# Alliance Networks and Trade: The Effect of Indirect Political Alliances on Bilateral Trade Flows

Dotan A. Haim *

Department of Political Science, University of California, San Diego

March 23, 2015

**Abstract**

How does the network of international political alliances influence trade flows? Previous work suggests that political alliances matter in predicting trade outcomes because of security externalities: states can turn the economic benefits from trade into increased political and military power. However, work to date investigates only the relationship between *dyadic* political alliances and trade, which ignores the complexity of international alliance structures and fails to account for the interdependent nature of international political relationships. In this article, I argue that states not only consider their direct political relationships when shaping international trade policy, but also focus crucially on indirect alliance relationships. Using social network methodology, I find that states trade more with other states with whom they have more *shared* alliances and with states that are in the same alliance *community*. Once these indirect relationships are accounted for, the apparent association of dyadic alliances with trade is drastically reduced. Being in the same alliance community as another state predicts an increase in trade that is approximately four times greater than the increase associated with a dyadic alliance. Additionally, results suggest that states promote trade with central states in their own alliance community while restricting trade with central states in other communities. States also trade less with other states as the length of the shortest path between them (geodesic distance) in the alliance network grows.

**Keywords:** Alliance Networks, International Trade, Social Network Analysis
**Word Count:** 10,858

*E-mail: *dhaim2@gmail.com*. Address: University of California, San Diego, Department of Political Science, Social Sciences Building 301, 9500 Gilman Drive #0521, La Jolla, CA, 92092.

# Introduction

Much of the recent work in IPE highlights domestic determinants of international trade, but international power politics still matter in determining trade policy. While previous studies find that political alliances have notable impacts on trade outcomes, these studies focus primarily on dyadic political relationships. Focusing only on dyadic alliances overlooks the complexity of international alliance structures and fails to account for the interdependence of the international system. A growing literature on international networks has shown the value of considering extra-dyadic relationships between states when investigating a variety of international phenomena (Maoz 2012, Ward, Stovel & Sacks 2011, Hafner-Burton, Kahler & Montgomery 2009). In this article, I argue that a network approach considering second level alliances (i.e. not just allies, but also the allies of allies) allows for important theoretical and empirical advances in understanding the relationship between alliances and trade.

Building on the seminal work of Gowa and Mansfield (1993), I focus on the effects of security externalities (the potential for economic gains to be transferred to political and military power) on government and firm decisions to promote trade with certain countries and restrict trade to others. However, thinking about these externalities in terms of dyadic relationships is less meaningful than conceptualizing externalities as being affected by properties of international alliance networks. I highlight four mechanisms by which indirect alliance relationships drive bilateral trade flows. First, states take indirect alliance relationships into account when determining their own bilateral trade policies. If country A is considering its trade policy with country B, it takes into account not only its direct political relationship with B, but also the political relationships that B has with other countries. For example, during the Cold War, the motivation behind the United States promoting trade with US proxies and restricting trade with Soviet proxies had little to do with security externalities deriving from direct relationships with these countries. On their own, they posed little threat to US security. Rather, negative security externalities derived from second level alliances with the Soviet bloc.

Second, states not only consider security implications when determining their own trade policies, but also consider the implications of promoting trade between other states. States derive positive security externalities when their allies trade with each other and negative externalities when their enemies trade with each other. Third, indirect alliance ties impact firms' risk assessment when considering foreign investment. Finally, the position of a potential trade partner in the overall alliance structure drives the level of security externalities associated with trade. Benefiting a state that is central to one's own alliance community will have a greater positive effect on security that benefiting a more peripheral state.

After laying out the theoretical mechanisms connecting indirect alliance relationships to bilateral trade flows, I use tools developed by social network analysis to test the empirical implications of the theory. I find that *shared* alliances and alliance *communities* are substantially better predictors of trade flows than dyadic alliances, regardless of whether a dyadic relationship exists. Additionally, I find that states trade more with central states within their own alliance community while limiting trade with central states in different communities. Finally, I use a measure of geodesic distance between states in the alliance network to differentiate the degree to which trade with a non-allied states implies negative security externalities. As the length of the shortest alliance paths between a pair of states increases, the model predicts even less trade in that dyad.

## Why alliances influence trade

An important line of literature in international relations finds that political alliances facilitate international trade while political tensions result in trade restrictions (Gowa & Mansfield 1993, Gowa 1994, Gowa & Mansfield 2004, Liberman 1996, Long 2003, Berger, Easterly, Nunn & Satyanath 2013). The proposed mechanism behind these results is the consideration for security externalities that affect the costs and benefits of trading with a certain country. Because economic gains can be translated into military strength and international influence, trading with a political enemy reduces the benefits of trade. On the other hand, trading with an ally has positive security externalities because the potential military strength and political influence that an ally gains from trade benefits both parties in the relationship. Gowa and Mansfield (1993) set this up as an optimal tariff game where two states individually decide either to cooperate (low tariffs) or defect (high tariffs). In this prisoner's dilemma format, cooperation can be sustained in an infinitely repeated game under certain discount rates. The added costs of negative security externalities associated with trade with an enemy make the cooperative equilibrium more difficult to sustain, while the positive externalities derived from trade with an ally make cooperation more easily sustainable.

The shift in focus away from states as the important level of analysis in IPE casts some doubt on the viability of this model. The dominant paradigm in IPE has shifted to open economy politics (OEP), which focuses to the incentives of individual political and business actors (Lake 2009). Much of the work in this research agenda has focused on domestic institutions (Rogowski 1987, Milner & Kubota 2005, Mansfield, Milner & Rosendorff 2002, Karol 2007, Lohmann & O'Halloran 1994) and individual firms (Melitz 2003, Helpman 2013, Pinto & Weymouth 2013). The actors that are actually involved in trade are firms that likely put concerns of profit maximization above international security concerns. Disaggregating even further, a significant portion of recent work has focused on individual preferences on trade (Scheve & Slaughter 2001, Hiscox 2006, Mansfield & Mutz 2009, Lü, Scheve & Slaughter 2012).

However, politicians can still manipulate trade flows to align with security interests through national level policies that affect the incentives of firms to invest and trade in certain countries. While tariffs were the focus of the early literature on alliances and trade, more recent work has illuminated a broader menu of tools that states can use to shape trade flows. For one, political leaders can incentivize trade with certain countries through preferential trade agreements (PTAs) and large multilateral institutions like the WTO. Mansfield (1997) argues that the interaction between political alliances and PTAs is driving the relationship between alliances and trade (Mansfield & Bronson 1997). In addition, negotiations over political alliances and trade policy are often directly tied with each other, which results in bundled alliances that involve both political and economic aspects (Stasavage & Guillaume 2002, Long & Leeds 2006).

In place of tariffs, states increasingly use non-tariff barriers to shape trade flows (Grieco 1990). These measures include import quotas, anti-dumping measures, countervailing duties, export subsidies, and unreasonable standards for the quality of goods, among others. In extreme cases, governments can impose explicit trade sanctions on other regimes for security purposes. Recently, policies regarding sanctions on Iran, Russia, and Cuba have been particularly salient. Whether or not these trade sanctions work in changing other countries' security policies, they certainly affect bilateral trade flows (Hufbauer, Elliot, Cyrus & Winston 1997, Caruso 2003, Yang, Askari, Forrer & Teegen 2004, Biglaiser & Lektzian 2011). In addition to policies that are specifically designed to facilitate trade with allies and disincentivize trade with enemies, firm-level decisions are driven by risk-perception that is shaped by political alliances. Firms are likely to view investment in political enemies of their base country as riskier than investment in political allies (Li & Vashchilko 2010). States are more likely to come into conflict, impose trade sanctions, and have strained diplomatic relations with non-allied states (Deutsch & Singer 1964), which can have significant deleterious effects on a firm's trade (Pollins 1989*b*, Glick & Taylor 2010).

While formal political alliances are imperfect indicators of similar security interests (Siverson & King 1980, Ostrom & Hoole 1978, Bueno de Mesquita 1981), they still serve as a meaningful indicator in the majority of cases (Bueno de Mesquita 1981, Gowa & Mansfield 1993). Reneging on alliance commitments can be costly because domestic and international audiences may punish their leaders for reneging on previous commitments (Fearon 1994, Gaubatz 1996, Tomz 2007). Additionally, the fact that many security alliances are bundled with economic agreements means that abrogating security treaty commitments can result in economic costs (Stasavage & Guillaume 2002, Long & Leeds 2006). Given that breaking alliance agreements is costly, states are likely to sign formal agreements primarily with states that share similar security concerns. Empirical work suggests that states rarely renege on their alliance commitments (Leeds, Long & Mitchell 2000) and when they do renege, it is usually due to power shifts and regime changes that took place after agreements were signed (Leeds 2003). Because states sign formal defense commitments primarily with states that have similar security concerns, they are still the best indicator of whether trade is associated with positive or negative security externalities.

While empirical evidence generally supports the hypothesis that alliances facilitate trade, especially during periods of bipolarity in the international system (Gowa & Mansfield 1993, Liberman 1996, Gowa & Mansfield 2004, Long & Leeds 2006, Kono 2012), there are also important criticisms of this idea. In an early rebuttal of Gowa and Mansfield's finding, Morrow and colleagues argue that the relationship between alliances and trade is driven by similarities in regime type and other underlying preferences (Morrow, Siverson & Tabares 1998). Gowa and Mansfield later argue that Morrow et al made several coding errors that impact the results and that alliances have a bigger impact on the trade of goods that are produced under conditions of increasing returns to scale (Gowa & Mansfield 2004). At the firm level, despite the fact that firms often continue to trade with countries who have tense relations their base country (Davis & Meunier 2011, Levy & Barbieri 2004), on average, trade and investments are reduced when tensions emerge (Pollins 1989*a*, Pollins 1989*b*, Keshk, Pollins & Reuveny 2004).

While I argue that political alliances still matter, considering only dyadic alliances does not allow researchers to capture the full picture of how alliances affect security externalities associated with trade. A network framework allows for a more nuanced theoretical understanding of how formal alliance commitments shape security concerns associated with trade.

## Applying networks

While, to my knowledge, social network analysis (SNA) has not been applied to the relationship between alliances and trade, a growing literature in international relations uses network theory to illuminate the importance of extra-dyadic ties for relationships between states (Maoz 2012, Ward, Stovel & Sacks 2011, Hafner-Burton, Kahler & Montgomery 2009). Studying international relations at the dyad level makes the problematic assumption that individual dyads are independent from one another, despite the fact that most theories suggest otherwise (Ward, Siverson & Cao 2007). As Lupu and Traag (2013) put it: 'we have assumed independence in order to study interdependence' (p. 1012). Network analysis can be used to overcome some of these drawbacks by more accurately depicting the interdependence inherent in the international system.

A network can be constructed using any dyadic data that describe relational ties between states. In the most basic formulation of a network, two nodes (which can be individuals, countries, firms, etc.) are either connected by a tie (which can represent a friendship, alliance, etc.) or are unconnected. In more complex networks, these ties can be weighted by substantive aspects of the relationship, such as trade flows (Ingram, Robinson & Busch 2005, Dorussen & Ward 2008, Lupu & Traag 2013) or the number and nature of shared memberships in IOs (Hafner-Burton & Montgomery 2006, Hafner-Burton, Kahler & Montgomery 2009, Maoz, Kuperman, Terris & Talmud 2006, Dorussen & Ward 2008). Once the network is constructed, one can ascertain statistics that describe the position of nodes (e.g. its 'centrality') or the relationships between nodes (e.g. distance, affinity scores, or community affiliation). These statistics can then be used in traditional statistical models. A new line of research uses exponential random graph models (ERGMs) to describe the endogenous formation of network structures (Kinne 2013, Warren 2010).

The international relations literature that uses network methodology falls into four main camps. In the first group, studies use measures of centrality to proxy for different aspects of influence/power (Hafner-Burton & Montgomery 2006, Hafner-Burton, Kahler &

Montgomery 2009). In the second camp, studies use network structures to ascertain indirect relationships between countries. These studies use joint memberships in international organizations (Hafner-Burton, Kahler & Montgomery 2009, Maoz et al. 2006, Dorussen & Ward 2008) or affinity scores based on alliance profiles (Maoz et al. 2006) and trade communities (Lupu & Traag 2013) to predict behavior at the dyadic level. The third camp looks at determinants of network formation and investigates whether the network structure in one time period influences the development of new ties in the next period (Maoz 2012, Maoz 2011, Warren 2010, Ward, Ahlquist & Rozenas 2013, Kinne 2013). A fourth camp focuses on firm-level (Goerzen & Beamish 2005) or individual-level networks such as terrorist groups (Krebs 2002, Stohl & Stohl 2007, Nielsen 2014) to investigate the causes and effects of organizational structures. The central focus of this article falls into the first and second camps.

Many of the studies in the international networks literature aim to predict conflict behavior. Joint membership in IOs (Russett, Oneal & Davis 1998, Hafner-Burton & Montgomery 2006), affinity based on alliance profile similarity (Maoz et al. 2006), and indirect trade ties (Lupu & Traag 2013, Peterson 2011, Dorussen & Ward 2010, Maoz 2009) are all associated with lower probabilities of conflict. However, few studies use aspects of political alliance networks to predict trade outcomes. The most prominent study that connects political networks to trade outcomes uses a count variable of joint IGO memberships to predict trade (Ingram, Robinson & Busch 2005). According to Ingram and colleagues, IGOs reduce transaction costs that hinder cooperation by facilitating communication and reducing uncertainty between countries. This theoretical mechanism (along with the empirical test) is conceptually distinct from the argument I present here. Ward and Hoff show that political alliances still have a positive effect on trade when accounting for indirect trade ties, but they do not investigate indirect alliance ties (Ward & Hoff 2007).

# Network theory for alliances and trade

In this section, I investigate the implications for security externalities when conceptualizing alliance structures as networks rather than a collection of dyadic relationships. Gowa and Mansfield hint at the fact that second order alliances matter and often discuss alliances as including more than two members. However, the theoretical implications of indirect alliance relationships are not discussed in detail and are not considered in the empirical analysis. Fleshing out the theory through a network framework provides new insights and allows for measurement that more accurately captures real-world security externalities.

The central argument in this article is that states and firms actually think in terms of indirect alliances when they are making decisions over trade policy and investment. This manifests in four main ways: 1) states consider indirect alliances when crafting their own bilateral trade policy with other states, 2) states actively promote trade *between* their allies, 3) firms take indirect alliances into account when assessing risk, and 4) states associate potential trade partners' centrality in alliance structures with differential externalities.

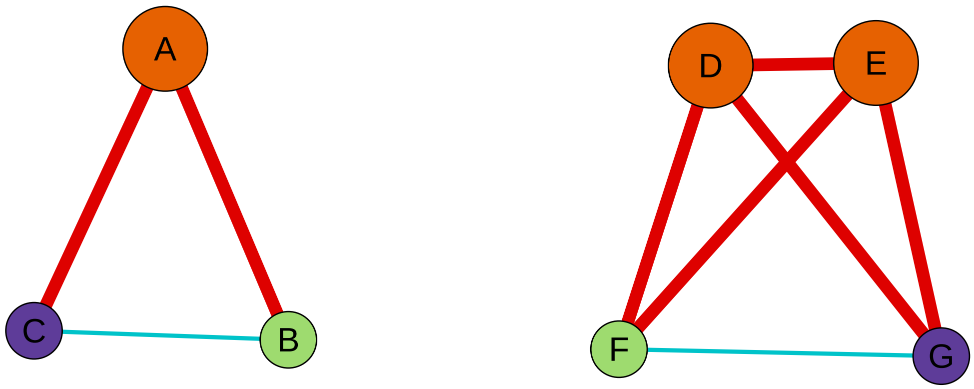
## The mechanisms: How indirect alliances influence bilateral trade

First, historical evidence suggests that states actually consider indirect political alliances when crafting their own bilateral trade policy with other states. During the Cold War, the US engaged in higher levels of trade with countries aligned with the Western bloc while restricting trade with the Soviet bloc. The main motivation behind this policy was not primarily based on whether the US had a direct dyadic alliance tie with a potential trade partner. The most important mechanism connecting trade to security externalities was the alliance *profile* of a potential trade partner.

For example, the US did not impose an embargo on Cuba primarily because it was afraid of the security externalities associated with the dyadic relationship. In a world in which security externalities derived solely from dyadic relationships, the US would not have been notably threatened by increased economic strength for Cuba. No matter how much of its economic gains it translated into military power, Cuba alone was not large enough to pose a major threat to the US. Then why was the US so concerned with Cuba gaining economic strength? The answer has to do with indirect alliances. Although Cuba itself did not pose a significant threat, Cuba as an extension of the Soviet bloc (or alliance 'community') affected the externalities associated with trade. The negative security externalities that arose from trade with Cuba derived from its second-order relationship with the Soviet Union and its allies. Benefiting Cuba economically could give the Soviet bloc a powerful thorn in the US's side right in its own neighborhood, shifting the balance of power between the US and Soviet Union. Having a powerful economic and military ally in the Caribbean could also help the Soviet Union make further advances in the region or inspire other communist revolutionaries, ultimately strengthening the Soviet bloc. A more direct reason to restrict trade based on indirect alliance relationships is that certain goods can be transshipped directly to a more salient adversary. States may impose export controls over military or dual-use products that could be quickly turned around and shipped to other states that pose a more direct security threat.

Second, the salience of indirect political alliances are seen when states actively promote trade *between* their allies. Trade between a state's political allies benefits that state by strengthening members of its alliance community, which has positive security implications. For example, after WWII, the US played a major role in promoting trade between its European allies by helping set up the European Economic Community, which established free trade zones and later developed into one of the pillars of the EU. By promoting trade between its European allies, the US hoped to strengthen the economic power of these countries, which could be translated into military strength or be used to attract Eastern European states. In response, the Soviet Union attempted to promote trade between its allies through COMECON, which was meant to balance against growth of Western European allies. Thus, we should expect to see more trade *between* allies of the great powers, regardless of whether

Figure 1: Toy example 1




they have a direct political alliance with each other. Evidence for this is provided by Lake in his discussion of international hierarchy when he suggests that 'Caribbean states... trade more overall and trade more with each other than other states, especially under the so-called "Washington consensus" on economic liberalism. These are the fruits of the authority to which they are subordinate' (Lake 2010).

Third, individual firms consider indirect alliances when evaluating the risk associated with investment and trade in other countries. By investing in another state that not only has a bilateral alliance with the firm's home country but also has alliance relationships with other countries their home country is allied with, they can be more confident in the lack of future conflict that would harm their investments. At the same time, firms attribute the greatest risk to investment in a state that has many alliance ties with their home state's enemies. Investment in states who are strongly tied to their home state's enemies (e.g. US firms considering investing in Soviet proxies) is riskier because of the increased probability of tense relations that could harm the firms' investments.

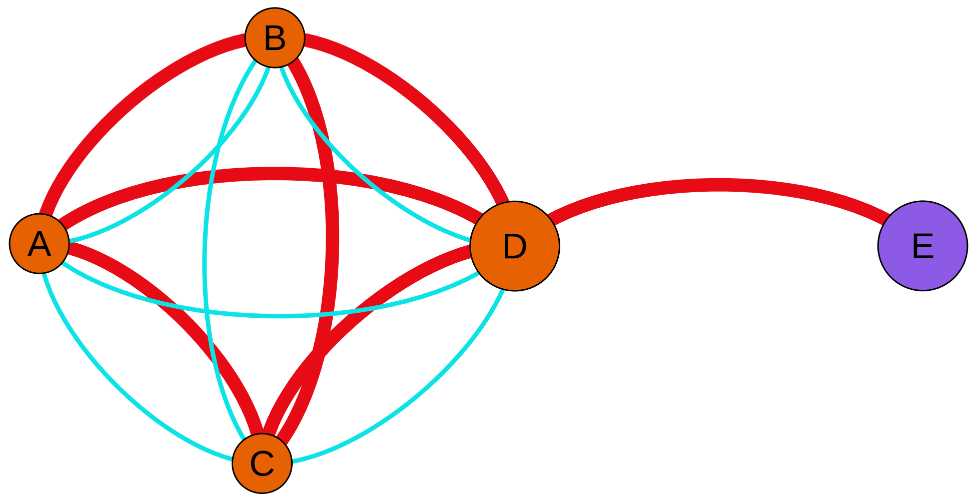
Fourth, the alliance ties of a potential trading partner are important for trade policy because these ties reflect a state's influence and power, which in turn affects security externalities. Positive externalities associated with trading with an alliance partner are enhanced when that partner plays an important role in international power politics. By benefiting another state that is most likely to influence the international balance of power in its favor, a state can gain greater positive externalities than through trade with a less relevant state. Two peripheral states in an alliance community may not gain as much from trading with each other as they would gain from trading with a state that is more important to their national security. Additionally, benefits from trading with a state that is important in one's alliance community are likely to multiply because that state can use those gains to benefit a greater number of other states in the alliance bloc. The impacts of trading with a central state in an opposing community are exactly the opposite. Negative externalities associated with trade with a powerful enemy are greater than the negative externalities associated with trade with a less relevant enemy.

## From theory to hypotheses

One way to think about the influence of indirect alliance ties is by looking at the number of *shared* alliances. While bilateral alliances may invoke some security externalities, what matters more is that potential trade partners are allied with a similar profile of countries. The number of shared alliances matters when two countries do not have a bilateral alliance with each other as well as when two countries do have a bilateral alliance. In the following toy examples, red ties between nodes depict political alliances, while blue ties depict trade relationships.

First, shared alliances matter when two countries do not have a bilateral alliance with each other. In Figure 1, consider the relationship between countries B and C. While they do not have a direct political alliance (red), the security externalities of trade are affected by the fact that they each have a political relationship with country A. The negative externalities that might be associated with not having a bilateral alliance with each other is tempered or, depending on the importance of country A to their security concerns, surpassed by the positive externalities associated with their joint relationship with country A. This is true for two reasons. First, because B benefits from increased strength for A and A benefits from increased strength for C, the transitive property suggests that B should benefit from

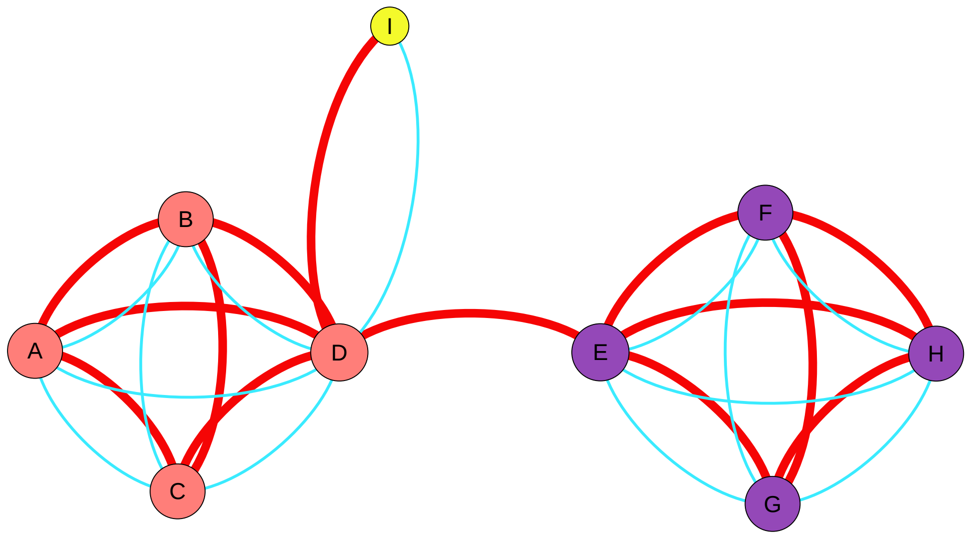
Figure 2: Toy example 2




increased strength for C. Second, by benefiting each other, B and C each allow for greater potential trade with country A and more strength for A in the international system. Thus, because of their relationships with country A, countries B and C are more likely to trade with each other (blue tie) than if they had no shared allies. In addition, because state A has a vested interest in trade between states B and C, it might actively promote trade between these mutual allies. This pattern would not be captured if considering alliances only at the dyad level.

Now consider countries F and G. Because they share two alliances, I postulate that, all else equal, they are even more likely to trade with each other than countries A and B, who only share one alliance. A greater number of shared alliances implies greater potential security externalities because it benefits more joint allies. In addition to the importance of second-level alliances, this figure illustrates the potential importance of third-level alliances. Perhaps countries F and G are also more likely to trade with each other because of the security relationship *between* their joint allies. Gains for G translate into gains for E which in turn translate into gains for D. Thus, F's trade with G produces benefits that multiply because of the relationship of D and E. In this way, the political alliance between a pair of countries can affect the trade relationship between two countries that are not a part of the

Figure 3: Toy example 3




allied dyad.

The above analysis suggests that shared alliances matter when two countries *do not* have a bilateral alliance with each other. In addition, I postulate that shared alliances affect security externalities between two countries that *do* have a bilateral alliance. In figure 2, countries A through D each have a political alliance with each other. While country D also has a bilateral alliance with country E, it is more likely to trade with A, B, and C than with E because of second level security externalities. By being part of a cooperative clique, countries A through D benefit from more positive security externalities than if their alliance partners were not also aligned with each other. At the first level, country D benefits from trade with C by bolstering the power of an alliance partner. At the second level, country D benefits from trade with C because gains for C translate into gains for A and B, which are also D's alliance partners. In contrast, D might benefit from first level security externalities associated with trade with E, but the lack of second level gains makes this a relative dead end.

For a potential trade partner, shared alliances matter, but so do the number of unique alliance partners *not shared* by the potential partner (discordant alliances). Consider figure

3: just like the situation in figure 2, D has greater incentive to trade with countries A-C than with country E. However, in this example, country D now has even less of an incentive to trade with E than in figure 2. Because trade with E would also benefit countries F through G (which are not allied with country D or any of its allies), trade with E might be associated with even greater negative externalities. Thus, D is more likely to trade with country $I$ (which is in a similar position as E in figure 2) than with country E. Returning to the previous real world example, this analysis suggests that the US would restrict trade to a Soviet proxy not only because it does not share a direct alliance with that country, but also because that country has additional alliances with other non-US allies. As with the previous section, I do not expect all discordant alliances to be equal; membership in another alliance may not produce negative security externalities in every case. Some discordant alliances may be with states that do not pose a security risk to the host state while others may be with direct enemies. However, I expect the claim to hold ceteris paribus. Stemming from the above analysis, I derive my first hypothesis:

H1. *All else equal, states with a greater number of shared alliances are likely to have higher levels of trade. States with a greater number of discordant alliances are likely to have lower levels of trade.*

The more complexity that is added to the toy examples, the more they mirror real world concerns about security externalities. Political alliances form interconnected webs of states that have important implications for trade outcomes. When situating themselves in these complex networks, states often consider themselves to be part of integrated alliance *blocs*. Trade that benefits one's bloc has positive security externalities while trade that benefits another bloc has neutral or negative externalities. In a large network containing several hundred nodes (such as the full international system), this implies that the most important divides that determine security externalities might be alliance 'communities.' Community detection algorithms can be used to identify highly connected clusters of nodes that form alliance blocs. In figure 3, ABCD and EFGH would be detected as separate communities.

An approach that uses alliance communities is similar to the shared alliances approach in the first hypothesis, but also takes into account third and fourth (etc.) level alliances that would not be picked up by the shared alliance measure. Lupu and Traag (2013) use community detection to show that members of the same trade communities are less likely to go to war with each other than members of different communities. Using a similar logic, a second hypothesis arises from the theory:

H2. *All else equal, states in the same alliance community are likely to have higher levels of trade with each other than states in different communities.*

While being in the same alliance bloc as a potential trading partner may increase positive externalities from trade, the *level* of externalities crucially depends on the importance of that partner in the alliance bloc. States who are central, powerful members of an alliance community are more important to the security of the bloc than more peripheral states. Thus, positive security externalities are enhanced when the gains from trade are transferred to central states in one's own community and negative externalities are exacerbated when gains are accrued by central states in opposing communities. Network tools allow for a more detailed analysis of these differential effects through measures of states' 'centrality' in the alliance network. Of particular importance is whether a country exhibits high 'betweenness' centrality, which measures the number of shortest paths from each node to each other node that go through the country of interest.[1] Because states with high 'betweenness' occupy crucial positions that link different sub-communities in alliance blocs, benefitting these states is most likely to spill over to the greatest number of alliance partners. A third hypothesis arises:

H3. *All else equal, a state is* more *likely to trade with a state that is highly central in*

[1]While previous studies have used degree centrality to proxy for social power in IGO networks (Kahler 2009, Hafner-Burton & Montgomery 2009), this measure does not have high face validity in the alliance network. Countries in certain regions are more likely to sign formal alliances than others. Degree centrality, which simply measures the number of alliances in which a country is a member, is highly correlated with these regional dynamics.

*its* own *community and* less *likely trade with a state that is highly central in* another *community.*

Finally, in addition to the differential effects predicted by H3, the level of externalities associated with trade depends on the likelihood that a potential trade partner is a member of particularly inimical alliance bloc. It would be misrepresentative to claim that all that matters is whether a pair of states is directly allied or not. Some non-allies may pose little or no security threat while others pose a far greater danger. A pair of alliance communities can be strongly interconnected with each other, suggesting that they are less likely to pose security threats to each other. On the other hand, a potential trading partner could be connected to a group of states that is completely unconnected to one's own community, thus increasing the likelihood that they have security preferences that come into conflict with one's own. Thus, negative security externalities are exacerbated when the distance between potential trading partner in the alliance network increases. The farther two states are from each other in the alliance network, the more likely they are to have security preferences that will bring them into conflict with each other. I operationalize this as the geodesic distance between a pair of states. This indicates the shortest path between a pair of states in the alliance network. For example, in 1960, the US and Soviet Union were five degrees of separation removed from each other (See Figure 4). In order to connect the two nodes, the shortest path along alliance ties is USSR-China-Yemen-Libya-France-US. Contrasted with this, while France and Brazil also did not have a direct alliance, they were only one step removed from each other (through the US). A fourth, and final, hypothesis arises:

H4. *All else equal, a pair of states is less likely to engage in high levels of trade as the geodesic distance between them increases.*

Table I: Example Adjacency Matrix

| Country | A | B | C | D |
|---|---|---|---|---|
| A | 0 | - | - | - |
| B | 1 | 0 | - | - |
| C | 0 | 1 | 0 | - |
| D | 1 | 0 | 0 | 0 |

# Data and methods

While thinking about the relationship between alliances and trade under a network framework adds theoretical complexity, the methods used to incorporate this theory into statistical models are quite simple. I begin with a quick overview of the alliance network before turning to the data used in this study and a discussion of how information relating to indirect alliances is incorporated into regression models.

To incorporate network information into the models, I first construct the full network of political alliance ties for each year 1948-2006. Each node represents a country and ties represent alliances coded in the ATOP dataset. (Leeds, Ritter, Mitchell & Long 2002). Consistent with previous literature, I count all defense pacts, neutrality or nonaggression treaties, and ententes as political alliances.[2] Because the alliance variable is binary, the network is unweighted. I convert the edge list of alliance ties into an adjacency matrix in which a '1' represents a alliance and a '0' represents the absence of an alliance.[3] In the following example adjacency matrix (Table I), alliances exist between states A and B, states A and D, and states B and C. All other states are unconnected. Using this adjacency matrix, I calculate the number of shared allies for each pair of states, run community detection algorithms, and calculate measures of centrality and geodesic distance. To detect communities, I use the 'Fast Greedy' community detection algorithm (Clauset, Newman & Moore 2004). The data are then converted back to dyadic format.

[2]If a pair of states has agreements that fit into more than one of these categories, I still count it as having a single alliance.

[3]I constructed the network using the 'iGraph' package in R.

Figures 4 and 5 are representations of the full ATOP alliance network for 1960 and 2000. In 1960, the map visualization shows four communities, with the Western and Soviet blocs clearly visible. The network visualization shows a similar picture, with the blocs of European, American, and several East Asian countries clearly separated from the communist bloc. In the network plot, nodes are sized by betweenness centrality and colored by community. By 2000, a vastly different picture arises. The community detection algorithm detects eight distinct alliance communities, though they are much more intertwined than the 1960 communities. The US and Russia are now part of the same community and are both highly central members of the alliance network.

---

Figure 4 in here

---

Figure 5 in here

---

To test the hypotheses in the previous section, I run a series of OLS models that incorporate information from the network of alliance ties. As a base model consistent with Gowa and Mansfield 1993, I run a gravity model that incorporates measures of GDP, population, distance, and conflict (all MIDs). The unit of analysis is the directed dyad-year. The dependent variable in all models is the natural log of directed trade flows from country $i$ to country $j$ in a dyad from the CEPII project.[4] All other gravity variables also come from this dataset, and are logged.

The independent variables of interest all stem from direct and indirect alliance relationships. First, consistent with previous studies, I account for whether two states in a dyad have a direct alliance tie. Next, the variable 'Shared Alliances' is operationalized by subtracting the number of discordant alliances (the sum of the alliances for each member of a dyad with whom the other member does not have an alliance) from the number of shared alliances

[4] http://www.cepii.fr/anglaisgraph/bdd/baci/baci.pdf (Mayer & Zignago 2005, Mayer & Zignago 2011)

for each dyad. This is meant to capture both aspects of H1 while also accounting for the fact that some countries are likely to have more official alliances than others due to omitted factors. As a robustness check, I replace the shared alliance variable with the *proportion* of shared alliances and all results hold. To test H2, The variable 'Shared Community' is operationalized as a dummy variable indicating whether both countries in a dyad are part of the same alliance community. The key variable for H3 is the interaction between whether the states in a dyad share a community and the betweenness centrality of those states. Finally, I operationalize the key concept of H4 with a measure of geodesic distance indicating the shortest path between a pair of states in the alliance network.

A series of additional control variables identified by the literature (including colonial history, common colonizer, geographical contiguity, GATT membership, joint membership in regional trade agreements and IGOs, common currency, and common language) are taken from the Correlates of War (COW) project[5] and CEPII. In accordance with Morrow, Siversen & Tabares (1998), I include models that account for joint democracy[6] and preference similarity.[7] Controlling for these variables accounts for some of the underlying factors that drive both political alliances and trade flows. To account for autocorrelation, I include a lagged measure of the dependent variable (trade flow) and panel corrected standard errors.

# Results

Table II shows the results for models featuring the Shared Alliance variable (shared alliances minus discordant alliances) used to operationalize H1. Model 1 reproduces the original Gowa and Mansfield (G&M) model using ATOP and CEPII data.[8] Consistent with their finding, political alliances are significantly associated with increased trade flows in a

[5]http://www.correlatesofwar.org/ (Barbieri, Keshk & Pollins 2009)

[6]Taken from Polity IV: http://www.systemicpeace.org/polity/polity4.htm (Marshall, Jaggers & Gurr 2011)

[7]Operationalized as similarity of UN voting records: http://pages.ucsd.edu/ egartzke/htmlpages/data.html (Gartzke 2007)

[8]In their 1993 article, they use data from COW

dyad after accounting for the gravity variables and conflict. Models 2 through 4 add the 'Shared Alliances' variable. The coefficient on Shared Alliances is positive, consistent, and statistically significant across all models while the coefficient on Dyadic Alliance is drastically reduced once these shared alliances are accounted for. Model 2 adds only the Shared Alliance variable to the G&M model. Under this specification, the coefficient on Dyadic Alliances is reduced almost three-fold and the increase in trade associated with a dyadic alliance and trade is equivalent to approximately 25 shared alliances.[9]

---

Table II in here

---

Model 3 adds a series of control variables: contiguity, WTO membership, joint regional trade agreement (RTA) membership, common currency, common language, and common colonizer. These account for some of the underlying factors that might be driving both political alliances and bilateral trade. Once these factors are accounted for, the coefficient on Shared Alliances remains remarkably consistent while the coefficient on Dyadic Alliance is again significantly reduced. Under this specification, the increase in trade associated with a dyadic alliance is equivalent to approximately 14 shared alliances.

Finally, Model 4 includes the two variables from Morrow, Siverson & Tabares (1998) that they claim are driving the G&M result – joint democracy and similar preferences. [10] After accounting for these variables, the association between shared alliances and trade grows even stronger. Under this specification, the increase in trade associated with a dyadic alliance is now only equivalent to approximately four shared alliances and the dyadic alliance variable is no longer statistically significant. These results suggest that second order relationships

[9]Because the shared alliance variable ranges from about -50 to 50, this makes it appear as if dyadic alliances are still the most important driver of trade.

[10]Morrow et al use the tau-b measure of alliance profiles (Bueno de Mesquita 1981) to measure preference similarity, but this measure has since fallen out of favor as a measure of preference similarity. Because the construction of tau-b is based on alliance profiles and is highly correlated with my shared alliance measure, I use similarity in UN voting (s-scores) to capture preference similarity. This also corresponds with the Gowa and Mansfield (2004) reply to the Morrow et al paper.

are driving the connection between political alliances and trade.

Table III shows the results for models featuring the Shared Community variable (a dummy for whether two states are in the same alliance community) meant to operationalize H2. The results in this table suggest a similar pattern to the results in Table II. By including only the Shared Community measure, the coefficient on Dyadic Alliance is more than halved. In the most basic model (model 5), being in the same alliance community as a potential trade partner predicts an increase in trade that is about 150% the magnitude of being in a dyadic alliance. Once the additional controls are accounted for (Model 6), being in the same community predicts nearly three times as much increased trade as being in a dyadic alliance. When joint democracy and shared preferences are accounted for (Model 7), being in the same community predicts nearly four times as much increased trade as being in a dyadic alliance (though the coefficient on Dyadic Alliance remains statistically significant in this case).

---

Table III in here

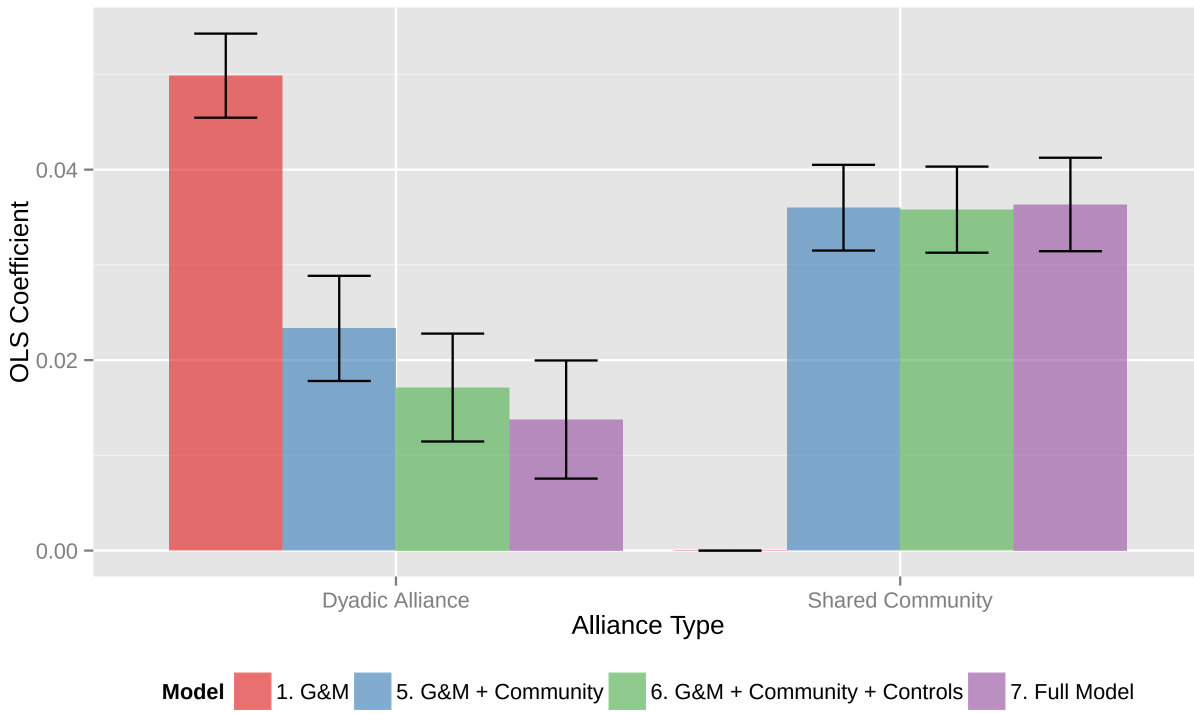
---

The results in tables II and III are particularly promising because of the remarkable consistency of the coefficients on the Shared Alliances and Shared Community measures across all models. The pattern is clear in Figure 5, which plots the coefficients on Dyadic Alliance and Shared Community for all models in Table III. While the coefficient on Dyadic Alliance is strongly reduced after including additional controls, these more rigorous specifications leave the coefficient of Shared Community unchanged.

Moving on to the tests of H3, Table IV displays results for models featuring the interaction of alliance communities and states' centrality. Models 1, 4, and 7 are copies of models from Tables II and III that can be used for reference. As seen in Model 9, betweenness centrality on its own is not highly predictive of a state's imports or exports.[11] However,

[11]In all models, betweenness centrality is logged to take into account the fact that the distribution of this variable is highly skewed. Though not shown, the result is similar for a state's degree centrality. The

Figure 4: Table III Coefficients




The above plots OLS coefficients for dyadic and shared alliances from Table III. The coefficients on dyadic alliance are on the left while the coefficients on shared community are on the right. Different colored bars represent different models in Table III. Because these are both dummy variables, the coefficients are directly comparable (i.e. being in the same alliance *community* as a potential trade partner predicts a significantly larger increase in trade than being in a *bilateral* alliance with that potential partner.

Model 10 shows striking support for H3. Because the Shared Community variable is binary, the interaction between Shared Community and Betweenness is easily interpretable. States are significantly *more* likely to trade with central states within their own community than with less central states and this is true of both exports and imports. On the other hand, states are significantly *less* likely to trade with states that are central in other alliance communities. This provides suggestive evidence that indirect political alliances that shape power structures within alliance communities influence the level of security externalities associated with trade.

---

Table IV in here

interaction between degree centrality and Shared Community is also not a significant predictor of trade flows.

Figure 5: Interaction of Centrality (Betweenness) with Shared Community

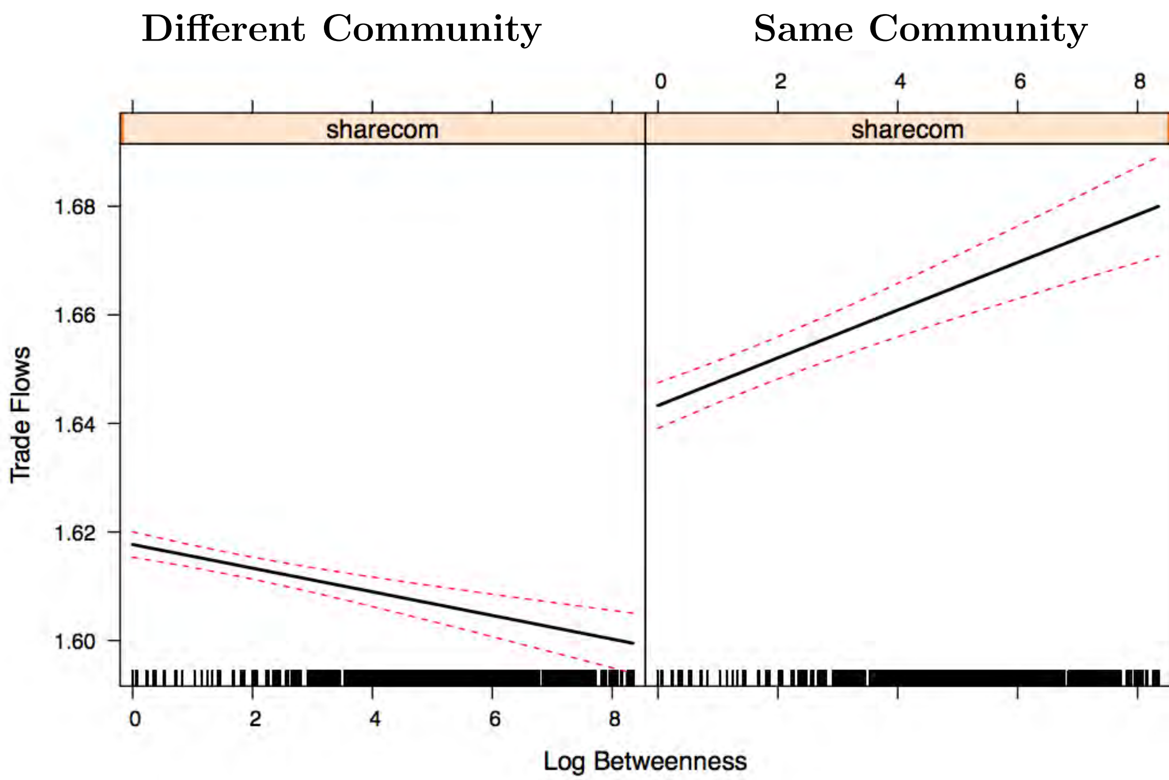



Figure 6 displays the diverging relationships of alliance centrality and trade between states in the same community versus states in different communities. The left panel shows the relationship between centrality (x-axis) and trade flows (y-axis) with states in a different community. The negative slope of the line suggests that a state is less likely to trade with another state that is highly central in a *different* alliance community. These highly central states are likely to have more power and influence in opposing alliance communities; trading with them generates greater negative security externalities because these powerful states pose more of a security risk. The right panel shows the opposite relationship of centrality and trade flows between states in the *same* community. States show greater propensity to trade with central states in their own community because these powerful states are likely more important to their security interests. This plot also displays the finding that states are generally more likely to trade with states in their own community, as the predicted trade within the same community is higher over the entire range of the centrality measure compared to predicted trade with states in a different community.

One problematic feature of the models up to this point is that not all states in different alliance communities pose an equal security threat to the state in question. In reality, some alliance blocs do not pose a threat while others are more inimical. For example, in the 1960 network, the community including the Soviet Union posed more of a threat to the Western bloc than the South American alliance community that was strongly tied to the US bloc. The results in Table V take this into account and suggest that as the geodesic distance between a pair of states grows, the less likely they are to trade with each other.[12] This provides strong support for H4.

---

Table V in here

---

## Discussion

The results in the previous section show strong support for all four central hypotheses. Based on these results, it appears that indirect alliance structures are important predictors of international trade. One important implication of the network approach is that it addresses some of the critiques of the relative gains assumption that drives the importance of security externalities. First, some have criticized the relative gains logic because the disparity in trade benefits between two countries would have to be very large to tip equilibrium outcomes (Morrow 1997). While this large disparity might be difficult to imagine when only considering dyadic relationships, the network externalities of trade significantly amplify the effect. Because security gains for one state translate into gains for its allies, both the positive

[12]For these models, I drop dyads where no path between the pair of states exists. This constitutes only 0.7% of overall cases.

and negative security externalities associated with trade are multiplied. Others have criticized the relative gains assumption because it breaks down when a large number of actors are involved (Snidal 1991). However, once the system of alliances is pared down from close to 200 countries to a handful of alliance blocs, the number of relevant actors is significantly reduced. Evidence suggests that states actually think in terms of these larger security blocs when considering trade policy.

A second important implication of considering the relationship between alliances and trade in network terms is that it provides a simpler explanation for why alliances seem to matter more for trade policy during periods of bipolarity in international alliance structures. Previous studies consistently find that alliances matter more during periods of bipolarity than during periods of multipolarity (Gowa & Mansfield 1993, Gowa 1994). The mechanism described by Gowa and Mansfield is that states are more worried about other states leaving their alliance for the other alliance during periods of bipolarity. Because there is a clearly defined opposing power, states have an obvious alternative and the risk of exit is greater. As a result, states keep their allies closer through enhanced trade. While there is some sense to this logic, problems remain. Theoretically, periods of multipolarity provide more alternative options for a state, thus *increasing* the risk of exit. On the empirical side, the major threat to the Gowa and Mansfield finding is that almost the entire period of multipolarity in their data consists of the period between WWI and WWII when trade was suppressed due to a number of additional factors not associated with political alliances.

Under a network framework, a separate mechanism derived from the network structure might be driving the relationship between bipolarity and the increased salience of political alliances. During periods of bipolarity, (such as in Toy Example 4), bilateral alliances are simply more likely to be correlated with shared alliances. Thus, trading with an ally is likely to benefit a more clearly defined set of other countries within the same alliance community. On the other hand, trading with an enemy is highly correlated with trade with an opposing community. Because the data in this study begin after WWII, I can only compare the period of bipolarity during the Cold War to the period of US hegemony after 1989. As seen in Models 11 and 12 (Table VI), dyadic alliances seem to matter more during the period of hegemony after the Cold War, while shared alliances seem to matter marginally more during the Cold War.

---

Table VI in here

---

One potential objection to the described results might be that the Shared Alliances and Shared Community variables are capturing the same reduction in transaction costs posited by those who claim that joint IGO memberships predict greater trade (Ingram, Robinson & Busch 2005). Perhaps formal alliances facilitate communication that makes it easier to establish trade relationships. Model 8 (Table IV) suggests that this is not the case. Even when controlling for the number of joint IGO memberships in a dyad, the results remain remarkably consistent.[13] Finally, one might think alliance communities are simply proxying for multilateral alliances. However, the coefficients on the indirect alliance variables remain significant and of a similar magnitude once the ATOP alliances are broken down into bilateral and multilateral alliances (Models 13 and 14).

A more problematic objection to the results in these models is that they are potentially highly endogenous. While political relationships may be driving trade, it might also be the case that trade relationships are driving security agreements. Lupu and Traag (2013) suggest that trade networks are driving conflict behavior, which seems to corroborate this story. Despite the fact that strong theoretical mechanisms exist and historical examples suggest that states take security concerns into account when formulating trade policy, reverse causality is not a critique that can be fully addressed by the empirical approach in this project.

[13]The large reduction in the number of observations in model 8 is due mainly to the fact that IGO data prior to 1965 are only reported every 5 years.

## Conclusion

The overarching goal of this article is to incorporate information on indirect alliance ties into the understanding of how countries' security concerns influence trade. I find evidence for four robust patterns that suggest these indirect alliances matter. The number of second-level alliances that a pair of states share with each other is a significant predictor of trade and states trade significantly more with other states in their same alliance communities. Not only do indirect alliances matter, but they are a more robust and substantively important predictor of trade relations. The increase in trade associated with two states being in the same alliance community is up to four times greater than the increase in trade associated with a dyadic alliance tie. In addition, the degree to which these patterns manifest depends on the centrality of a potential trade partner and the distance between states in the overall alliance structure. States trade more with states that are central to the security structure of their own alliance blocs and less with states that are central in other alliance blocs. At the same time, states are less likely to trade with others that are further separated from them in the overall alliance structure.

The findings of this article imply that large-scale international security structures are still important predictors of economic relations between states. The majority of recent work in IPE has shifted its focus on the study of determinants of trade to domestic political factors, firm-level incentives, and individual preferences (Lake 2009, Melitz 2003). While these factors undoubtedly matter, states still shape trade policies to align with international security concerns, reaffirming the larger theoretical point made by Gowa and Mansfield (1993).

On a broader level, the theoretical and empirical strategies of this article highlight the importance of indirect relationships in international relations that can be better understood through social network analysis (Maoz 2012, Ward, Stovel & Sacks 2011, Hafner-Burton, Kahler & Montgomery 2009). While network theory has provided an important methodological tool for uncovering subtle empirical patterns and investigating previously untestable hypotheses, it can also allow for important theoretical insights into many of the biggest questions in international relations. The contribution of this article is not purely empirical. Rather, it is driven by three previously underdeveloped mechanisms that connect indirect security relationships to trade outcomes. The empirical tools provided by social network analysis are best used to test hypotheses that develop from the conceptualization of the international system as an interconnected network rather than a series of dyadic relationships. As argued by Lupu and Traag (2013) one particularly useful application of network analytic tools is to the study of regional subsystems. Community detection methodologies can inform more rigorous definitions of subsystems and blocs of states, a problem that has traditionally plagued the study of regional subsystems (Thompson 1973, Lake 1997, Buzan & Waever 2003). This is particularly important to the study of alliances, as policymakers and academics alike give great attention to the relations between blocs of states tied together by security alliances.

Finally, this article highlights the importance of mechanisms that connect security relations to trade outcomes rather than vice versa. Many scholars have focused on the effect of economic relations between states on conflict behavior (Oneal & Russett 1997, Oneal & Russett 1999, Hegre, Oneal & Russett 2010, Gartzke 2007). Understanding the mechanisms that lead from security relationships to trade is an important part of accounting for endogeneity concerns and establishing the direction of causal arrows. I hope the insights and findings of this article will set the groundwork for future scholarship that works to unpack the endogenous relationship between security and trade. Dynamic network models may help in achieving this goal.

# References

Barbieri, K, O M G Keshk & B M Pollins. 2009. "Trading Data: Evaluating our Assumptions and Coding Rules." *Conflict Management and Peace Science* 26(5):471–491.

Berger, Daniel, William Easterly, Nathan Nunn & Shanker Satyanath. 2013. "Commercial Imperialism?" *The American Economic Review* 103(2):863–896.

Biglaiser, Glen & David Lektzian. 2011. "The Effect of Sanctions on U.S. Foreign Direct Investment." *International Organization* 65(03):531–551.

Bueno de Mesquita, Bruce. 1981. *The War Trap*. New Haven: Yale University Press.

Buzan, Barry & Ole Waever. 2003. *Regions and Powers: The Structure of International Security*. Cambridge: Cambridge University Press.

Caruso, Raul. 2003. "The Impact of International Economic Sanctions on Trade: An Empirical Analysis." *Peace Economics, Peace Science and Public Policy* 9(2).

Clauset, Aaron, M E J Newman & Christopher Moore. 2004. "Finding Community Structure in Very Large Networks." *Arvix Working Paper* .

Davis, Christina L & Sophie Meunier. 2011. "Business as Usual? Economic Responses to Political Tensions." *American Journal of Political Science* 55(3):628–646.

Deutsch, Karl W & David J Singer. 1964. "Multipolar Power Systems and International Stability." *World politics* 16(3):390–406.

Dorussen, Han & Hugh Ward. 2008. "Intergovernmental Organizations and the Kantian Peace: A Network Perspective." *Journal of Conflict Resolution* 52(2):189–212.

Dorussen, Han & Hugh Ward. 2010. "Trade networks and the Kantian peace." *Journal of Peace Research* 47(1):29–42.

Fearon, James D. 1994. "Domestic Political Audiences and the Escalation of International Disputes." *American Political Science Review* 88(3):577–592.

Gartzke, Erik. 2007. "The Capitalist Peace." *American Journal of Political Science* 51(1):166–191.

Gaubatz, Kurt Taylor. 1996. "Democratic States and Commitment in International Relations." *International Organization* 50(01):109.

Glick, Reuven & Alan M Taylor. 2010. "Collateral Damage: Trade Disruption and the Economic Impact of War." *The Review of Economics and Statistics* 92(1):102–127.

Goerzen, Anthony & Paul W Beamish. 2005. "The Effect of Alliance Network Diversity on Multinational Enterprise Performance." *Strategic Management Journal* 26(4):333–354.

Gowa, Joanne. 1994. *Allies, Adversaries, and International Trade*. Princeton: Princeton University Press.

Gowa, Joanne & Edward D Mansfield. 1993. "Power Politics and International Trade." *The American Political Science Review* 87(2):408–420.

Gowa, Joanne & Edward D Mansfield. 2004. "Alliances, Imperfect Markets, and Major-Power Trade." *International Organization* 58(4):775–805.

Grieco, Joseph M. 1990. *Cooperation Among Nations: Europe, America, and Non-tariff Barriers to Trade*. Ithaca: Cornell University Press.

Hafner-Burton, Emilie M & Alexander H Montgomery. 2006. "Power Positions." *Journal of Conflict Resolution* 50(1):3–27.

Hafner-Burton, Emilie M & Alexander H Montgomery. 2009. Globalization and the Social Power Politics of International Economic Networks. In *Networked Politics: Agency, Power, and Governance*, ed. Miles Kahler. Ithaca: Cornell University Press pp. 23–42.

Hafner-Burton, Emilie M, Miles Kahler & Alexander H Montgomery. 2009. "Network Analysis for International Relations." *International Organization* 63(3):559–592.

Hegre, Havard, John R Oneal & Bruce Russett. 2010. "Trade Does Promote Peace: New Simultaneous Estimates of the Reciprocal Effects of Trade and Conflict." *Journal of Peace Research* 47(6):763–774.

Helpman, Elhanan. 2013. "Foreign Trade and Investment." *NBER Working Paper* .

Hiscox, Michael J. 2006. "Through a Glass and Darkly." *International Organization* 60(3):755–780.

Hufbauer, Gary Clyde, Kimberly Ann Elliot, Tess Cyrus & Elizabeth Winston. 1997. "US Economic Sanctions: Their Impact on Trade, Jobs, and Wages." *Working Paper, Institute for International Economics* .

Ingram, Paul, Jeffrey Robinson & Marc L Busch. 2005. "The Intergovernmental Network of World Trade." *American Journal of Sociology* 111(3):824–858.

Kahler, Miles. 2009. Networked Politics: Agency, Power, and Governance. In *Networked Politics: Agency, Power, and Governance*, ed. Miles Kahler. Ithaca: Cornell University Press pp. 1–20.

Karol, David. 2007. "Does Constituency Size Affect Elected Officials' Trade Policy Preferences?" *The Journal of Politics* 69(2):483–494.

Keshk, Omar M G, Brian M Pollins & Rafael Reuveny. 2004. "Trade Still Follows the Flag: The Primacy of Politics in a Simultaneous Model of Interdependence and Armed Conflict." *Journal of Politics* 66(4):1155–1179.

Kinne, Brandon J. 2013. "Network Dynamics and the Evolution of International Cooperation." *American Political Science Review* 107(04):766–785.

Kono, Daniel Yuichi. 2012. "Alliances, Trade Discrimination, and the Global Trade Regime." *International Interactions* 38(5):647–669.

Krebs, Valdis E. 2002. "Mapping Networks of Terrorist Cells." *Connections* 24(3):43–52.

Lake, David A. 1997. Regional Security Complexes: A Systems Approach. In *Regional Order: Building Security in a New World*, ed. David A Lake & Patrick M Morgan. State College: The Pennsylvania State University Press pp. 45–67.

Lake, David A. 2009. "Open Economy Politics." *The Review of International Organizations* 4(3):219–244.

Lake, David A. 2010. "Rightful Rules: Authority, Order, and the Foundations of Global Governance ." *International Studies Quarterly* 54(3):587–613.

Leeds, Brett Ashley. 2003. "Alliance Reliability in Times of War: Explaining State Decisions to Violate Treaties." *International Organization* 57(04).

Leeds, Brett Ashley, Andrew G Long & Sara McLaughlin Mitchell. 2000. "Reevaluating Alliance Reliability: Specific Threats, Specific Promises." *Journal of Conflict Resolution* 44(5):686–699.

Leeds, Brett, Jeffrey Ritter, Sara Mitchell & Andrew Long. 2002. "Alliance Treaty Obligations and Provisions, 1815-1944." *International Interactions* 28(3):237–260.

Levy, Jack S & Katherine Barbieri. 2004. "Trading With the Enemy During Wartime." *Security Studies* 13(3):1–47.

Li, Quan & Tatiana Vashchilko. 2010. "Dyadic Military Conflict, Security Alliances, and Bilateral FDI Flows." *Journal of International Business Studies* 41:765–782.

Liberman, Peter. 1996. "Trading with the Enemy: Security and Relative Economic Gains." *International Security* 21(1):147–175.

Lohmann, Susanne & Sharyn O'Halloran. 1994. "Divided Government and U.S. Trade Policy." *International Organization* 48(4):595–632.

Long, Andrew G. 2003. "Defense Pacts and International Trade." *Journal of Peace Research* 40(5):537–552.

Long, Andrew G & Brett Ashley Leeds. 2006. "Trading for Security: Military Alliances and Economic Agreements." *Journal of Peace Research* 43(4):433–451.

Lü, Xiaobo, Kenneth Scheve & Matthew J Slaughter. 2012. "Inequity Aversion and the International Distribution of Trade Protection." *American Journal of Political Science* 56(3):638–654.

Lupu, Yonatan & Vincent A Traag. 2013. "Trading Communities, the Networked Structure of International Relations, and the Kantian Peace." *Journal of Conflict Resolution* 57(6):1011–1042.

Mansfield, Edward D & Diana C Mutz. 2009. "Support for Free Trade: Self-Interest, Sociotropic Politics, and Out-Group Anxiety." *International Organization* 63(03):425–457.

Mansfield, Edward D, Helen V Milner & B Peter Rosendorff. 2002. "Why Democracies Cooperate More." *International Organization* 56(3):477–513.

Mansfield, Edward D & Rachel Bronson. 1997. "Alliances, Preferential Trading Arrangements, and International Trade." *American Political Science Review* 91(1):94–107.

Maoz, Zeev. 2009. "The Effects of Strategic and Economic Interdependence on International Conflict Across Levels of Analysis." *American Journal of Political Science* 53(1):223–240.

Maoz, Zeev. 2011. *Networks of Nations.* The Evolution, Structure, and Impact of International Networks, 1816-2001 New York: Cambridge University Press.

Maoz, Zeev. 2012. "How Network Analysis Can Inform the Study of International Relations." *Conflict Management and Peace Science* 29(3):247–256.

Maoz, Zeev, Ranan D Kuperman, Lesley Terris & Ilan Talmud. 2006. "Structural Equivalence and International Conflict." *Journal of Conflict Resolution* 50(5):664–689.

Marshall, Monte G, Keith Jaggers & Ted Robert Gurr. 2011. "Polity IV Project." *Polity IV Project* .

Mayer, Thierry & Soledad Zignago. 2005. "Market Access in Global and Regional Trade." *CEPII Working Paper* pp. 1–42.

Mayer, Thierry & Soledad Zignago. 2011. "Notes on CEPII's Distances Measures: The GeoDist Database." *CEPII Working Paper* pp. 1–47.

Melitz, Marc J. 2003. "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity." *Econometrica* 71(6):1695–1725.

Milner, Helen V & Keiko Kubota. 2005. "Why the Move to Free Trade?" *International Organization* 59(01):107–143.

Morrow, James D. 1997. "When Do "Relative Gains" Impede Trade?" *The Journal of Conflict Resolution* 41(1):12–37.

Morrow, James D, Randolph M Siverson & Tressa E Tabares. 1998. "The Political Determinants of International Trade." *American Political Science Review* 92(3):649–661.

Nielsen, Richard A. 2014. Networks, Careers, and the Jihadi Radicalization of Muslim Clerics PhD thesis MIT.

Oneal, John R & Bruce M Russett. 1997. "The Classical Liberals Were Right: Democracy, Interdependence, and Conflict, 1950–1985." *International Studies Quarterly* 41:267–294.

Oneal, John R & Bruce Russett. 1999. "The Kantian Peace: The Pacific Benefits of Democracy, Interdependence, and International Organizations, 1885-1992." *World politics* 52(1):1–37.

Ostrom, Jr, Charles W & Francis W Hoole. 1978. "Alliances and Wars Revisited: A Research Note." *International Studies Quarterly* 22(2):215–236.

Peterson, Timothy M. 2011. "Third-Party Trade, Political Similarity, and Dyadic Conflict." *Journal of Peace Research* 48(2):185–200.

Pinto, Pablo M & Stephen Weymouth. 2013. "Firms, Politics, and the Global Organization of Production." *Working Paper* .

Pollins, Brian M. 1989*a*. "Conflict, Cooperation, and Commerce: The Effect of International Political Interactions on Bilateral Trade Flows." *American Journal of Political Science* 33(3):737–761.

Pollins, Brian M. 1989*b*. "Does Trade Still Follow the Flag?" *The American Political Science Review* 83(2):465–480.

Rogowski, Ronald. 1987. "Political Cleavages and Changing Exposure to Trade." *The American Political Science Review* 81(4):1121–1137.

Russett, Bruce, John R Oneal & David R Davis. 1998. "The Third Leg of the Kantian Tripod for Peace: International Organizations and Militarized Disputes, 1950–85." *International Organization* 52(03):441–467.

Scheve, Kenneth & Matthew J Slaughter. 2001. "What Determines Individual Trade-Policy Preferences?" *Journal of International Economics* 54:267–292.

Siverson, Randolph M & Joel King. 1980. "Attributes of National Alliance Membership and War Participation, 1815-1965." *American Journal of Political Science* 24(1):1–15.

Snidal, Duncan. 1991. "Relative Gains and the Pattern of International Cooperation ." *The American Political Science Review* 85(3):701–726.

Stasavage, David & Dominique Guillaume. 2002. "When are Monetary Commitments Credible? ." *British Journal of Political Science* 32(1):119–146.

Stohl, Cynthia & Michael Stohl. 2007. "Networks of Terror: Theoretical Assumptions and Pragmatic Consequences." *Communication Theory* 17(2):93–124.

Thompson, William R. 1973. "The Regional Subsystem: A Conceptual Explication and a Propositional Inventory." *International Studies Quarterly* 17(1):89–117.

Tomz, Michael. 2007. "Domestic Audience Costs in International Relations." *International Organization* 61(4):821–840.

Ward, Michael D, John S Ahlquist & Arturas Rozenas. 2013. "Gravity's Rainbow: A dynamic latent space model for the world trade network." *Network Science* 1(01):95–118.

Ward, Michael D, Katherine Stovel & Audrey Sacks. 2011. "Network Analysis and Political Science." *Annual Review of Political Science* 14:245–264.

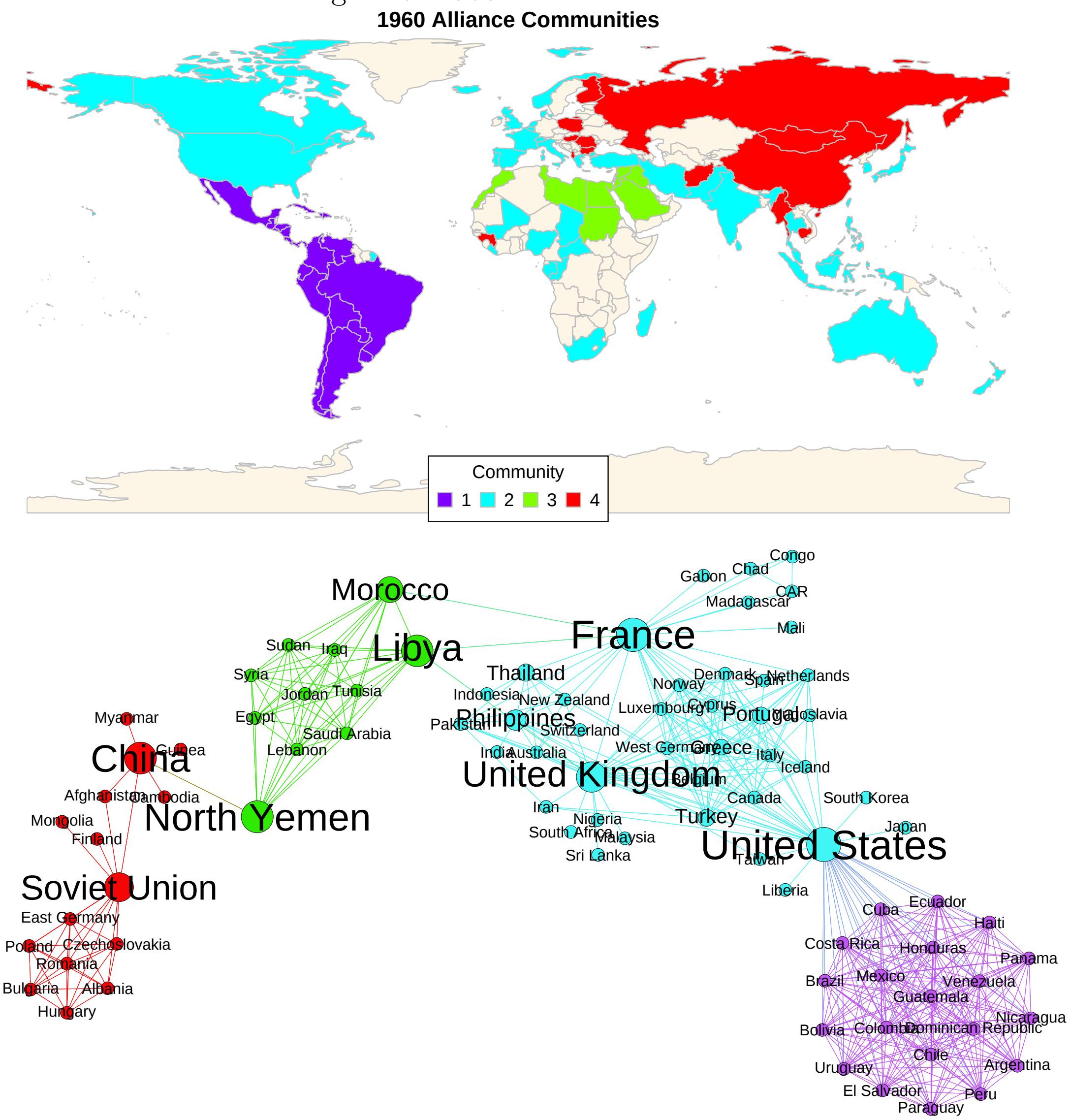
Ward, Michael D & Peter D Hoff. 2007. "Analyzing Dependencies in Geo-Economics and Geo-Politics." *Contributions to Conflict Management, Peace Economics and Development* 6.

Ward, Michael D, Randolph M Siverson & Xun Cao. 2007. "Disputes, Democracies, and Dependencies." *American Journal of Political Science* 51(3):583–601.

Warren, T Camber. 2010. "The Geometry of Security: Modeling Interstate Alliances as Evolving Networks." *Journal of Peace Research* 47(6):697–709.

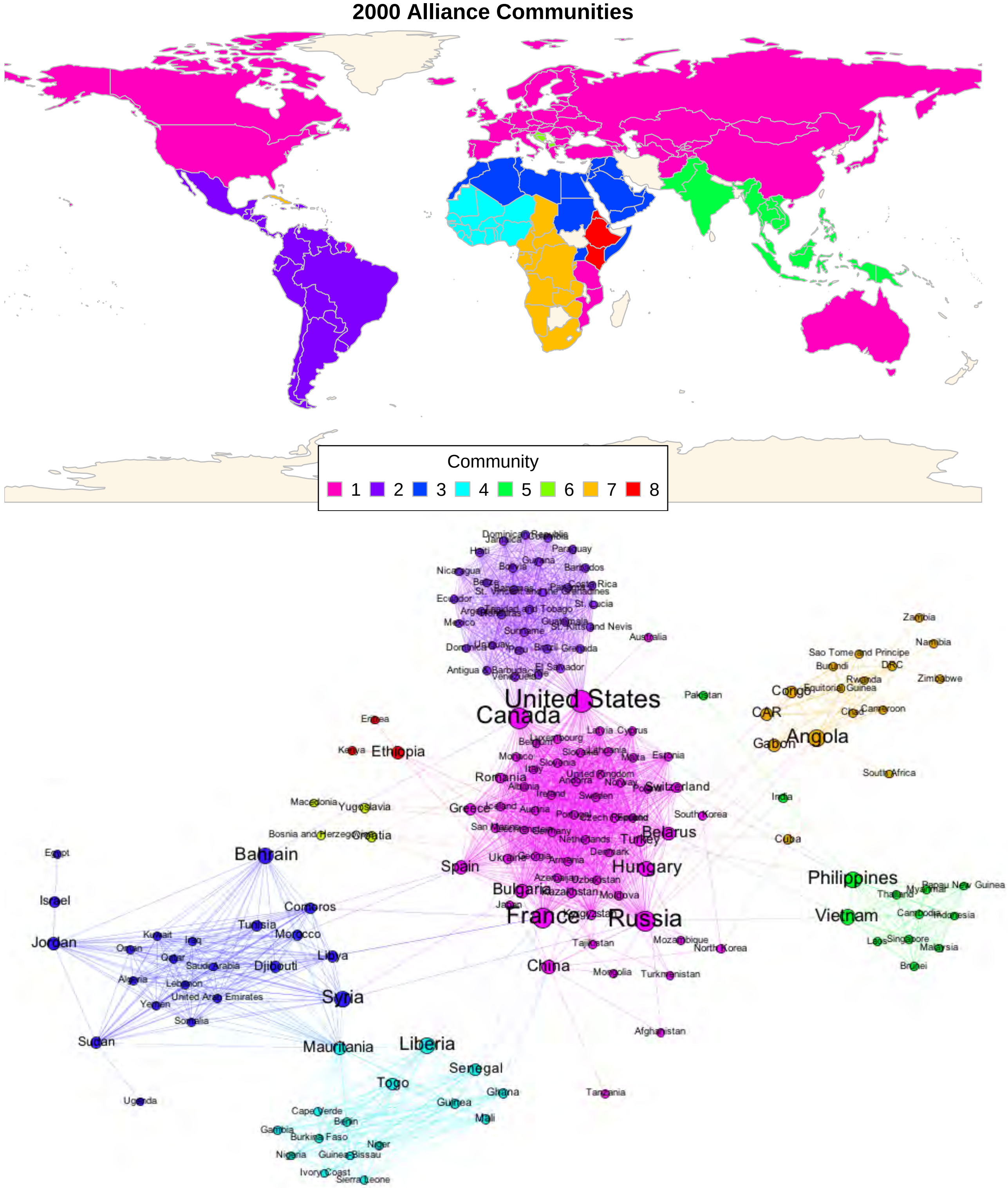
Yang, Jiawen, Hossein Askari, John Forrer & Hildy Teegen. 2004. "U.S. Economic Sanctions: An Empirical Study." *The International Trade Journal* 18(1):23–62.

Figure 6: 1960 Alliance network




Ties between state nodes represent security alliances. Nodes are colored by community and sized by betweenness centrality.

Figure 7: 2000 Alliance network




Ties between state nodes represent security alliances. Nodes are colored by community and sized by betweenness centrality.

Table II: Shared alliances and trade flows

| | *DV:* Trade Flows | | | |
|---|---|---|---|---|
| | G&M Model | | | |
| | (1) | (2) | (3) | (4) |
| **Shared Alliances** | | 0.00071*** | 0.00071*** | 0.00079*** |
| | | (0.0001) | (0.0001) | (0.0001) |
| **Shared Community** | | | | |
| **Dyadic Alliance** | 0.045*** | 0.018*** | 0.010*** | 0.003 |
| | (0.002) | (0.003) | (0.003) | (0.003) |
| Lagged Trade | Y | Y | Y | Y |
| Gravity Variables | Y | Y | Y | Y |
| MID | −0.213*** | −0.208*** | −0.226*** | −0.239*** |
| | (0.007) | (0.007) | (0.007) | (0.007) |
| Joint Democracy | | | | 0.034*** |
| | | | | (0.002) |
| UN S-Score | | | | −0.042*** |
| | | | | (0.003) |
| Additional Controls | | | Y | Y |
| Constant | −0.115*** | −0.129*** | −0.205*** | −0.154*** |
| | (0.010) | (0.010) | (0.011) | (0.012) |
| Observations | 482, 346 | 482, 346 | 482, 346 | 414, 837 |
| $R^2$ | 0.945 | 0.945 | 0.945 | 0.945 |
| Adjusted $R^2$ | 0.945 | 0.945 | 0.945 | 0.945 |
| Residual Std. Error | 0.490 | 0.490 | 0.489 | 0.491 |

*p<0.1; **p<0.05; ***p<0.01

*Includes panel corrected standard errors. Gravity Variables: GDP, population, and distance. Additional Controls: colonial history, common colonizer, geographical contiguity, GATT membership, joint membership in regional trade agreements and IGOs, common currency, and common language

Table III: Alliance communities and trade flows

| | *DV:* Trade Flows | | | | |
|---|---|---|---|---|---|
| | G&M Model | | | | |
| | (1) | (5) | (6) | (7) | (8) |
| **Shared Alliances** | | | | | |
| **Shared Community** | | 0.033*** | 0.033*** | 0.034*** | 0.026*** |
| | | (0.002) | (0.002) | (0.002) | (0.003) |
| **Dyadic Alliance** | 0.045*** | 0.021*** | 0.013*** | 0.009*** | 0.010** |
| | (0.002) | (0.003) | (0.003) | (0.003) | (0.005) |
| Lagged Trade | Y | Y | Y | Y | Y |
| Gravity Variables | Y | Y | Y | Y | Y |
| MID | −0.213*** | −0.212*** | −0.228*** | −0.241*** | −0.261*** |
| | (0.007) | (0.007) | (0.007) | (0.007) | (0.012) |
| Joint Democracy | | | | 0.035*** | 0.030*** |
| | | | | (0.002) | (0.003) |
| UN S-Score | | | | −0.041*** | −0.051*** |
| | | | | (0.003) | (0.004) |
| Shared IGOs | | | | | −0.002*** |
| | | | | | (0.0002) |
| Additional Controls | | | Y | Y | Y |
| Constant | −0.115*** | −0.140*** | −0.215*** | −0.166*** | −0.102*** |
| | (0.010) | (0.010) | (0.011) | (0.013) | (0.018) |
| Observations | 482, 346 | 482, 346 | 482, 346 | 414, 837 | 213, 401 |
| $R^2$ | 0.945 | 0.945 | 0.945 | 0.945 | 0.947 |
| Adjusted $R^2$ | 0.945 | 0.945 | 0.945 | 0.945 | 0.947 |
| Residual Std. Error | 0.490 | 0.490 | 0.489 | 0.491 | 0.492 |

*p<0.1; **p<0.05; ***p<0.01

*Includes panel corrected standard errors. Gravity Variables: GDP, population, and distance. Additional Controls: colonial history, common colonizer, geographical contiguity, GATT membership, joint membership in regional trade agreements and IGOs, common currency, and common language

Table IV: Centrality and trade flows

| | *DV:* Trade Flows | | | | |
|---|---|---|---|---|---|
| | G&M Model | | | | |
| | (1) | (4) | (7) | (9) | (10) |
| **Shared Alliances** | | 0.00079*** | | | |
| | | (0.0001) | | | |
| **Shared Community** | | | 0.034*** | 0.033*** | 0.022*** |
| | | | (0.002) | (0.002) | (0.003) |
| **Dyadic Alliance** | 0.045*** | 0.003 | 0.009*** | 0.010*** | 0.010*** |
| | (0.002) | (0.003) | (0.003) | (0.003) | (0.003) |
| Betweenness (exp) | | | | −0.00057* | −0.0016*** |
| | | | | (0.0003) | (0.0004) |
| Betwenness (imp) | | | | −0.00016 | −0.0011*** |
| | | | | (0.0003) | (0.0004) |
| ShareCom*Bet (exp) | | | | | 0.0037*** |
| | | | | | (0.001) |
| ShareCom*Bet (imp) | | | | | 0.0035*** |
| | | | | | (0.001) |
| Lagged Trade | Y | Y | Y | Y | Y |
| Gravity Variables | Y | Y | Y | Y | Y |
| MID | −0.213*** | −0.239*** | −0.241*** | −0.240*** | −0.241*** |
| | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) |
| Joint Democracy | | 0.034*** | 0.035*** | 0.035*** | 0.035*** |
| | | (0.002) | (0.002) | (0.002) | (0.002) |
| UN S-Score | | −0.042*** | −0.041*** | −0.041*** | −0.041*** |
| | | (0.003) | (0.003) | (0.003) | (0.003) |
| Additional Controls | | Y | Y | Y | Y |
| Constant | −0.115*** | −0.154*** | −0.166*** | −0.165*** | −0.153*** |
| | (0.010) | (0.012) | (0.013) | (0.013) | (0.013) |
| Observations | 482, 346 | 414, 837 | 414, 837 | 414, 837 | 414, 837 |
| $R^2$ | 0.945 | 0.945 | 0.945 | 0.945 | 0.945 |
| Adjusted $R^2$ | 0.945 | 0.945 | 0.945 | 0.945 | 0.945 |
| Residual Std. Error | 0.490 | 0.491 | 0.491 | 0.491 | 0.491 |

*p<0.1; **p<0.05; ***p<0.01

*Includes panel corrected standard errors. Gravity Variables: GDP, population, and distance. Additional Controls: colonial history, common colonizer, geographical contiguity, GATT membership, joint membership in regional trade agreements and IGOs, common currency, and common language

Table V: Geodesic alliance distance

| | *DV:* Trade Flows | | |
|---|---|---|---|
| | (15) | (16) | (17) |
| **Geodesic Distance** | −0.007*** | −0.007*** | −0.005*** |
| | (0.001) | (0.001) | (0.001) |
| **Dyadic Alliance** | 0.037*** | 0.031*** | 0.031*** |
| | (0.003) | (0.003) | (0.003) |
| Lagged Trade | Y | Y | Y |
| Gravity Variables | Y | Y | Y |
| MID | −0.232*** | −0.244*** | −0.257*** |
| | (0.005) | (0.005) | (0.005) |
| Joint Democracy | | | 0.035*** |
| | | | (0.002) |
| UN S-Score | | | −0.040*** |
| | | | (0.003) |
| Additional Controls | | Y | Y |
| Constant | −0.087*** | −0.163*** | −0.127*** |
| | (0.011) | (0.012) | (0.013) |
| Observations | 488,319 | 488,319 | 419,955 |
| $R^2$ | 0.945 | 0.945 | 0.945 |
| Adjusted $R^2$ | 0.945 | 0.945 | 0.945 |
| Residual Std. Error | 0.494 | 0.494 | 0.496 |
| *Note:* | *p<0.1; **p<0.05; ***p<0.01 | | |

*Includes panel corrected standard errors. Gravity Variables: GDP, population, and distance. Additional Controls: colonial history, common colonizer, geographical contiguity, GATT membership, joint membership in regional trade agreements and IGOs, common currency, and common language

Table VI: Bipolarity and multilateral alliances

| | *DV:* Trade Flows | | | | |
|---|---|---|---|---|---|
| | G&M Model | | | | |
| | (1) | (11) | (12) | (13) | (14) |
| **Shared Alliances** | | | 0.00044*** | 0.00084*** | |
| | | | (0.0001) | (0.0001) | |
| **Shared Community** | | 0.027*** | | | 0.030*** |
| | | (0.005) | | | (0.002) |
| **Dyadic Alliance** | 0.050*** | 0.032*** | 0.031*** | | |
| | (0.002) | (0.005) | (0.005) | | |
| Multilateral Alliance | | | | 0.005 | 0.006** |
| | | | | (0.003) | (0.003) |
| Bilateral Alliance | | | | 0.053*** | 0.050*** |
| | | | | (0.006) | (0.006) |
| Bipolar | | 0.063*** | 0.065*** | | |
| | | (0.002) | (0.003) | | |
| SharedAlly*Bipolar | | | 0.00018* | | |
| | | | (0.0001) | | |
| ShareCom*Bipolar | | 0.001 | | | |
| | | (0.005) | | | |
| DyadicAlly*Bipolar | | −0.025*** | −0.024*** | | |
| | | (0.006) | (0.006) | | |
| Lagged Trade | Y | Y | Y | Y | Y |
| Gravity and Conflict | Y | Y | Y | Y | Y |
| Democracy and S-Score | | Y | Y | Y | Y |
| Additional Controls | | Y | Y | Y | Y |
| Constant | −0.110*** | −0.263*** | −0.253*** | −0.159*** | −0.095*** |
| | (0.010) | (0.013) | (0.013) | (0.012) | (0.009) |
| Observations | 489,570 | 421,029 | 421,029 | 421,029 | 621,093 |
| $R^2$ | 0.945 | 0.945 | 0.945 | 0.945 | 0.945 |
| Adjusted $R^2$ | 0.945 | 0.945 | 0.945 | 0.945 | 0.945 |
| Residual Std. Error | 0.494 | 0.495 | 0.495 | 0.496 | 0.461 |

*p<0.1; **p<0.05; ***p<0.01

*Includes panel corrected standard errors. Gravity Variables: GDP, population, and distance. Additional Controls: colonial history, common colonizer, geographical contiguity, GATT membership, joint membership in regional trade agreements and IGOs, common currency, and common language