellor Angela Merkel was quoted as saying that the summit did not mark the end of the transatlantic partnership between Europe and the U.S., but that that Europe could no longer rely on its ally (Nienaber 2018).

[10] See Backzynska (2018) and Reuters (2018).

The implications of these developments for U.S. trade relations are, at a minimum, unsettling. But assessing those implications is not straightforward. Causality between trade agreements and geopolitics can run both ways, as explained above. Multilateral trade negotiations and regional trade agreements are potential confounders, since regional and multilateral trade negotiations are correlated with bilateral trade agreements.[11]

Multilateral trade negotiations are also correlated with geopolitics, insofar as global trade talks since World War II have been conducted among nations tied together in military alliances, such as the North Atlantic Treaty, not least with a view to cementing the alliances in question. The U.S. promoted trade liberalization under the General Agreement on Tariffs and Trade (GATT) after 1945 partly as a way of solidifying relations with NATO members and Japan according to Clayton (1963), who was present at the creation.

This paper turns to history to address these challenges. We focus on the years prior to World War I, when multilateralism and the global rules-based order did not exist to not confound the analysis. This period saw a proliferation of bilateral trade agreements following negotiation of the Cobden-Chevalier treaty between the U.K. and France, the first major trade liberalization agreement of its kind, in 1860. The subsequent spread of bilateral agreements unfolded unevenly, as described by Pahre (2007). This unevenness is convenient insofar as cross-country and intertemporal variation in trade cooperation is informative for identifying the determinants of free trade agreements. And as noted, the period is well suited for focusing on the determinants of bilateral trade agreements, given absence of the confounding effects of multilateral negotiations and the current global rules-based order.[12]

Evidence from this era is further informative for identifying the impact of economic factors insofar as those economic factors were changing – they were generally growing stronger – over the period. Global trade grew almost half again as fast as global GDP over the four decades ending with World War I, driven by not only commercial diplomacy but also by exogenous technological advances such as the shift from sailing ships to steamships and the spread of steel-hulled vessels, screw

[11] The stalling of the Doha Round in the 2000s and subsequent breakdown of global trade negotiations under the auspices of the WTO, for example, caused countries to turn to bilateral and regional free trade agreements (FTAs) in response. See inter alia McMahon (2006). The slow pace of the Uruguay Round encouraged the U.S. to launched bilateral trade agreements with Canada and Israel in the latter part of the 1980s (and to negotiate NAFTA with Canada and Mexico in the early 1990s); see e.g. Wise (2007). Likewise, the conclusion of a trade agreement between the E.U. and Japan is seen by some as a response to the U.S.'s retrenchment from multilateral trade talks (The Economist, 2018).

[12] The first major multilateral organization, the League of Nations, was created after World War I.

propellers and refrigeration.[13] The period is equally promising for identifying the role of geopolitical factors, since it saw a proliferation of military and strategic alliances.[14]

We analyze 271 bilateral trade agreements among 44 countries in the period 1871-1913. We measure economic factors using gravity-model covariates familiar to the literature, which we interpret as proxies for trade frictions. We measure geopolitical motives using data on military alliances, including defense pacts, non-aggression treaties, neutrality treaties, and ententes.

We address endogeneity concerns with propensity score matching estimates of the average treatment effect among countries with defense pacts. We also implement an instrumental variable strategy.

The results verify the importance of both economic and geopolitical factors. We find that defense pacts raised the probability of a trade agreement within a pair of countries by as much as 20 percentage points. Our estimates imply that were the U.S. to alienate its geopolitical allies, the likelihood and benefits of successful bilateral agreements would diminish. Expected trade creation from an agreement between the U.S. and EU countries, for instance, would decline by 0.6 percent of total U.S. exports.

This paper contributes to three strands of literature. We extend existing studies of the impact of geopolitical considerations for trade agreements, such as Martin, Mayer and Thoenig (2012), Baldwin and Jaimovich (2012) and Vicard (2012) and Bove, Elia and Sekeris (2014), to an earlier era, enabling us to assess the generality of their findings. We contribute to the historical literature on trade

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[13] A comprehensive discussion is Findlay and O'Rourke (2007).

[14] Such alliances featuring prominently in all accounts of the factors heightening tension in the run-up to World War I. Austria, Germany and Russia formed the League of the Three Emperors, designed to prevent any two of them from teaming up against the third, in 1872. Their agreement expired in 1878, was renegotiated in 1881, and collapsed with Russia's withdrawal in 1887. Uncertainty about Russia's intentions led Austria and Germany to create the Dual Alliance in 1879. This was expanded into the Triple Alliance of Germany, Austria-Hungary and Italy in 1882, in which the three members committed to support one another in the event of war between one of them and another great power. The Triple Alliance was countered by the "Definition of Understanding" signed by Russia and France in 1892, intended to balance out the Central Powers. In 1897 it was enlarged to the Triple Entente between France, Britain and Russia, which entailed "friendly understandings" that the three countries would not fight one another. The Triple Entente was then supplemented by Ententes between Great Britain and France and Russia, respectively, signed in 1904 and 1907, and by the Entente Cordiale between France and England initiated in 1904. This enumeration is only an excerpt of the multitudinous diplomatic agreements of the period, but it is enough to suggest that the proliferation of trade and diplomatic agreements in this period renders it fruitful ground for investigating their inter-relationship.

agreements in the 19th century, such as Irwin (1993), Lazer (1999), Accominotti and Flandreau (2008) and Lampe (2009, 2011), by proposing two approaches to identifying the respective importance of economic and security considerations.[15] And we complement the literature on the economic consequences of the Trump Administration's foreign trade policies (e.g. Auerbach et al. 2017, Erceg, Prestipino and Raffo 2017, Lindé and Pescatori 2017), which has focused on the effects of its import-tariff and export-subsidy dimensions.

Section 2 presents our data and methodology. Section 3 reports the basic results focusing on pecuniary motives, while Section 4 adds geopolitical motives. Section 5 considers robustness checks, while Section 6 discusses the propensity score matching and instrumental variable estimates. The scenario analysis is presented in Section 7. Section 8 concludes by drawing out implications for policy.

2. Data and Methodology

We take data on bilateral trade agreements from Pahre (2008), who compiled them from government documents, contemporary enumerations and communication with other scholars. Pahre includes all treaties, exchanges of letters and other understandings in which the participating nations made mutual tariff concessions or granted Most Favored Nation (MFN.) status.[16] He excludes treaties governing navigation and shipping matters alone; treaties granting MFN. treatment in navigation laws but not in export and import duties; treaties granting reciprocal rights of

[15] Irwin(1993) finds that the 19th century liberalisation was attained entirely through bilateral agreements, with an utter absence of multilateral cooperation. Lazer's (1999) model suggests that the surge in bilateral trade agreements post-1860 worked through contagion. In other words, after Cobden-Chevalier was signed, smaller European economies had strong incentives to sign similar agreements with France and the U.K. to avoid trade diversion, as well as among each other. Countries that were located closer to the European economic core faced greater risk of trade diversion and were among the first to sign treaties. Accominotti and Flandreau (2008) show evidence that the Cobden-Chevalier network of bilateral trade agreements gave no boost to international trade whose expansion actually started losing momentum after 1870. Lampe (2009) shows that insofar as the agreements in question cut tariffs mainly on manufactured goods and not across the board, liberalization increased exports of corresponding items, but not overall trade. And Lampe (2011) finds that the Cobden-Chevalier network can be explained by a combination of economic, political economy and international determinants. A related country study that also pays attention to identification is Hubermann, Meissner and Oosterslinck (2017) which – using micro data – shows that the establishment of a foreign diplomatic network encouraged foreign trade in Belle Époque Belgium.

[16] MFN status is based on non-discrimination, whereby any concession or privilege granted by one contracting party to a product of another trading partner will be unconditionally granted to the like product of the other contracting party.

establishment of business operations; and Europe's unequal treaties with Africa and Asia, insofar as these last gave rights to one party without reciprocity.[17]

Our sample consists of annual observations for the years between 1871 – i.e. after German and Italian unification – and 1913 – just prior to World War I – for the 44 countries listed in Table A1. The country sample comes very close to comprising the universe of independent nations.[18] While the potential sample size is $(44\times43^2)/2$ = 40,678 observations, our basic estimates use roughly 30,000 observations due to the limited availability of covariates.

Figure 1 shows that the number of bilateral trade agreements doubled between 1871 and 1913, with some 180 such agreements in force in 1913. Over the full sample period, there were 271 agreements in total, compared to roughly 300 agreements in 2017. About three-quarters of the country pairs considered had no agreements. Hence there is significant cross-country and time heterogeneity to be exploited for identification.

Figure 2 shows bilateral trade agreements by region. European nations were parties to almost 60% of the agreements, against 40% for Latin American nations. The remainder consisted of agreements involving Asian nations or the United States and Canada.

[Figures 1 and 2 about here]

Our basic specification follows Baier and Bergstrand (2004), Baldwin and Jaimovich (2012) and Vicard (2012), estimating the probability of existence of a bilateral trade agreement in a particular dyad as:

[17] In some cases, it is difficult to identify when treaties expired. In such cases, Pahre assumes that they lasted as long as comparable treaties signed by other nations. In the absence of information about duration, Pahre considers that a treaty was in effect for ten years, because this was the most common duration. Pahre considers a treaty as being in effect in a given year if it was executed for at least six months. He also considers that a treaty was in effect if the nations in question agreed to honour it while negotiating a new one. In some cases, treaties were honoured although they had already expired. His data do not provide information as to how much tariff reduction was involved, but other studies suggest that they were probably limited. The bulk of tariff reductions at the global level came in the years following the Coben-Chevalier Treaty whereas tariffs were broadly stable in the period 1870-1880, at about 15-20% (see Tena-Junguito et al. 2012)..

[18] Colonies are excluded because they lacked the autonomy to negotiate treaties. We note a small handful of omissions, such as Venezuela and Siam (Thailand).

$$P(y_{i,j,t|}|\mathbf{X}) = [1 + \exp\big(-[\beta'\mathbf{X} + \alpha_i + \alpha_j + \lambda_t]\big)]^{-1} \quad (1)$$

where *i*, *j*, and *t* are the source country, destination country and time dimensions ($i = j$ =1…44; t = 1871…1913); y is a dummy variable which equals 1 if dyad (i, j) has a bilateral trade agreement in year t and 0 otherwise; α_i, α_j; and λ_t are vectors of source-country fixed effects, destination-country fixed effects and time fixed effects; and β is the vector of parameters.[19] **X** is a vector of controls which includes dyadic variables, such as distance and remoteness, posited to affect the probability of existence of a bilateral trade agreement in general equilibrium models of world trade in the spirit of Baier and Bergstrand (2004).[20] Theory and logic suggest that the net gains from a trade agreement between two nations increases as the distance between them declines, which should influence favorably the probability of existence of an agreement.[21] We measure distance as the natural logarithm of the physical distance (in kilometers) between the most populous cities of countries *i* and *j*, taken from CEPII's GeoDist data base.[22]

The net gains from a trade agreement between two nations should also increase when they are more remote from the rest of the world.[23] Remoteness is a measure of multilateral distance, which, for a given dyad (i, j) we compute as the average of distance between (i) country *i* and countries other than country *j* and (ii) country *j* and countries other than country *i*.

[19] The constant term is included insofar as estimates without it could not be successfully obtained. This changed slightly the interpretation of the fixed effects, but not the estimates of the remaining variables. If at all, when we excluded all fixed effects, the Mars effect estimates became somewhat stronger (see below).

[20] Baier and Bergstrand assume two factors of production, two monopolistically-competitive product markets, and transportation costs between countries in multiple continents.

[21] As Baier and Bergstrand put it, the closer are two nations, the lower are transportation costs and the higher is their trade volume. Slashing tariffs between close nations alleviates price distortions on a relatively large volume of trade, which improves utility of consumers more than a similar decrease in tariffs between distant countries, insofar as their volume of trade would be smaller.

[22] See Mayer and Zignago (2011).

[23] Countries that are remote from the rest of the world face higher transport costs, lowering trade volumes, other things equal. With less trade with the rest of the world, slashing tariffs between two countries in a particular dyad results in more limited trade diversion effects. Hence utility gains from consumers in the dyad in question are not offset by a fall in utility from consumers in the rest of the world.

Economic size and heterogeneity in factor endowments will further affect the probability of observing a trade agreement.[24] As data for these additional variables is more limited, however, we consider them in robustness checks only.

Previous studies have found that other dyadic covariates typically used in gravity models such as common border, common language, and common colonial relationship influence both bilateral trade patterns and the probability of trade agreements. These variables capture transaction costs or information asymmetries that affect trade and financial relations; they are sometimes described as capturing "familiarity" or "connectivity." We take data on them from CEPII's GeoDist data base.[25]

We start by reporting logit estimates of Equation (1) with standard errors robust to two-way clustering. Cameron et al. (2011) show that controlling for multiway clustering is important when using dyadic data, since failure to do so can lead to under-estimated standard errors and over-rejection of the null of statistical insignificance. We cluster standard errors by both source and destination country.[26]

3. Basic Results with Pecuniary Motives

The logit estimates of Eq. (1) in Table 1 are restricted to pecuniary motives and control for source country, destination country and time fixed effects. The explanatory variables are entered individually in columns 1 to 5 of Table 1 and jointly in columns 6 and 7.

The results are consistent with theory in that the probability of a trade agreement falls with distance. Also consistent with intuition, trade agreements are

[24] For instance, Baier and Bergstrand posit that net gains from a bilateral trade agreement increase with the economic size of the two nations in question (i.e. their average real GDPs) because the agreement increases the volume of trade of more varieties of goods. Moreover, the probability of a bilateral trade agreement is higher the larger the difference between two countries' relative factor endowments.

[25] The data consist of binary dummy variables that equal 1 if two countries are contiguous (common border), share a common official language (common language), and were ever in a colonial relationship (common colony); distance is the simple distance (in kilometres) between the two most populated cities of a particular dyad.

[26] In robustness checks we obtain estimates of Equation (1) using probit, linear probability models, time-varying fixed effects, logit cum survival temporal dummies and using survival-time data (see below). We address endogeneity and reverse causality issues by obtaining propensity score matching estimates and using an instrumental variable estimation strategy discussed in Section 6.

more likely between countries that are contiguous or in a colonial relationship.[27] In contrast, common language is statistically insignificant throughout. When remoteness is entered individually, its effect is negative, but it becomes statistically insignificant in the joint estimates (contrast column 2 with columns 6 and 7 of Table 1). The full model explains about 30% of the variance in trade agreements, of which 7 percentage points is explained by pecuniary determinants alone.[28]

[Table 1 about here]

Table 2 shows that the results are robust to the use of logit (in columns 1, 5 and 6); probit (in column 2); and linear probability models (in columns 3 and 4). The estimates again control for source country, destination country and time fixed effects in columns (1), (2), (3) and (5). The estimates of column (4) control for time-varying (destination and source) country fixed effects, while those of column (6) control for survival temporal dummies in the spirit of Beck et al. (1998). Although our main results are robust, there are differences when we include all the Baier and Bergstrand controls, as in column 5 of Table 2.[29] The sample in this case is considerably smaller, which inevitably affects estimation consistency and efficiency.

Because trade agreements are concluded for several years, observations may be serially correlated, as discussed by Beck et al. (1998), we also include survival temporal dummies in the manner of duration models (see column 6 of Table 2). Once more the results remain basically unchanged.

[Table 2 about here]

4. Extended Results with Geopolitical Motives

One can think of several channels through which geopolitics influence the probability of a trade agreement.[30] Insofar as trade agreements increase bilateral trade volumes and economic welfare, dyads in a military alliance have an incentive to

[27] The effect of contiguity is not statistically significant in column 6 of Table 1, while that of the common colony dummy is not statistically significant in column 5.

[28] The remainder is explained by the source country, destination country and time fixed-effects.

[29] We measure relative economic size and factor endowment in the spirit of Baier and Bergstrand with (i) the sum of countries' real GDPs within a dyad, (ii) the absolute difference in their real GDPs and (iii) in their real GDP per capita as well as (iv) the square of the latter variable, taking data from Maddison (2010). As stressed above, data for these additional control variables is more limited.

[30] Our discussion builds mainly on Martin, Mayer and Thoenig (2012).

conclude trade agreements so as to increase the opportunity cost of war and, in turn, solidify their security links. The need to maintain access to supplies and resources in times of war encourages allied nations to bolster an alliance with a trade agreement.[31] In addition, alliances are a vehicle for interaction and information exchange, enabling policy makers to learn about one another's options and challenges; low information asymmetries in turn help to bridge gaps and solve conflicts over trade and other international economic matters.[32]

We take data on military alliances among states between 1890 and 1913 from the Correlates of War Project.[33] Estimates including any type of military alliance are reported in column 1 of Table 3, while those including defense pacts, neutrality treaties, nonaggression treaties and entente only are in columns 2 to 5.[34]

In Table 3 geopolitical motives are measured using bilateral military alliance dummies equaling 1 if a defense pact, non-aggression treaty, neutrality treaty or entente exists between country *i* and country *j* in year *t*, and 0 otherwise.[35] The various military alliance dummies are typically not significant with the exception of the defense agreement dummy. Evidently, only the highest level of military alliance commitment influences the conclusion of a trade agreement. Put differently, only when countries invest significantly in their geopolitical relationship is there an enhanced likelihood of a trade agreement. This finding echoes the results of Long (2003), who found that defense pacts are associated with higher trade volumes among alliance members, but that trade between members of non-defense pacts, such as neutrality or nonaggression treaties, is statistically indistinguishable from trade between non-allies. And it may explain why some studies of the recent period, such

[31] Bonfatti and O'Rourke (forthcoming) take an opposing view and develop a model in which industrialisation requires the import of natural resources, potentially leading a smaller nation to trigger war either against a resource-rich country or the incumbent nation. As they argue, the model can help explain the US-Japanese conflict of 1941 and Hitler's invasion of Poland.

[32] As Martin, Mayer and Thoenig recall, this is longstanding point in the political science literature (see e.g. Keohane and Nye 1977, Haas 1980). It has been argued (e.g. in Morgan 2012) that the G7's stronger record relative to the G20 in effectively managing the global economy is due to the fact that the G7 membership comprises nations that are longstanding allies, unlike the G20, which brings together nations with open military conflicts or rivalries.

[33] See Gibler (2009) on formal alliances among states in the Correlates of War data base. Defense pacts are international agreements where the signatories promise to support each other militarily against a specific threat. A non-aggression treaty is an agreement between countries not to attack each other for a specified period of time. A neutrality treaty foresees that signatories observe neutrality if one of them is attacked. An entente is a friendly understanding or informal alliance between states.

[34] Here again we report in parentheses two-way cluster robust standard errors that control for both two-way clustering between source and destination countries as well as heteroscedasticity in the manner of Cameron et al. (2011).

[35] The estimates here include both pecuniary and geopolitical motives underlying trade agreements and control for source country, destination country and time fixed effects.

as Baldwin and Jaimovich (2012), conclude that geopolitical factors do not matter for trade agreements. To identify the effect of military alliances on the likelihood of conclusion of a trade agreement, one needs sufficiently granular data providing information on alliances.

The effect of defense pacts is economically large. A point estimate of 0.9 suggests that such pacts increase the probability of a trade agreement by 21 percentage points.[36]

[Table 3 about here]

Figure 3 provides a perspective on the relative importance of pecuniary and geopolitical motives. It shows marginal effects of changes from 0 to 1 for binary dummies (contiguity, common language, common colony and defense pacts) against first derivatives evaluated at means for continuous variables (distance and remoteness). All else equal, the effect of defense pacts is similar in magnitude to the effect of continuity or common colonial status.

Figure A1 shows the estimated probability of a trade agreement in a particular dyad (*i*, *j*) using the estimates reported in column (2) of Table (3) conditional on (i) the physical distance between *i* and *j* and on whether there is a defense agreement between *i* and *j* (black solid line) and when there is not (dashed line).[37] The conditional probability of a trade agreement declines with distance, as one would expect.[38] This decline is even more pronounced when geopolitical factors are unsupportive (when there is no defense pact). For very distant partners (towards the right hand side of the chart), the relative difference in estimated probabilities is sizeable.

[Figure 3]

[36] Assuming that the remaining variables are equal to zero and computing this elasticity as the difference between $(1 + e^{-0.9})^{-1} - (1 + e^{0})^{-1} = 0.21$. If we assume that the remaining variables stand at median levels the effect is smaller, at about 8 percentage points.

[37] The conditional probabilities are computed using the average remoteness between countries *i* and *j* and assuming that the countries are not contiguous, do not speak the same language and are not in a colonial relationship.

[38] As also explained above, and as Baier and Bergstrand put it, for a given distance between country pair and the rest of the world (other things equal), the closer are two countries, the lower their transport costs of international trade and consequently the higher is their trade volume. Elimination of the ad valorem tariff between close members alleviates the price distortion on a large amount of trade, improving utility of consumers more in the countries in question.

Identification of the positive effect of defense pacts on the probability of a trade agreement comes to a large extent from the cross-sectional dimension. Almost 90% of the panel observations have both a defense and a trade agreement or neither.[39] But the time dimension also plays a role. For instance, Romania had a defense agreement with the German Empire since 1883 before concluding a trade agreement in 1894. Peru and Bolivia had also a long-standing defense agreement before their trade agreement of 1873. And prior to concluding a trade agreement in 1875, Peru and Chile had a defense agreement in 1871.

5. Robustness

Table 4 reports estimates using alternative methodologies: logit (in columns 1, 5); probit (in column 2); and linear probability models (in columns 3 and 4). The estimates of column (1) do not control for unobserved heterogeneity, unlike those of columns (2) and (3) which control for country, destination country and time fixed effects. The estimates of column (4) control for time-varying (destination and source) country fixed effects, while those of column (6) control for survival temporal dummies in the spirit of Beck et al. (1998). The coefficient on the defense dummy is always positive and statistically significant.[40] When we exclude all fixed effects, as in column (1), Mars effects are somewhat stronger. And again, statistical significance remains when one controls for survival temporal dummies.

[Table 4 about here]

In Table A2 we control for whether countries within a dyad are enemies using a dummy variable which equals 1 if the countries in question are at war, i.e. if the intensity of a militarized conflict is equal to or greater than 3 in year *t*, and 0 otherwise, in line with the definition of Spolaore and Wacziarg (2016).[41] The effect of defense pacts is again unchanged. We also control for the extent of diplomatic relations with dyadic measures of diplomatic presence and rank (see below for details). The effect of defense pacts remains robust.

[39] In other words, only 10% of the observations have a defense agreement without a trade agreement or a trade agreement without an defense agreement. If we time-collapse the observations, the proportions are 73% and 27%, respectively. Moreover 24 dyads have defense agreements, compared with 271 dyads with trade agreements, as mentioned above.

[40] The coefficient changes in magnitude when we use linear estimation methodologies in lieu of nonlinear estimation methodologies, as one would expect.

[41] The data on militarized interstate disputes are also from the Correlates of War database.

In Table 5 we estimate the probability of finalizing a bilateral trade agreement in the current period, not simply whether a bilateral trade agreement exists for a particular dyad. We transform our observations into survival-time data with year as the time variable and trade agreement as the failure variable. The dependent variable now equals 0 until a trade agreement is signed by a particular dyad, 1 in the year of signature of the agreement in question, while all subsequent observations being now excluded from the estimation.[42] We again find positive and statistically significant Mars effects. The coefficient estimate of about 1.9 on defense pacts suggests that Mars effects increase the probability of signing a trade agreement by about 37 percentage points, i.e almost 80% more than in the basic estimates.

[Table 5 about here]

We can assess the predictive power of our model using Receiver Operating Characteristic (ROC) Analysis. We consider a range of alternative probability cut-offs; dyads for which our basic probability estimates are above the cut-offs in question are classified as having a trade agreement, while dyads for which the estimates is below the respective cut-offs are classified as having no trade agreement. For every possible cut-off, there are dyads with a trade agreement correctly classified as having one (true positives); dyads with a trade agreement incorrectly classified as having none (false negatives); dyads without a trade agreement correctly classified as having none (true negatives); and dyads without a trade agreement incorrectly classified as having one (false positives).

Figure 4 shows the ROC curve of the estimates in column (2) of Table 3; it plots the true positive rate (the fraction of observed positive outcomes correctly classified) against the false positive rate (the fraction of observed positive outcomes incorrectly classified) corresponding to each cut-off. Models with no predictive power lie along the 45-degree line, where true positives and false positives are equally likely. Models with perfect predictive power have a ROC curve that passes through the upper left corner of the figure. That our basic model's ROC curve is close to the upper left corner testifies to its predictive accuracy.

Another diagnostic computes the area under the ROC, also known as AUROC. This area can be interpreted as the probability that our model ranks a

[42] The estimates in Table 5 include the defense pact dummy as an explanatory variable in column (1), while pecuniary motives underlying trade agreements are added in columns (2) to (5). The estimates of column (5) control for source country, destination country and time fixed effects.

random positive observation (i.e. a dyad with a trade agreement) more highly than a random negative observation (i.e. a dyad without a trade agreement). Models with no predictive power have an AUROC equal to 0.5, against 1 for models with perfect predictive power. The AUROC of our model is 0.87 (with a standard error of just 0.0025). We easily reject the null hypothesis that the AUROC equals 0.5.

[Figure 4 about here]

6. Causality

Trade agreements and geopolitics are endogenous, since existing trade agreements may encourage the conclusion of a military alliance, while military alliances may encourage governments to solidify their relations through a trade agreement.[43]

To address this, we used propensity score matching to estimate the average treatment effect of military alliances among treated dyads. We obtained the estimates in question on the cross-sectional dimensional of our sample in two steps.[44] First, we obtained propensity scores i.e. the probability that a given pair has a military alliance (i.e. is treated) from a logit model. We used variables posited by political scientists to be correlated with power and proximity and, in turn, military alliance formation (see e.g. Walt 1985): economic size, population, physical distance, genetic distance, military expenditure and military personal. We then used nearest neighbor, radius, kernel and stratification matching to match treated pairs with control pairs (countries expected to have an alliance but which don't have one) based on their observable characteristics. The causal effect of military alliances was estimated by comparing the mean difference in shares between the two groups.[45]

We assigned observations to four blocks in the region of common support, i.e. the overlap in probability values between the treated and control pairs. This ensured that mean propensity scores for treated and control-group cases in each block were not different. The balancing property was satisfied insofar as the hypothesis of similarity

[43] Endogeneity problems could also work in our favour, however. As shown by Martin et al. (2012), past wars are strong determinants of future trade agreements, but with an opposite sign, and interact with pecuniary gains. Our alliance variable might hence capture both effects, and be biased towards zero in the basic estimates.

[44] Using the cross-sectional dimension aimed to make sure that we match between different pairs rather than between the same pair at different points in time.

[45] Causality remains nonetheless conditional on the observables used in the first stage regression which we run to obtain the propensity scores.

of covariates between the two groups was not rejected. Averaging the estimates across the last three algorithms, we find that defense pacts boost the probability of a trade agreement by about 20 percentage points (Table 6).[46]

[Table 6 about here]

Alternatively, we addressed endogeneity using an instrumental variable for military alliances: diplomatic representation, i.e. the presence and rank of diplomats from a sending nation in the host nation.[47] The presence of diplomats plausibly helps to forge or sustain international agreements and will therefore be positively correlated with military alliances.[48] Diplomatic representation is also unlikely to be otherwise correlated with trade agreements in this era.[49] Governments sent or accredited diplomats based on broad foreign policy considerations, not mainly in order to directly affect trade relations. An important task of diplomats in this earlier era was intelligence gathering about the host country. Expulsions or withdrawals of diplomats typically occurred because of foreign policy incidents, not in order to influence bilateral trade patterns. Only recently, with the advent of modern information and telecommunication technologies, have foreign embassies and consulates begun losing importance for foreign policy and intelligence gathering, and turned their attention to export promotion (see e.g. Rose 2007 for discussion). This variable plausibly satisfies the exclusion restriction for a valid instrument, in other words.[50]

The Correlates of War project provides data on diplomatic representation. This variable equals 0 if there is no presence of diplomats of country *i* in country *j* (and vice-versa); 1 if a chargé d'affaires of country *i* is present in country *j* (and vice-versa); 2 if there is a minister; 3 if there is an ambassador.[51]

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[46] When we excluded distance from the first stage the effects were stronger still and on the order of 30 percentage points.

[47] This follows the approach is Eichengreen, Mehl and Chițu (2019).

[48] The simple correlation coefficient between alliance and diplomatic representation is 0.2.

[49] Some of the gravity model covariates, such as economic size, are likely to be affected by the extent of trade and therefore by trade agreements, so we do not include them as instruments. The linear probability model of column 4 of Table 4 also includes pecuniary factors as instruments such as contiguity and distance which, as political scientists posit, are correlated with power and proximity and, in turn, with military alliance formation (see e.g. Walt 1985).

[50] If diplomatic representation was motivated by trade-promotion goals, which would determine the direction of trade and, in turn, the likelihood of trade agreements, results will be biased, and issue to which we turn below.

[51] A chargé d'affaires is a head of mission accredited by his country's foreign minister to the receiving nation's foreign minister when the two nations have not agreed to exchange ambassadors. A minister is a head of mission accredited to the receiving country's head of state; he leads a legation rather than an embassy. An ambassador is a head of mission accredited to the receiving country's head of state

In Table 7 the estimates of columns (1), (4) and (5) are obtained with a logit model, column (2) with probit model and column (3) with a linear probability model. The estimates of columns (1), (2), (3) and (5) control for origin country, destination country and time fixed effects, while those of column (4) control for survival temporal dummies in the spirit of Beck et al. (1998). The effect of defense pacts remains positive and statistically significant throughout.[52]

[Table 7 about here]

Skeptics may argue that "gunboat diplomacy" was pertinent insofar as some nations used force to open markets for their exporters. If diplomatic representation was motivated by trade promotion, these results will be biased.[53] To address this concern we calculated the residuals from a regression of diplomatic presence and rank on standard arguments of the gravity model, including distance, remoteness, contiguity, common language and common colonial relationship. This provides a measure of diplomatic representation that is orthogonal to trade frictions (including trade potential insofar as the latter is captured by the frictions in question). When we used this alternative instrument, the effect of defense pacts (reported in column 5 of Table 7) remained positive and significant.

7. Scenario Analysis

Given these findings, what would be the impact on the likelihood of conclusion of a trade agreement of a scenario in which the U.S. is no longer seen as a predictable guarantor of the security of its allies?

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who heads an embassy in the receiving country's capital city. For a small number of dyads there is also a category entitled "other" which, in the absence of further information, we discarded from the sample.

[52] Our instrument has power insofar as the first-stage regression yields a highly significant chi-square statistic.

[53] For instance, consuls in this earlier era served to certify that invoices were genuine for the process of customs declaration. We do not use data on consular representation for our instrument, however. Ferguson and Forslid (forthcoming) investigate the effects of trade promotion using firm-level data and information on the opening and closing of embassies abroad from the very similar neighbouring countries Sweden and Norway. They use a difference-in-difference specification where firms from Norway are used as a control group for Swedish firms. Their results show that large firms as well as medium-sized firms respond to the opening of embassies.

The international economic environment differed in important ways in the pre-World War I era from today, rendering inferences about the impact of current events extrapolated from our historical analysis necessarily heroic. International trade then was based on factor endowments, Hechscher-Ohlin style, unlike now, when trade is also based on monopolistic competition, intra-firm transactions and global value chains are important. International trade then focused on raw and manufactured goods, unlike now, where services and the digital economy are growing in importance.[54] But there were also similarities between that environment and today's. By some metrics, the global economy was equally integrated in this earlier era (O'Rourke and Williamson 2001; Obstfeld and Taylor 2003, 2004). Then as now, emerging powers rose to challenge established ones. Germany and the U.S. challenged Britain's economic leadership in the final decades of the nineteen century, not unlike how China is challenging the U.S. now. The same economic motives drive the existence of bilateral trade agreements, which makes insights from this earlier era still relevant.

Figure 5 shows the estimated probabilities of a trade agreement between the U.S. and selected NATO members under these scenarios.[55] It first assumes that the U.S. remains committed to its NATO obligations (see the estimated probabilities shown as dark grey bars where the defense pact dummy is set to 1). It then assumes that the U.S. no longer commits to its NATO obligations (see the estimated probabilities shown as light grey bars where the defense pact dummy is set to 0). The probability of the successful conclusion of a bilateral trade agreement between the U.S. and the countries in question clearly declines.

Figure 6 highlights the relative difference of the two probabilities shown in Figure 5.[56] The smallest relative probability decline, for Canada, is about 20 percent. Proximity implies low trade costs and strong gains from trade for these neighboring countries. It follows that economic considerations create incentives to sign bilateral trade deals, whether or not these are reinforced by geopolitical considerations. This is

[54] That said, manufactured goods are precisely those on which the Trump administration has focused its new trade policy, hence making the earlier era fertile ground to gauge its effect.

[55] The figure shows estimates for all NATO members included in our sample. We also show estimates for Japan, which is a non-NATO ally. Readers may ask whether structural changes in international trade patterns, such as the emergence of monopolistic competition or of global value chains, weaken the relevance of estimates obtained from an earlier era for such a scenario analysis. But, as our estimates have shown, the economic motives governing bilateral trade agreements have been remarkably stable in the last century. Now, like then, the agreements in question have been governed by the same trade frictions, hence suggesting that our estimates are not irrelevant for the modern era.

[56] This is obtained as the difference of the two estimated probabilities (including and excluding Mars effects), scaled by the probability including Mars effects.

in line with the fact that the US signed bilateral trade agreements with Canada and Mexico, replacing NAFTA with the USMCA trade deal in 2018.

But for countries that are remote from the US – or that did not have existing trade agreement with America – the story is different. In some cases, such as Japan and Germany, which have benefited extensively from U.S. military protection since World War II, the probability decline is about 50 percent. For the UK, this decline is more than 40 percent. U.S. disengagement from global geopolitical affairs and pursuit of a trade policy focused on bilateralism, not multilateralism, would significantly reduce the odds of bilateral deals.

[Figures 5 and 6 about here]

These estimates also suggest that expected trade creation from any future bilateral trade agreements between the U.S. and other countries would decline significantly were the U.S. seen as a less predictable military ally. Table 8 reports the results of a scenario analysis where we simulate the decline in trade creation from the conclusion of a hypothetical trade deal between the U.S. and EU countries when the U.S. no longer credibly adheres to its NATO obligations.[57] In the first row we report total exports in goods from the U.S. to selected EU countries in 2017.[58] Expected trade creation is reported in the second row; this reaches about 60% of the countries' total trade.[59] Expected trade creation including Mars effects is reported in the third row; it is computed as trade creation multiplied by the probability of a trade agreement; expected trade creation excluding Mars effects is computed analogously (with probabilities lowered by about 20 percentage points). The expected decline in trade creation were the U.S. no longer seen as a predictable alliance partner is the difference between the latter two rows.

The resulting total, at about US$ 21 billion (see the middle row of Table 8) is about 0.6% of total U.S. exports in 2017, or 0.1% of U.S. GDP. Relative to U.S. population of working age, this translates into a cost of about US$ 100 per person.

[57] This scenario is motivated by Mr. Trump's proposal on 25 July 2018 to cut all tariffs on non-auto industrial goods to zero with E.U. countries to appease transatlantic trade tensions, after his earlier suggestion of "no tariffs, no barriers" between the U.S. and G7 countries (see Donnan 2018 and Reuter 2018).

[58] We focus on the E.U. countries shown in Figures 6 and 7 (excluding the U.K.) which are N.AT.O. members. Extending the analysis to all 27 EU countries would produce larger effects.

[59] Where $e^{0.47} - 1 \approx 0.60$; this assumption is based on the median elasticity of the logarithm of trade with respect to a free trade agreement dummy (0.47) reported by Head and Mayer (2014) from a meta-analysis of 159 recent papers.

[Table 8 about here]

8. Conclusion

We have assessed the role of economic and security considerations in the conclusion of trade agreements in a world where multilateralism and the global rules do not exist, using the period before World War I as a laboratory. Our results suggest that international trade is from both "Mars" and "Mercury" – that both pecuniary and non-pecuniary factors matter for the conclusion of bilateral trade agreements. In particular, defense pacts boost the probability of a bilateral trade agreement by as much as 20 percentage points.

While these results speak to current discussions of the U.S. trade policy, they also speak to similar debates in other contexts. They suggest that diplomatic and strategic cooperation between the UK and the EU will be important for the outcome of the negotiation on the UK's future trade relations with the continent. They suggest that mitigating geopolitical risks in East Asia is important for fostering trade within the region. And they suggest that solving military conflicts would help Africa grow its intra-regional trade.

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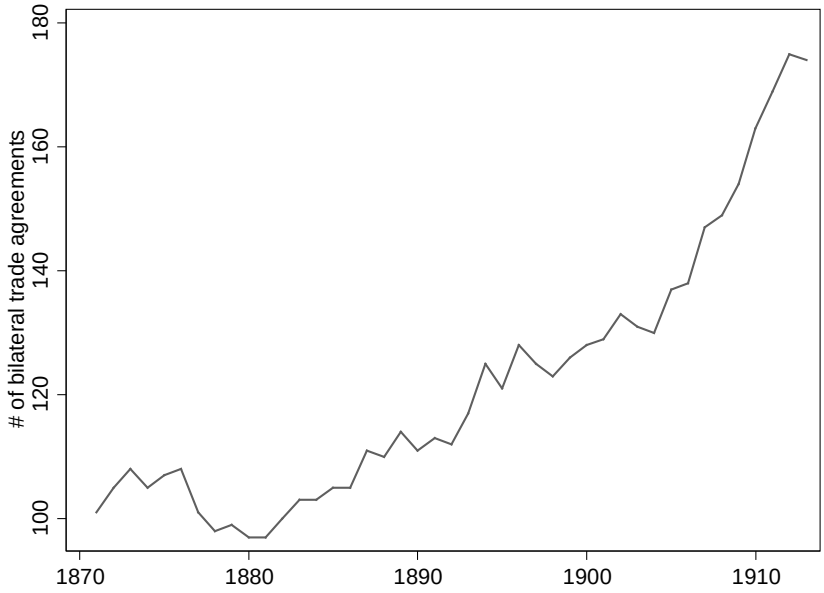
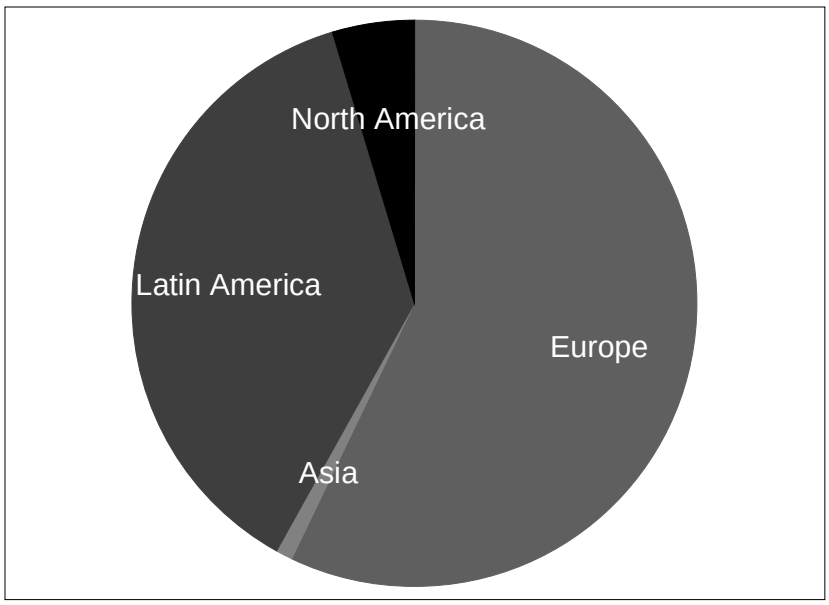
Figure 1: Evolution of the Number of Trade Agreements – 1871-1913



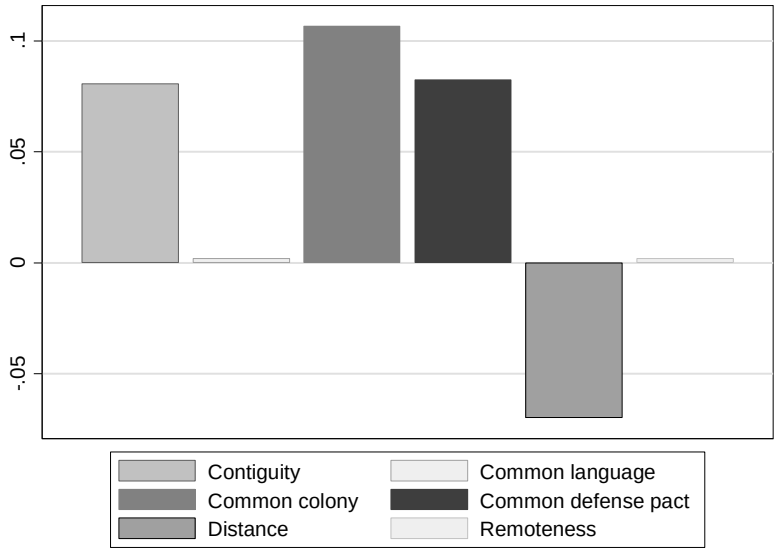
Note: The figure shows the number of bilateral trade agreements in force between 1871 and 1913 as reported in the data base of Pahre (2007).

Figure 2: Trade Agreements – Breakdown by Region



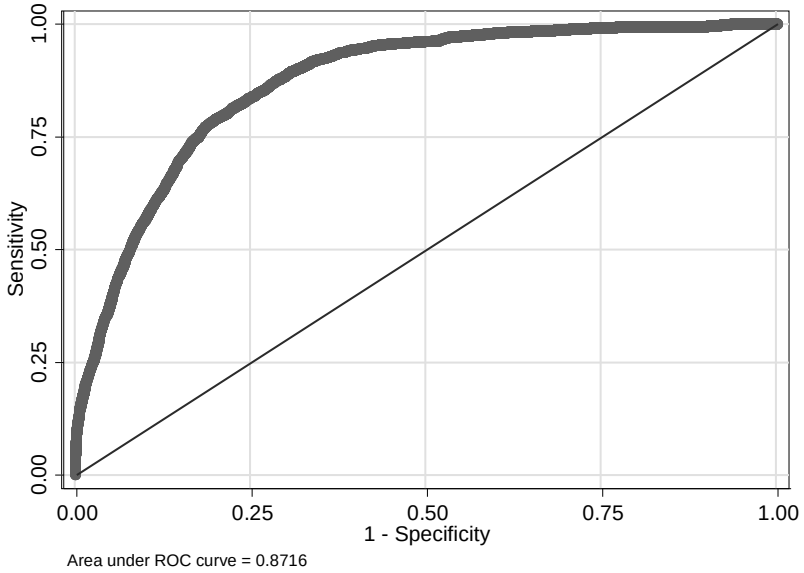
Note: The figure breaks down the bilateral trade agreements in force between 1871 and 1913 as reported in the data base of Pahre (2007) by main region of origin of the nations having signed the agreements in question.

Figure 3: Relative Economic Importance of Pecuniary vs. Geopolitical Motives



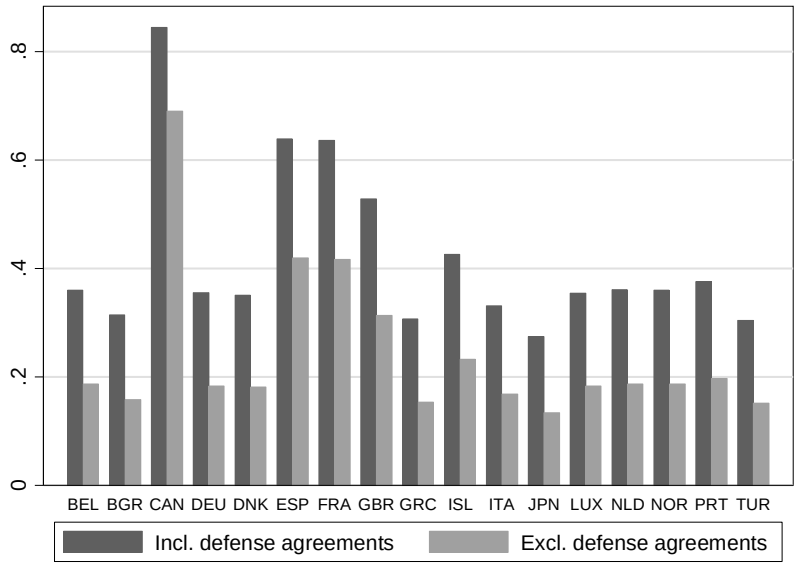
Note: The figure shows the marginal effects on the estimated probability of a trade agreement in a particular dyad (*i, j*) of changes in pecuniary and non-pecuniary factors using the estimates reported in column (2) of Table (3). Marginal effects are computed from changes from 0 to 1 for binary dummies (contiguity, common language, common colony and defense pacts) against first derivatives evaluated at means for continued variables (distance and remoteness).

Figure 4: Receiver Operating Characteristic (ROC) Analysis



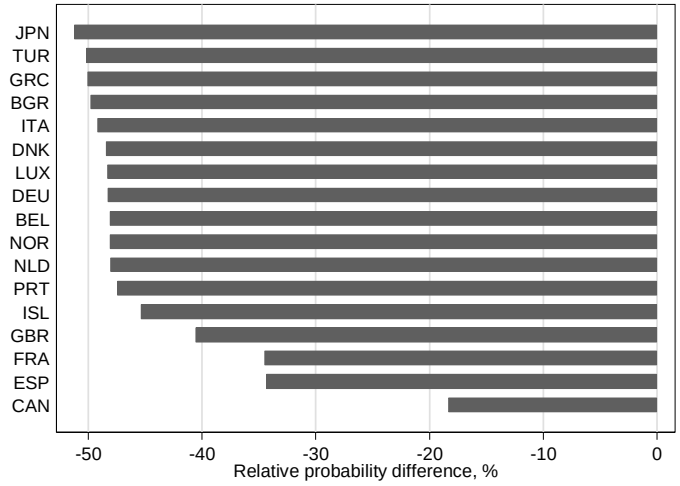
Note: The figure shows the ROC curve of our basic model estimates (reported in column (2) of Table 3); it plots the true positive rate (sensitivity) against the false positive rate (1 minus specificity) corresponding to each probability cut-off. Models with no predictive power lay along the 45-degree line. The figure also reports the area under the ROC (AUROC), which can be interpreted as the probability that our model ranks a random positive observation (i.e. a dyad with a trade agreement) more highly than a random negative observation (i.e. a dyad without a trade agreement).

Figure 5: Estimated Trade Agreement Probability – U.S. and its N.A.T.O. Allies



Note: The figure shows the estimated probabilities of a trade agreement between the U.S. and selected N.A.T.O. members (including Japan, which has the status of "major non-N.A.T.O. ally") using the estimates reported in column (2) of Table 3. The probabilities in question are computed by assuming (i) that the U.S. remains committed to its N.A.T.O. obligations (i.e. setting the defense pact dummy to 1; dark grey bars) as well as (ii) a hypothetical scenario where the U.S. no longer remains committed to its obligations, hence implying that the military alliance with N.A.T.O. members is as if inexistent (i.e. setting the defense agreement dummy to 0; light grey bars).

Figure 6: Relative Difference in Estimated Probabilities by Country



Note: The figure shows the relative difference in estimated probabilities for the two scenarios. This is obtained as the difference of the two estimated probabilities (including and excluding Mars effects), scaled by the probability including Mars effects., using the estimates shown in Figure 6.

Table 1: Basic Estimates with Pecuniary Motives

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Distance	-0.972***					-0.783***	-0.300*
	(0.263)					(0.288)	(0.170)
Remoteness		-58.253*				-0.067	-1.237
		(30.302)				(33.735)	(1.384)
Contiguity			1.854***			0.871	1.150***
			(0.483)			(0.696)	(0.438)
Common language				0.564		-0.478	-0.104
				(0.428)		(0.458)	(0.392)
Common colony					1.028	1.126***	0.983**
					(0.781)	(0.393)	(0.463)
Observations	30,487	30,487	30,487	30,487	30,487	30,487	35,260
Source country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	No
Destination country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	No
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	No
Pseudo-R^2	0.304	0.279	0.295	0.274	0.275	0.311	0.067
Log likelihood	-9251	-9577	-9362	-9645	-9637	-9158	-13105

Note: The table reports logit estimates of Eq. (1) obtained from our dyadic sample of observations over the period 1871-1913. The estimates are restricted to pecuniary motives underlying trade agreements and control for source country, destination country and time fixed effects. We report in parentheses two-way cluster robust standard errors that control for both two-way clustering between source and destination countries as well as heteroscedasticity in the manner of Cameron et al. (2011). *** $p<0.01$, ** $p<0.05$, * $p<0$ .1.

Table 2: Estimates with Selected Alternative Estimation Methods

	(1) Baseline logit	(2) Probit	(3) Linear probability model	(4) Linear probability model	(5) Additional Baier & Bergstrand (2004) controls	(6) Logit + survival temporal dummies
Distance	-0.783***	-0.415***	-0.040**	-0.040**	0.083	-0.243
	(0.288)	(0.153)	(0.017)	(0.018)	(0.172)	(0.328)
Remoteness	-0.067	2.575	1.233	1.233	-3.536*	-37.746
	(33.735)	(19.026)	(1.462)	(1.536)	(1.810)	(27.197)
Contiguity	0.871	0.504	0.172***	0.172***	1.234***	1.100**
	(0.696)	(0.358)	(0.053)	(0.056)	(0.334)	(0.526)
Common language	-0.478	-0.289	-0.039	-0.039	0.001	-0.977*
	(0.458)	(0.225)	(0.029)	(0.030)	(0.479)	(0.592)
Common colony	1.126***	0.626***	0.112*	0.112*	-0.047	1.259*
	(0.393)	(0.190)	(0.059)	(0.062)	(0.630)	(0.660)
Observations	30,487	30,487	35,260	35,260	8,028	21,860
Source country fixed effects	Yes	Yes	Yes	No	Yes	Yes
Destination country fixed effects	Yes	Yes	Yes	No	Yes	Yes
Time fixed effects	Yes	Yes	Yes	No	Yes	No
Time-varying country fixed effects	No	No	No	Yes	No	No
Survival temporal dummies	No	No	No	No	No	Yes
(Pseudo)-R^2	0.311	n.a.	0.261	0.313	0.123	n.a.
Log likelihood	-9158	-9153	-6993	n.a.	-4132	-710.8

Note: The table reports estimates of Eq. (1) obtained from our dyadic sample of observations over the period 1871-1913 and using alternative estimation methods, namely: logit (in columns 1, 5 and 6); probit (in column 2); and linear probability models (in columns 3 and 4). The estimates are restricted to pecuniary motives underlying trade agreements and control for source country, destination country and time fixed effects in columns (1), (2), (3) and (5). The estimates of column (4) control for time-varying (destination and source) country fixed effects, while those of column (6) control for survival temporal dummies in the spirit of Beck et al. (1998). The additional controls in column (4) include (i) the sum of countries' real GDPs within a dyad, (ii) the absolute difference in their real GDPs and (iii) in their real GDP per capita as well as (iv) the square of the latter variable. We report in parentheses two-way cluster robust standard errors that control for both two-way clustering between source and destination countries as well as heteroscedasticity in the manner of Cameron et al. (2011). *** $p<0.01$, ** $p<0.05$, * $p<0$ .1. "n.a." = not available.

Table 3: Estimates with Geopolitical Motives

	(1)	(2)	(3)	(4)	(5)
Distance	-0.786***	-0.778***	-0.782***	-0.789***	-0.780***
	(0.291)	(0.287)	(0.289)	(0.297)	(0.291)
Remoteness	-0.203	0.396	-0.108	0.183	-0.863
	(33.726)	(33.767)	(33.767)	(33.964)	(33.881)
Contiguity	0.876	0.855	0.868	0.870	0.883
	(0.692)	(0.697)	(0.695)	(0.697)	(0.696)
Common language	-0.473	-0.484	-0.481	-0.477	-0.460
	(0.465)	(0.443)	(0.454)	(0.459)	(0.475)
Common colony	1.122***	1.128***	1.127***	1.123***	1.121***
	(0.395)	(0.396)	(0.393)	(0.392)	(0.394)
Entente					-0.758
					(0.606)
Nonaggression treaty				-0.298	
				(0.660)	
Neutrality treaty			0.322		
			(1.021)		
Defense pact		0.894**			
		(0.378)			
Any alliance	-0.186				
	(0.387)				
Observations	30,487	30,487	30,487	30,487	30,487
Source country fixed effects	Yes	Yes	Yes	Yes	Yes
Destination country fixed effects	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2	0.311	0.312	0.311	0.311	0.311
Log likelihood	-9157	-9148	-9158	-9157	-9152

Note: The table reports logit estimates of Eq. (1) obtained from our dyadic sample of observations over the period 1871-1913. The estimates include both pecuniary and geopolitical motives underlying trade agreements and control for source country, destination country and time fixed effects. Geopolitical motives are measured using various definitions of bilateral military alliances, namely: any type of alliance (in column 1); defense pacts (in column 2); neutrality treaties (in column 3); nonaggression treaties (in column 4); and entente (in column 5). We report in parentheses two-way cluster robust standard errors that control for both two-way clustering between source and destination countries as well as heteroscedasticity in the manner of Cameron et al. (2011). *** $p<0.01$, ** $p<0.05$, * $p<0$ .1.

Table 4: Robustness Checks with Alternative Estimation Methods

	(1) Logit	(2) Probit	(3) Linear probability model	(4) Linear probability model	(5) Logit + survival temporal dummies
Distance	-0.298*	-0.413***	-0.040**	-0.040**	-0.224
	(0.174)	(0.153)	(0.017)	(0.018)	(0.335)
Remoteness	-1.151	2.784	1.280	1.290	-37.850
	(1.378)	(18.997)	(1.463)	(1.536)	(27.545)
Contiguity	1.105**	0.495	0.169***	0.168***	1.045**
	(0.450)	(0.359)	(0.053)	(0.055)	(0.533)
Common language	-0.106	-0.291	-0.040	-0.040	-0.919
	(0.388)	(0.217)	(0.029)	(0.031)	(0.607)
Common colony	1.003**	0.628***	0.113*	0.113*	1.234*
	(0.453)	(0.190)	(0.059)	(0.062)	(0.683)
Defense pact	1.468***	0.542**	0.138**	0.166*	1.881**
	(0.515)	(0.247)	(0.070)	(0.087)	(0.934)
Observations	35,260	30,487	35,260	35,260	21,860
Source country fixed effects	No	Yes	Yes	No	Yes
Destination country fixed effects	No	Yes	Yes	No	Yes
Time fixed effects	No	Yes	Yes	No	No
Time-varying country fixed effects	No	No	No	Yes	No
Survival temporal dummies	No	No	No	No	Yes
(Pseudo)-R^2	0.0705	n.a.	0.262	0.314	n.a.
Log likelihood	-13054	-9142	-6972	n.a	-709.1

Note: The table reports estimates of Eq. (1) obtained from our dyadic sample of observations over the period 1871-1913 and using alternative estimation methods, namely: logit (in columns 1, 5); probit (in column 2); and linear probability models (in columns 3 and 4). The estimates include both pecuniary and geopolitical motives (measured by bilateral defense pacts) underlying trade agreements. The estimates of column (1) do not control for unobserved heterogeneity unlike those of columns (2) and (3), which control for country, destination country and time fixed effects. The estimates of column (4) control for time-varying (destination and source) country fixed effects, while those of column (5) control for survival temporal dummies in the spirit of Beck et al. (1998). We report in parentheses two-way cluster robust standard errors that control for both two-way clustering between source and destination countries as well as heteroscedasticity in the manner of Cameron et al. (2011). *** $p<0.01$, ** $p<0.05$, * $p<0$ .1. "n.a." = not available.

Table 5: Mars Effect Estimates for the Signature of a Bilateral Trade Agreement (Survival-Time Data)

	(1)	(2)	(3)	(4)	(5)
Distance		-0.203	-0.205	-0.221	-0.224
		(0.181)	(0.184)	(0.289)	(0.304)
Remoteness		-0.380	-0.393	-35.682	-37.850
		(1.186)	(1.217)	(37.081)	(39.873)
Contiguity		0.706	0.729	0.903***	1.045***
		(0.464)	(0.470)	(0.318)	(0.354)
Common language		-0.223	-0.226	-0.944**	-0.919*
		(0.262)	(0.267)	(0.482)	(0.540)
Common colony		0.600**	0.604**	1.241*	1.234
		(0.303)	(0.306)	(0.666)	(0.782)
Defense pact	2.054***	1.439*	1.407*	1.617*	1.881**
	(0.647)	(0.805)	(0.778)	(0.928)	(0.910)
Constant	-5.325***	-0.160	-1.127	314.220	332.797
	(0.204)	(10.716)	(10.887)	(329.451)	(354.324)
Observations	34,140	27,541	26,206	21,703	20,646
Source country fixed effects	No	No	No	Yes	Yes
Destination country fixed effects	No	No	No	Yes	Yes
Time fixed effects	No	No	Yes	No	Yes
Gravity controls	No	Yes	Yes	Yes	Yes
(Pseudo)-R^2	0.00329	0.0132	0.0391	0.121	0.159
Log likelihood	-1057	-872.7	-843	-747.8	-709.1

Note: The table reports logit estimates of Eq. (1) obtained from our dyadic sample of observations over the period 1871-1913 where the observations in question were transformed into survival-time data with year as the time variable and trade agreement as the failure variable. The dependent variable hence equals 0 until a trade agreement is signed by a particular dyad, 1 in the year of signature of the agreement in question, while all subsequent observations are excluded from the estimation. The estimates include the defense pact dummy as an explanatory variable in column (1), while pecuniary motives underlying trade agreements are added in columns (2) to (5). The estimates of column (5) control for source country, destination country and time fixed effects. We report in parentheses two-way cluster robust standard errors that control for both two-way clustering between source and destination countries as well as heteroscedasticity in the manner of Cameron et al. (2011). *** $p<0.01$, ** $p<0.05$, * $p<0$ .1.

Table 6: Average Treatment Effect of Military Alliances

Matching algorithm	No. of treated pairs	No. of control pairs	Average treatment effect	Bootstrapped S. E.	*t*-stat
Nearest neighbour	27	20	0.222	0.152	1.461
Radius	27	188	0.237	0.097	2.443 ***
Kernel	27	188	0.216	0.112	1.929 ***
Stratification	27	188	0.220	0.110	2.000 ***

Note: The table reports the average treatment effect (ATT) of military alliances on treated pairs when currency shares is the outcome variable. The estimates were obtained with four algorithms (nearest neighbour, radius, kernel and stratification matching) to match treated pairs with control pairs in the region of common support. The standard errors (S.E.) of the ATT were obtained with 30 bootstrap replications. *** $p<0.01$.

Table 7: IV estimates using Diplomatic Representation as Instrument

	(1) Logit	(2) Probit	(3) Linear probability model	(4) Logit + survival temporal dummies	(5) Logit + Defense trade
Distance	-0.873***	-0.452***	-0.052	0.833	-0.906***
	(0.307)	(0.164)	(0.036)	(0.821)	(0.303)
Remoteness	3.020	3.845	3.765*	-177.392	2.550
	(35.909)	(19.789)	(2.102)	(146.570)	(35.890)
Contiguity	0.722	0.440	0.021	1.959	0.906
	(0.681)	(0.353)	(0.132)	(1.995)	(0.706)
Common language	-0.528	-0.312	-0.072	-4.491#	-0.582
	(0.460)	(0.222)	(0.084)	(3.395)	(0.452)
Common colony	1.039**	0.590**	0.136**		1.163**
	(0.517)	(0.257)	(0.069)		(0.501)
Defense pact	0.127**	0.065*	6.294**	0.339+	0.148**
	(0.065)	(0.037)	(3.025)	(0.224)	(0.075)
Observations	5,411	5,411	6,525	996	5,411
Source country fixed effects	Yes	Yes	Yes	Yes	Yes
Destination country fixed effects	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	No	Yes
Survival temporal dummies	No	No	No	Yes	No
Log likelihood	-1639	-1641	n.a.	-76.97	-1638

Note: The table reports estimates of Eq. (1) obtained from our dyadic sample of observations over the period 1871-1913 using an instrumental variable estimation strategy where diplomatic representation at the level of chargé d'affaires, minister, and ambassador between states is used as an instrument. The estimates of columns (1), (4) and (5) are obtained with a logit model, those of column (2) with probit model and those of column (3) with a linear probability model. The estimates of columns (1), (2), (3) and (5) control for country, destination country and time fixed effects, while those of column (4) control for survival temporal dummies in the spirit of Beck et al. (1998). We report in parentheses two-way cluster robust standard errors that control for both two-way clustering between source and destination countries as well as heteroscedasticity in the manner of Cameron et al. (2011). *** $p<0.01$, ** $p<0.05$, * $p<0$ .1, $^{+}$ p <0.15. "n.a." = not available.

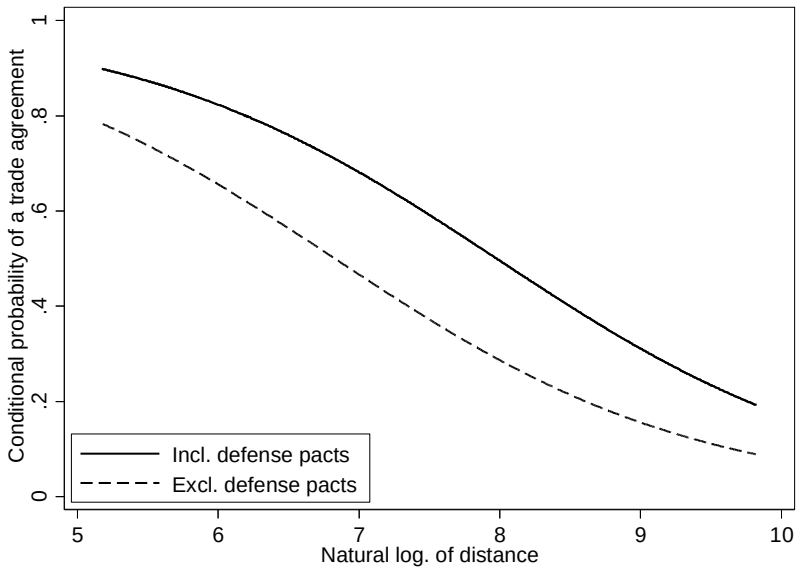
Table 8: Scenario Analysis

			France	Spain	Portugal	Nether-lands	Belgium	Germany	Luxem-bourg	Denmark	Italy	Bulgaria	Greece
US exports to EU members in 2017	*USD billion*		34.2	11.0	1.2	42.2	29.9	53.5	1.1	2.2	18.3	0.4	1.0
Head&Mayer 2014 FTA elasticity on trade	*0.47*		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Trade creation if free trade agreement	*USD billion*		20.5	6.6	0.7	25.3	17.9	32.1	0.6	1.3	11.0	0.2	0.6
Expected trade creation (incl. Mars effects)			13.1	4.2	0.3	9.1	6.5	11.4	0.2	0.5	3.6	0.1	0.2
Expected trade creation (excl. Mars effects)			8.6	2.8	0.1	4.8	3.4	5.9	0.1	0.2	1.9	0.0	0.1
Decline in expected trade creation	*USD billion*		4.4	1.5	0.1	4.4	3.1	5.5	0.1	0.2	1.8	0.0	0.1
Total decline in expected trade creation	***USD billion***	**21.3**											
- as a share of US GDP in 2017	*% of GDP*	0.11											
- as a share of US trade in 2017	*% of GDP*	0.55											
- per US citizen	*USD*	66											
- per US person of working age (15-64)	*USD*	104											
- per US taxpayer	*USD*	151											

Note: The table reports the results of a scenario analysis simulating the decline in expected trade creation from hypothetical trade agreements between the U.S. and selected European Union (E.U.) countries (those that are N.A.T.O. members shown in Figures 5 and 6) where we assume that the U.S. is no longer seen as a predictable military ally and committed to its N.A.T.O. obligations. This is motivated by Mr. Trump's proposal on 25 July 2018 to cut all tariffs on non-auto industrial goods with E.U. countries "to zero" to appease transatlantic trade tensions, after Mr. Trump's earlier suggestion to have "no tariffs, no barriers" between the U.S. and G7 countries (see Donnan (2018) and Reuter (2018)). We report in the first row of the table the total exports from the U.S. to E.U. countries in 2017. Trade creation implied by a trade agreement between the U.S. and the countries in question is reported in the second row, and is assumed to reach about 60% of total trade. This assumption is based on the median elasticity of the logarithm of trade with respect to a free trade agreement dummy (0.47) reported by Head and Mayer (2014) from a meta-analysis of 159 recent papers. Expected trade creation including Mars effects is reported in the third row and is computed as trade creation multiply by the probability of a trade agreement (see Figure 6); expected trade creation excluding Mars effects is computed analogously (with probabilities lowered by about 20 percentage points). The expected decline in trade creation if the U.S. were no longer seen as predictable is the difference between the latter two rows. The resulting total (USD 21.3 billion) is then scaled by alternative metrics, including 2017 US GDP (USD 19.5 trillion), total trade (USD 3.9 billion), population (325 million), population of working age (205 million), and number of U.S. taxpayers (141 million).

ONLINE APPENDIX (NOT FOR PUBLICATION)

Figure A1: Economic Importance of Pecuniary vs. Geopolitical Motives (cont'd)



Note: The figure shows the estimated probability of a trade agreement in a particular dyad (*i, j*) using the estimates reported in column (2) of Table (3) conditional on (i) the physical distance between *i* and *j* and on whether there is a defense pact between *i* and *j* (black solid line) or not (dashed line). The conditional probabilities are computed using the average remoteness between countries *i* and *j* and assuming that the countries are not contiguous, do not speak the same language and are not in a colonial relationship.

Table A1: Country Sample

Argentina	Iran
Austria	Italy
Belgium	Japan
Bolivia	Liechtenstein
Brazil	Luxembourg
Bulgaria	Mexico
Canada	Montenegro
Chile	Netherlands
China	Nicaragua
Colombia	Norway
Costa Rica	Paraguay
Cuba	Peru
Denmark	Portugal
Dominican Republic	Romania
Ecuador	Russian Federation
El Salvador	Serbia
France	Spain
Germany	Sweden
Greece	Switzerland
Guatemala	United Kingdom
Honduras	Turkey
Iceland	U.S.A

Note: The table reports the 44 countries in the sample for which trade agreement data are available from Pahre (2008). China's trade agreements included in the sample are not the unequal treaty port agreements with imperial powers but agreements with Brazil and Mexico.

Table A2: Estimates Controlling for Enemies

	(1)	(2)	(3)	(4)	(5)
Distance	-0.786***	-0.778***	-0.782***	-0.788***	-0.780***
	(0.291)	(0.287)	(0.288)	(0.296)	(0.290)
Remoteness	-0.311	0.284	-0.229	0.063	-0.971
	(33.710)	(33.751)	(33.753)	(33.942)	(33.867)
Contiguity	0.886	0.865	0.878	0.880	0.893
	(0.690)	(0.694)	(0.693)	(0.695)	(0.694)
Common language	-0.476	-0.487	-0.484	-0.479	-0.463
	(0.465)	(0.443)	(0.454)	(0.459)	(0.475)
Common colony	1.129***	1.134***	1.134***	1.130***	1.127***
	(0.391)	(0.392)	(0.390)	(0.389)	(0.391)
Entente					-0.750
					(0.605)
Nonaggression treaty				-0.287	
				(0.648)	
Neutrality treaty			0.353		
			(0.994)		
Defense pact		0.895**			
		(0.379)			
Any alliance	-0.179				
	(0.381)				
Enemy	-1.165	-1.181	-1.217	-1.166	-1.138
	(0.867)	(0.865)	(0.870)	(0.872)	(0.853)
Constant	8.112	2.747	7.348	4.798	13.939
	(299.610)	(299.971)	(299.995)	(301.643)	(301.002)
Observations	30,487	30,487	30,487	30,487	30,487
Source country fixed effects	Yes	Yes	Yes	Yes	Yes
Destination country fixed effects	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2	0.311	0.312	0.311	0.311	0.311
Log likelihood	-9155	-9146	-9156	-9155	-9150

Note: The table reports logit estimates of Eq. (1) obtained from our dyadic sample of observations over the period 1871-1913. The estimates include both pecuniary and geopolitical motives underlying trade agreements and control for source country, destination country and time fixed effects. Geopolitical motives are measured using various definitions of bilateral military alliances, namely: any type of alliance (in column 1); defense pacts (in column 2); neutrality treaties (in column 3); nonaggression treaties (in column 4); and entente (in column 5). The estimates control for whether a pair of countries within a dyad are enemies using a dummy variable which equals 1 if the countries in question are at war, i.e. if the intensity of a militarized conflict is equal to or greater than 3 in year *t*, and 0 otherwise, in line with the definition of Spolaore and Wacziarg (2016). We report in parentheses two-way cluster robust standard errors that control for both two-way clustering between source and destination countries as well as heteroscedasticity in the manner of Cameron et al. (2011). *** $p<0.01$, ** $p<0.05$, * $p<0$ .1.

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