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The Relevance of Politically Relevant Dyads in the Study of Interdependence and Dyadic Disputes

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The role of dyadic trade dependence in reducing conflict has been a subject of some dispute in the recent literature. Liberals have presented strong evidence that a higher level of trade dependence leads to lower probabilities of dyadic disputes, while an equally compelling literature has generated evidence that elevated levels of trade dependence generally increase the likelihood of disputes, or that dependence only decreases the likelihood of conflict for certain pairs of states under specific conditions. Unfortunately, the direct comparison of these competing perspectives has been hindered by the use of different estimation techniques, variable measurements, data sets, and samples. While recent work has attempted to provide a more systematic analysis of the effect of different data sets and sample choices on the relationship between interdependence and conflict (Schneider, Barbieri, & Gleditsch, 2003), no theoretical reason has been put forward as to why *estimation results for some samples should differ from others.*

This paper employs three different data sets (Russett & Oneal, 2001; Barbieri, 2002; and Gleditsch, 2002) to test the effects of sample choice, especially that of politically relevant dyads, on the relationship between interdependence and conflict. Following Polachek, Robst, and Chang (1999) I note that the gains from trade are not homogeneous across dyad type; thus, the use of a politically relevant sample leads to biased estimates of the relationship between trade and conflict. Using a model that has been found to be critical of the liberal perspective (Barbieri, 2002), the results show that trade dependence does not have the same impact on conflict for dyads of different sizes. In sum, dyads with larger economies and high levels of trade salience have lower probabilities of conflict than dyads with smaller economies and equivalent amounts of trade.

Keywords trade, interdependence, conflict, politically relevant sample

Much recent literature on interdependence and conflict suggests that the costs of losing the gains from trade make dyads with higher levels of trade dependence less likely to engage in conflict than those with lower levels of trade dependence (Polachek, 1980; Gasiorowski & Polachek, 1982; Gasiorowski, 1986; Pollins, 1989a, 1989b; Mansfield & Pollins, 2001; Russett & Oneal, 2001). In contrast, Barbieri and Levy (1999, 2003) note that the gains from trade are not necessarily lost during conflict; consequently, they posit that trade should not increase the likelihood of dyadic peace. Barbieri (1996, 2002) further suggests that trade dependence will only decrease conflict if the trading relationship is equally beneficial to both states in the dyad. An additional group of literature posits that trade only decreases the

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likelihood of conflict under certain conditions or for certain types of dyads (Reuveny, 1999a, 1999b; Gelpi & Grieco, 2003; Hegre, 2003). Unfortunately, the use of different estimation techniques, different variable measurement, different data sets, and different samples has made it difficult to directly compare liberal findings such as those proposed by Russett and Oneal (2001) with those of scholars more critical of the liberal perspective.[1] The boundary conditions of interdependence and conflict are consequently under some dispute (Mansfield & Pollins, 2001).

This paper is designed to help resolve a critical facet of this dispute by focusing largely on the issue of sample choice and its effect on the estimation of the relationship between interdependence and dyadic conflict. An important discrepancy in much of the work on this topic lies with the use of politically relevant data sets. Such data sets have a limited number of observations based upon states' size and geographic proximity to one another. Those who employ a politically relevant sample suggest that it captures the only population of interest and is thus the most appropriate data set for the study of trade and international conflict (e.g., Gasiorowski & Polachek, 1982; Oneal et al., 1996; Oneal & Ray, 1997; Oneal & Russett, 1997; Russett & Oneal, 2001). However, some scholars have recently noted that politically relevant samples produce different (and often more supportive) results for the negative relationship between interdependence and conflict (Bearce & Fisher, 2002; Beck, 2003; Oneal & Russett, 2003). Yet, very little systematic comparison has been made of the effect of such a sample on the relationship between interdependence and conflict. More importantly, no theoretical reason has been put forward as to *why* estimation results for politically relevant samples should differ from other samples.

This paper aims to both make that comparison and deliver a theoretical justification. Employing a model that has been shown to be critical of the liberal perspective (Barbieri, 2002), I utilize three separate data sets (Russett & Oneal, 2001; Barbieri, 2002; Gleditsch, 2002) to illustrate that the effects of bilateral trade dependence on conflict differ depending on the absolute size of a dyad's economy. As Polachek, Robst, and Chang (1999) note, trade with an economically larger state is likely to benefit an actor's economy more than trade with a smaller state. This implies that samples biased towards great-power states (e.g., politically relevant samples) should be more likely to find support for a significant, negative relationship between trade dependence and conflict.

A comparison of estimation results using Russett and Oneal's (2001) politically relevant data, Barbieri's (2002) data, and Gleditsch's (2002) data illustrates that some of the differences in findings in the previous interdependence and conflict literature are somewhat attributable to data construction but most likely dependent on sample choice. Specifically, using Barbieri's data and measurement techniques, a negative relationship between salient trade and dyadic disputes is found when a sample of politically relevant dyads, mixed-power dyads, and mixed- and major-power dyads is employed. Similarly negative findings for salient trade also apply when Gleditsch's data are employed. However, for both Barbieri's and Gleditsch's data, a positive or nonsignificant relationship between trade salience and disputes is obtained for a minor power or full sample of dyads. One of the crucial findings put forth here is that both a full sample of dyads and a control for the size of economies in a dyad should be employed in the study of interdependence and conflict. When this is done, the results suggest that trade salience does not have an independent effect on conflict; instead, dyads with larger economies *and* more salient trade are less likely to engage in dyadic conflict.

[1] For a discussion of the literature in terms of variable selection and temporal range see Schneider, Barbieri, and Gleditsch (2003). For a discussion of different dependent variables and estimation techniques, see Beck (2003).

Trade, Conflict, and Political Relevance

The relationship between economic interdependence and conflict has been the topic of an increasing number of studies in the international relations literature over the last two decades. Much of this research falls under the rubric of the liberal perspective in suggesting that a Kantian "spirit of commerce" leads to a more peaceful international system. The most prevalent hypothesis found in this body of work suggests that high levels of bilateral trade dependence lead to welfare gains. The presence of these gains is said to increase the likelihood of peace by adding a material cost to conflict (see Mansfield & Pollins, 2001, for a recent review of the literature). The research that lends the greatest support to this argument has generally employed samples of politically relevant dyads (Oneal et al., 1996; Oneal & Ray, 1997; Oneal & Russett, 1997, 2003; Russett & Oneal, 2001; Reed, 2003) or samples of states with large economies (Polachek, 1980; Gasiorowski & Polachek, 1982; Polachek & McDonald, 1992).

In contrast, Barbieri's work (Barbieri, 1996, 2002; Barbieri & Levy, 1999, 2003; Barbieri & Schneider, 1999) presents an ardent challenge to the liberal perspective. In her book, *The Liberal Illusion* (2002), she illustrates that both salient trade and the interaction between salient trade and trade symmetry have a positive relationship with the onset of dyadic disputes. Her findings were based on a fuller sample of dyads than much previous work, but her model was also estimated with new data and new measures of the importance of trade dependence and trade symmetry. Consequently, her work is not easily compared with previous research.[2] Using Barbieri's (2002) models, this paper addresses how differences in sample choice lead to important disparities in the estimation results for the relationship between bilateral trade dependence and conflict.

The Use of Politically Relevant Dyads in the Interdependence and Conflict Literature

Studies of international conflict employ samples of politically relevant dyads in an attempt to capture a population that has a reasonable probability of engaging in dyadic conflict. A dyad is said to be politically relevant if one of the states in the dyad is a major power or if the two states in the dyad are contiguous.[3] While different definitions of contiguity are employed by different studies, the use of a politically relevant sample dramatically decreases the number of observations in a data set and increases the proportion of conflict to nonconflict events.[4] It is suggested that such a sample is more relevant for the study of international conflict than others because the dyads in question are more likely to be politically active (Maoz & Russett, 1993) or to have the opportunity for conflict (Most & Starr, 1989; Siverson & Starr, 1991). In effect, the ultimate goal of a politically relevant sample is to obtain a set of observations where only dyads with a nonzero probability of conflict are included. Unfortunately, samples of politically relevant dyads based on major-power status and contiguity do not capture the full population of states that have an above-zero probability of engaging in conflict. Indeed, in the postwar period, only about 75% of Militarized Interstate Disputes (MIDs)

[2]Recently, Oneal and Russett (2003) have used their own data to test Barbieri's model. Their findings are discussed below.

[3]For the post–World War II period, major powers are considered to be the United States, Great Britain, France, the USSR/Russia, and China.

[4]Most studies focus on two separate issues when defining contiguity. The first issue is one of direct contiguity between two states. Politically relevant samples define direct contiguity ranging from two states with touching borders to those states separated by 400 miles or less of open water. The second of these issues is indirect contiguity, where states may be considered to be contiguous if they touch through a colony or if their colonies touch each other. The most restrictive definition of political relevance includes directly contiguous states (i.e., with shared borders).

are captured when a narrow definition of political relevance is employed (i.e., states with shared borders), and approximately 89% are captured when a less strict definition of political relevance is employed (states separated by less than 400 miles or contiguous through colonies).

Because of the selection criteria—major-power status and contiguity—the 11% to 25% of conflicts excluded from a relevant sample are necessarily those between two states of minor-power status. In particular, the politically relevant sample used by Russett and Oneal (2001) has a distribution of approximately 30% of minor power dyads to 70% mixed-power and major-power dyads. A distribution more representative of the international system, as found in the *Eugene* data set (Bennett & Stam, 2000), would include approximately 90% minor-power dyads and 10% mixed- and major-power dyads.

This is all to say that politically relevant samples exclude many dyads of interest while presenting a sample biased heavily in favor of major-power and mixed-power dyads. Nevertheless, such a sample would not lead to biased estimates if it was not biased in terms of the relationships being studied. For example, Lemke and Reed (2001) find that in the study of the democratic peace, it makes little difference whether a researcher uses a politically relevant sample or not. This is to be expected, since the democratic peace does not posit a heterogeneous causal mechanism for minor- and major-power dyads. However, such a biased sample would have an important effect on estimation results if the relationships under study differed according to states' sizes. This is, unfortunately, the case in studies of the relationship between bilateral trade dependence and dyadic disputes.

Size Matters: Disparate Gains and the Trade and Conflict Literature

The gains from trade have long been tied to the absolute size of a state's trading partner in the economic literature (Ethier & Ray, 1979; Head, 1995).[5] The important links between export prices, gains from trade, and dyadic conflict have also been examined extensively by Polachek, Robst, and Chang (1999). They note that trade with a large country can substantially impact the smaller country's domestic consumption. The reverse cannot be said to be true, however. Since "price changes affect the gains from trade, and thereby conflict, differently depending on whether trade is with a small or large country" (Polachek, Robst, & Chang, 1999, 414), the level of bilateral trade with a large country or a major power should reduce the likelihood of conflict more than trade with a minor power.[6] While they obtain this finding using a sample of directed dyads using the Conflict and Peace Data Bank, their results also have important implications for the relationship between trade and conflict for samples of nondirected dyads such as those used in the majority of the interdependence and conflict literature.[7]

[5]In addition, the role of absolute economic size has earned increased attention in determining the relationship between interdependence and conflict (Mansfield & Pevehouse, 2000; Mansfield & Pollins, 2001).

[6]In a related argument, Rosencrance (1986) suggests that developed states are more likely to benefit from the gains from trade. Hegre (2003) likewise posits that since the utility for trade (as opposed to military occupation) increases with development, we should expect developed states to be less conflictual. He further suggests that "development strengthens the effect of interdependence—there is an interaction effect between the two variables. A certain level of development may even be a *prerequisite* for the liberal peace to work" (Hegre, 2003, 209).

[7]Note that Oneal and Russett (2003), Russett and Oneal (2001), Barbieri (2002), and Gleditsch (2002) all use a nondirected dyad format in their studies. Additional articles using samples of politically relevant dyads or those biased towards great powers include Polachek (1980), Gasiorowski and Polachek (1982), Polachek and McDonald (1992), Oneal et al. (1996), Oneal and Ray (1997), Oneal and Russett (1997, 1999), Hegre (2003), and Reed (2003).

Because the gains from trade and, consequently, the likelihood of conflict, differ depending upon the absolute economic size of a state's trading partner, a sample that is biased in terms of power status will lead to different results than those from an unbiased sample. A politically relevant sample, in which 70% of the dyads include at least one major power (i.e., the U.S., Great Britain, France, the Soviet Union/Russia, and China), is also a sample in which an abnormally high proportion of the dyads include at least one very large economy and is thus heavily biased towards finding a negative relationship between interdependence and conflict.[8]

Within a nondirected dyad format, one would expect major/major-power trade to decrease conflict more than minor/minor-power trade. Mixed minor/major-power dyads should exhibit the same relationship between trade dependence and conflict as major/major-power dyads. Polachek, Robst, and Chang (1999, 415) note that,

> [L]arge countries enter into an alliance with small countries to receive trade gains, while small countries enter into alliances with large countries to gain security. Small countries lose this security as well as trade gains, as a result of being conflictual with a large trading partner. The small actor also risks that large country using its military advantage in response to the actor's conflictual behavior.

In contrast, mixed major/minor-power dyads might exhibit as weak of a relationship between trade and conflict as minor-power dyads. Using a nondirected dyad format, the sum effect of a major/minor-power and minor/major-power dyad should, nonetheless, lead to a stronger, negative relationship between interdependence and conflict than for a purely minor-power dyad. In short, major- and mixed-power dyads should find that trade has a larger dampening effect on conflict than minor-power dyads. If such is the case, then the liberal hypothesis is conditioned by state size, and the interaction between trade dependence and economic dyad size should be thoroughly examined. It may well be that higher trade dependence levels, in and of themselves, do not add enough value to a dyadic relationship to reduce conflict propensities.

Data and Measurement

If the purely liberal hypothesis is correct, then one would expect trade dependence to have a negative relationship with conflict regardless of the size of states under study. If the liberal hypothesis is not accepted, then one would expect to see a positive or nonsignificant relationship between dyadic conflict and trade regardless of sample choice. Finally, if the liberal hypothesis must be conditioned, then one would expect trade dependence to decrease conflict primarily for economically larger dyads.

Three data sets from the post–World War II period are employed in this analysis to test the effects of sample and dyad size on the relationship between trade dependence and conflict. The first of these, used by Russett and Oneal in *Triangulating Peace* (2001), is limited to a set of politically relevant dyads as determined by direct contiguity of less than 400 miles, contiguity through a colony, or major-power status. The second of these is from Barbieri's (2002) *The Liberal Illusion*. Barbieri has critiqued the data used in *Triangulating Peace* for replacing some missing trade data with zero values (implying the lack of trade). Her data also differ from Russett and Oneal's in that no interpolation or extrapolation techniques were used to replace additional missing values. Finally, Gleditsch (2002) has similarly improved upon Russett and Oneal's data by temporally and spatially expanding bilateral

[8]Indeed, GDP is often used as a proxy for power in the conflict processes literature.

trade and GDP data fourfold with information obtained from a wide variety of sources. However, as with Oneal and Russett (and unlike Barbieri), he also imputes missing bilateral import and export data from nonmissing bilateral export and import data. An understandably important benefit of the Barbieri and Gleditsch data sets is that they allow for a test of the relationship between interdependence and conflict on a variety of different samples.

Using her own data set and different measures for trade salience and symmetry, Barbieri finds that only symmetrically dependent trade is negatively related to dyadic conflict. Salient trade and the interaction between salience and symmetry are shown to have a positive effect on the onset of dyadic disputes. Gleditsch, in contrast, illustrates in a simple test that the lower dyadic level of bilateral trade as a proportion of GDP has a negative relationship with conflict. Unfortunately, Gleditsch's results were meant to be an illustration of the validity of his data rather than an accurate test of the relationship between bilateral trade dependence and conflict. Because of this, he only employs a single control variable, the distance between states in a dyad. His results should consequently not be strictly compared to previous research and his findings must be taken for what they are: a useful presentation of his expanded data.

Of course, to best compare results across different data sets a single model must be employed. This paper uses the model and measurement from Barbieri's *The Liberal Illusion* (2002). In recent published work, these findings are undoubtedly among the most critical of the liberal hypothesis. Setting the bar high should lend increased credibility to any results that support a negative impact of trade dependence on the likelihood of dyadic disputes.

Dependent Variable: Outbreak of Militarized Disputes

The dependent variable employed in this study is the outbreak of militarized interstate disputes.[9] The *Dispute* dependent variable is coded as 0 = no dispute and 1 = the first occurrence of either threat of force, show of force, use of force, or war for a particular militarized dispute.

Independent Variables

Much empirical support has been lent to the proposition that bilateral trade flows are reduced in the presence of conflict (Pollins, 1989a, 1989b; Morrow, Siverson, & Tabares, 1998, 1999; Feng, 2000; Li & Sacko, 2002).[10] In addition, the heightened possibility of conflict has also been posited to reduce trade flows (Gowa, 1989; Gowa & Mansfield, 1993).[11] Morrow (1999) likewise notes that even the expectations of future conflict might lead traders to pull out of the market. Consequently, independent variables have been lagged one year ($t - 1$) in all analyses to control for reversed causality.[12]

Bilateral Trade Dependence

The trade variables used in these analyses are based on data obtained from Russett and Oneal's (2001) data set, Barbieri's (2002) data set, and Gleditsch's (2002) expanded trade

[9] Note that Russett and Oneal (2001) and Gleditsch (2002) examine the occurrence (rather than the onset or outbreak) of dyadic disputes.

[10] Much of this research uses the Conflict and Peace Data Bank and/or the World Events Interaction Survey (rather than the Militarized Interstate Dispute Data set) to measure dyadic conflict.

[11] Using data from 1948 to 1978, Feng (1994) finds that hegemonic conflict reduces trade between allies and adversaries. However, hegemonic conflict is shown to increase trade between the hegemon and neutral countries.

[12] Exceptions to this are the *Peaceyears* and *cubic spline* variables.

data set.[13] All operationalizations of the trade variables are those used by Barbieri (2002).[14]

Trade Salience

State i's bilateral trade dependence on State j is measured by State i's imports and exports from State j as a proportion of State i's Gross Domestic Product:

$$\left(\frac{\text{Imports}_{ij} + \text{Exports}_{ij}}{\text{GDP}_i}\right).^{15}$$

Following Barbieri, the geometric mean of State i and State j's bilateral trade dependence as a total measure of the level of trade salience is given below:

$$\text{Salience}_{ij} = \sqrt{\left(\frac{\text{Imports}_{ij} + \text{Exports}_{ij}}{\text{GDP}_i}\right) \times \left(\frac{\text{Imports}_{ji} + \text{Exports}_{ji}}{\text{GDP}_j}\right)}.^{16}$$

Barbieri (2002) finds a positive relationship between *Salience* and dyadic conflict.[17] Previous research in the liberal perspective leads to the expectation of a negative coefficient for *Salience*, where more important trade leads to decreased conflict. Given the findings from Polachek, Robst, and Chang (1999), we should expect such a negative relationship to be especially strong for samples biased towards major-power dyads.

Trade Symmetry

Barbieri suggests that states that are equally dependent on one another should be less likely to engage in conflict. She constructs a symmetry measure[18] ranging from 0 to 1. High

[13] Russett and Oneal's (2001) trade data are available at http://www.yale.edu/unsy/democ/democl.htm. Barbieri's (2002) trade data are available at http://sitemason.vanderbilt.edu/site/k5vj7G/new_page_builder_4. Gleditsch's (2002) expanded trade data are available at http://weber.ucsd.edu/~kgldits/exptradegdp.html.

[14] Many different measures of trade have been proposed in the recent literature. See Schneider, Barbieri, and Gleditsch (2003) for a review.

[15] In her work, Barbieri examines bilateral trade both as a proportion of a state's GDP and as a proportion of a state's total trade. This analysis focuses solely on trade as a proportion of GDP as employed by the majority of the liberal trade literature. Russett and Oneal generally use the lowest level of trade dependence in a dyad as the measure of dyadic interdependence. They posit that the state with the lowest level of dyadic trade to GDP is faced with fewer economic costs for dyadic conflict and have generally found a negative relationship between their trade variable and conflict (Oneal & Russett, 1997, 1999; Russett & Oneal, 2001). However, this "weakest link" approach to dyadic trade interdependence has come under recent criticism. By using the lower level of dependence as the measure for interdependence, a dyad for which the more dependent state is very dependent on its partner is not differentiated from a dyad in which the most dependent state is barely more dependent than the least dependent state. Barbieri (2002) notes that it is likely that the former dyad would have a greater incentive to mitigate dyadic disputes than the latter.

[16] This measure is highly correlated ($r = 0.70$) with the bilateral trade as a proportion of total trade measure.

[17] Hegre (2003) suggests that results using Barbieri's measure of trade salience as compared to Russett and Oneal's lowest trade to GDP ratio of trade dependence are very similar. However, he also suggests that Barbieri's measure may be slightly preferable in that it is less likely to serve as a proxy for country size.

[18] Russett and Oneal (2001) control for trade asymmetry by including the highest level of bilateral trade dependence in the dyad.

values imply higher levels of trade symmetry, where

$$\text{Symmetry}_{ij} = 1 - |\text{Dependence}_i - \text{Dependence}_j|.$$

Hegre (2001) suggests that this measure is weakened by its dependence on the magnitude of trade shares. He notes, for example, that two symmetrically dependent states with 20% and 25% of their dyadic trade as a proportion of GDP would have a lower score on the symmetry variable than a dyad in which one state has trade as 5% of its GDP and the other with has trade accounting for only 0.001% of its trade as a proportion of GDP. Thus, this variable is likely not the ideal measure of trade symmetry. Nonetheless, I include the variable to provide as complete a comparison as possible with *The Liberal Illusion*. The liberal perspective would expect a nonsignificant relationship, between *Symmetry* and the onset of dyadic disputes, while Barbieri (2002) finds a negative relationship where more symmetrical trading relationships are associated with a decreased probability of disputes.

Salience*Symmetry

Barbieri (2002) also examines the interaction between the level of salience and symmetry of bilateral trade dependence. Hegre (2001) notes that such an interaction can be dangerously collinear. Barbieri reduces collinearity by standardizing the *Salience* and *Symmetry* variables into z scores before obtaining their product. *Salience*Symmetry* consequently correlates at −0.48 with *Salience* and at 0.53 with *Symmetry*.[19] The variable is included in Tables 2 through 4 to facilitate comparison with *The Liberal Illusion.* Barbieri (2002) finds that this interactive term has a positive, significant impact on conflict. However, the liberal perspective provides no specific expectations for such a variable, as *Salience* is expected to have a negative effect and *Symmetry* no effect on dyadic conflict.

Dyad Size ($GDP_i + GDP_j$)

To ensure that national income is not the driving force behind an inverse relationship between interdependence and conflict, it is becoming more prevalent to include Gross Domestic Product (GDP) as a control variable (Gasiorowski, 1986; Polachek & McDonald, 1992). Mansfield and Pevehouse (2000) and Hegre (2003) also note that a state's trade as a proportion of GDP is highly correlated with its GDP. Consequently, a control for the absolute size of the dyad is added to the model. The *Dyadsize* variable is operationalized by the sum of GDPs for State_i and State_j. GDP and trade data are from Barbieri in Sample 14 and Gleditsch in Sample 15. This variable has also been employed as a control by Oneal and Russett (1997) and Bennett and Stam (2000) and is expected to be positively associated with the likelihood of dyadic disputes.[20]

*Salience*Dyadsize*

To apply Polachek, Robst, and Chang's (1999) logic to a nondirected dyad analysis, it is necessary to test for the *joint* effect of the size of dyadic economies and the salience of trade. It is expected that more important trading relationships, as defined by the salience

[19]While this is not as high as the 0.94 correlation obtained between *Salience* and an unstandardized interaction variable, correlations in the high 0.40s and low 0.50s are still high enough to lead to potential problems with high standard errors (and consequently nonsignificant coefficients) for the trade variables.

[20]In addition, the weakest link test of the lowest level of GDP of the state in a dyad (GDP_{low}) is employed.

of trade and the size of the trading partner, should lead to a lower probability of disputes. Consequently, Samples 14 and 15 also include the interactive variable *Salience***Dyadsize*. One would expect that the larger the economies of the states in a dyad, and the more salient the trading relationship, the lower the likelihood of dyadic disputes.

Contiguity

Geographical contiguity is a well-established condition that has been shown to increase the likelihood of conflict (Starr & Most, 1976; Siverson & Starr, 1991; Bremer, 1992). Noncontiguous dyads should thus be less likely to engage in conflict with one another. In addition, contiguous states are often those states with the highest levels of bilateral trade dependence. This dichotomous variable is coded as 1 if two states share a boundary or are separated by less than 400 miles of water. Otherwise, the dyad is considered to be noncontiguous and the variable is coded as 0. *Contiguity* is expected be positively associated with dyadic conflict.

Joint Democracy

Numerous studies have bolstered the liberal proposition that two countries with strong democratic institutions are less likely to engage in either conflict or war with one another (Maoz & Abdolali, 1989; Bremer, 1992; Maoz & Russett, 1993; Dixon, 1994; Ray, 1995; Oneal & Russett, 1997, 2003). Furthermore, Dixon and Moon (1993) posit that democracies are more likely to trade with each other than states with dissimilar political systems. These results are generally supported by Mansfield, Milner, and Rosendorff (1997), Polachek (1997), and Bliss and Russett (1998).[21]

Using data from the *Polity III* data set (Gurr, Jaggers, & Moore, 1989; Jaggers & Gurr, 1995, 1996), a variable measuring the level of joint democracy in a dyad is constructed. The *Joint Democracy* variable ranges from zero to one hundred and is constructed in the following manner:

$$\text{Joint Democracy} = \left(\frac{\text{Democracy}_i - \text{Autocracy}_i + 10}{2}\right)\left(\frac{\text{Democracy}_j - \text{Autocracy}_j + 10}{2}\right).$$

A negative relationship between *Joint Democracy* and the onset of dyadic disputes is expected.

Alliance

States may be more likely to trade with other states who have similar security interests or alliances (Pollins, 1989b; Gowa & Mansfield, 1993; Gowa, 1994).[22] In addition, the presence of a security alliance between states in a dyad may be an important factor in reducing the likelihood of conflict between states.[23] The *Alliance* variable is coded as 1 =

[21] In addition, Gowa (1994) and Gowa and Mansfield (1993) suggest that levels of trade between two states are related to domestic political interests.

[22] Feng (1994), however, suggests that alliance trade actually decreases in the presence of hegemonic conflict.

[23] Of course, security relationships and alliances are no guarantor of dyadic peace (Bueno de Mesquita, 1981; Siverson & King, 1980; Siverson & Starr, 1991).

TABLE 1 Correlations between salience and symmetry variables, 1948–1992 ($N = 17{,}810$)

	R&O salience	R&O symmetry	Barbieri salience	Barbieri symmetry	Gleditsch salience
R&O salience	1.00				
R&O symmetry	−0.61	1.00			
Barbieri salience	0.75	−0.43	1.00		
Barbieri symmetry	−0.34	0.72	−0.46	1.00	
Gleditsch salience	0.60	−0.30	0.76	−0.29	1.00
Gleditsch symmetry	−0.25	0.44	−0.31	0.52	−0.44

the presence of a mutual defense pact, neutrality agreement, or entente between the two states in the dyad; otherwise, the variable is coded as 0. It is expected that the presence of an alliance should be associated with decreased dispute involvement.[24]

Relative Capabilities

The importance of power preponderance in reducing the likelihood of dyadic war and conflict has been extensively supported (Organski & Kugler, 1980; Bueno de Mesquita & Lalman, 1992; Bremer, 1992; Geller, 1993; Kugler & Lemke, 1996). Furthermore, the relationship between a state's utility for military force (which declines with dyadic power preponderance) versus the utility for trade has been established by Rosencrance (1986). The relative power capabilities of two states in a dyad is consequently a common control variable in studies of interdependence and conflict. This paper employs the natural logarithm of the ratio of the stronger state's Composite Indicator of National Capabilities index (from the Correlates of War data set) to the weaker one's to test the importance of power ratios on conflict. It is expected that the variable *Relative Capability* will have a negative relationship with conflict, where a greater disparity of power between two states will be associated with lower probabilities of dyadic disputes.

Estimation and Results

A simple comparison of the *Salience* and *Symmetry* measures for the Russett and Oneal (2001), Barbieri (2002), and Gleditsch (2002) data sets are presented in Table 1. The correlations between Oneal and Russett's and Barbieri's variables are high enough to lead to expectations of similar relationships with the onset of dyadic disputes ($r = 0.75$ and 0.72).[25] A comparison of Gleditsch's and Russett and Oneal's data provides a strong correlation of 0.60 for *Salience* and 0.44 for *Symmetry*. Barbieri and Gleditsch's data correlate at 0.76 for *Salience* and 0.52 for *Symmetry*.

[24]These data are from the COW formal alliance data set (Small & Singer, 1969) as revised by Alan Sabrosky (Sabrosky, 1980).

[25]Note that Russett and Oneal test the relationship between dependence and conflict with the occurrence of dyadic disputes in their 2001 book and with the onset of disputes in their 2003 chapter. Bennett and Stam (2000) note that, when using the correction for duration dependence as suggested by Beck, Katz, and Tucker (1998) and Beck (2003), the trade dependence coefficients are only significant determinants of occurrence of dyadic disputes when a sample of politically relevant dyads is employed.

The Effects of Data-Set Choice on the Relationship between Interdependence and Conflict

Because this paper employs a dichotomous dependent variable (i.e., the onset of dyadic disputes), a maximum likelihood logit estimation technique is employed. Logit coefficients with robust standard errors clustered on the dyad are presented in Tables 2 through 5. In addition, dyadic disputes are not only rare; they are often temporally dependent upon one another. As suggested by Beck (2003), controls for duration dependence are employed through use of a *Peaceyears* variable and three cubic splines created from the *BTSCS* algorithm (Beck, Katz, & Tucker, 1998).

Using all three data sets, Table 2 presents Barbieri's base model estimated with a politically relevant sample similar to the one employed by Russett and Oneal (2001). The control variables in Sample 1 and all following samples have either nonsignificant or the

TABLE 2 Duration-dependent logits and onset of dyadic disputes: 1950–1985. Politically relevant sample as from Russett and Oneal (2001)

	Sample 1 Russett & Oneal trade data	Sample 2 Barbieri trade data	Sample 3 Gleditsch trade data
Salience$_{t-1}$	−23.341 (10.644)	−6.313 (6.811)	0.287 (0.155)
	p = 0.028	p = 0.354	p = 0.064
Symmetry$_{t-1}$	−6.434 (1.924)	−1.918 (1.401)	−0.090 (0.220)
	p = 0.001	p = 0.171	p = 0.684
Salience*Symmetry$_{t-1}$	0.027 (0.039)	0.005 (0.008)	0.001 (0.001)
	p = 0.489	p = 0.533	p = 0.389
Contiguity$_{t-1}$	1.119 (0.229)	1.098 (0.232)	1.086 (0.226)
	p = 0.000	p = 0.000	p = 0.000
Joint democracy$_{t-1}$	−0.004 (0.002)	−0.005 (0.002)	−0.006 (0.002)
	p = 0.109	p = 0.048	p = 0.012
Alliance$_{t-1}$	−0.230 (0.178)	−0.212 (−0.181)	−0.206 (−0.182)
	p = 0.196	p = 0.241	p = 0.258
Relative capabilities$_{t-1}$	−0.245 (0.044)	−0.215 (0.046)	−0.187 (0.044)
	p = 0.000	p = 0.000	p = 0.000
Peaceyears	−0.378 (0.044)	−0.379 (0.044)	−0.380 (0.045)
	p = 0.000	p = 0.000	p = 0.000
Spline 1	−0.003 (0.001)	−0.003 (0.001)	−0.003 (0.001)
	p = 0.000	p = 0.000	p = 0.000
Spline 2	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)
	p = 0.000	p = 0.000	p = 0.000
Spline 3	−0.000 (0.000)	−0.000 (0.000)	−0.000 (0.000)
	p = 0.347	p = 0.328	p = 0.349
Constant	4.786 (1.994)	0.215 (1.501)	−1.666 (0.376)
	p = 0.016	p = 0.886	p = 0.000
χ^2	471.92*	473.54*	516.21*
Log likelihood	−1700.85	−1707.52	−1707.57
Pseudo R^2	0.21	0.20	0.20
N	17,131	17,131	17,131

Robust standard errors are clustered by dyad in parentheses. Two-tailed significance tests.
$^{*}p \leq 0.001$.

expected relationships with dyadic disputes. The interactive term *Salience***Symmetry* fails to obtain significance in any of the models in Table 1. When Russett and Oneal's data are used with Barbieri's measurements in Sample 1, both *Salience* and *Symmetry* have a negative, significant impact on conflict.

In *Globalization and Armed Conflict* (2003), Oneal and Russett also estimate Barbieri's model using their own data. Using a data set extended by seven years from the *Triangulating Peace* (2001) sample used here, they find that *Salience***Symmetry* (Interdependence), but neither *Salience* nor *Symmetry* has a significant effect on conflict when their politically relevant sample is employed.[26]

When Barbieri's data are utilized with Oneal and Russett's sample (Sample 2), neither *Salience* nor *Symmetry* nor *Salience***Symmetry* are significant. Using Gleditsch's data in Sample 3, in turn, a significant, negative coefficient for *Salience* and a nonsignificant coefficient for *Symmetry* and *Salience***Symmetry* are obtained. These results are the most supportive of the purely liberal hypothesis where, of all the trade variables, only salient trade leads to decreased conflict. Russett and Oneal's data are also supportive of the negative impact of trade salience on conflict. However, use of these data also supports the negative effect of symmetrical trade dependence on conflict, which is not suggested to be either a determinant of reduced conflict in the majority of liberal research nor a significant variable in Russett and Oneal's (2001) previous work.

The results in Table 1 illustrate that there are important differences in the data. The negative, significant results for the *Salience* variable in Samples 1 and 3 suggest that Barbieri's measurement of salient trade (the geometric mean of trade dependence for State_i and State_j) should be acceptable to the majority of the researchers working within the liberal perspective.

The Effects of Sample Choice on the Relationship Between Interdependence and Conflict

Using the same measures and model, the impact of sample choice on the relationship between interdependence and conflict is examined using Barbieri's data in Table 3 and using Gleditsch's data in Table 4. The same model and observations as Chapter 3, Table 3 of *The Liberal Illusion* ($N = 119{,}296$) are presented in Sample 4. The results are substantively very similar to Barbieri's (2002). In her codebook (p. 1), she suggests that any differences can be attributed to differences between the statistical packages *Stata 7.0* (as used here) and *Stata 6.0* (as used in her book). In addition to the robust standard errors employed by Barbieri, this paper also clusters all observations on the dyad, leading to somewhat higher standard errors. As a consequence, *Salience* drops from $p \leq 0.001$ to $p \leq 0.01$ and the interactive term *Salience***Symmetry* drops from $p \leq 0.01$ to $p \leq 0.10$. Barbieri's model with a full sample of dyads (Sample 4) was also estimated using control for the distance between states as suggested by Oneal and Russett (2003).[27] The direction of relationship for all of the trade variables remains the same as above, with *Salience***Symmetry* leading to a significant increase ($p = 0.083$) and *Symmetry* leading to a significant decrease ($p = 0.00$) in the likelihood of conflict. The level of *Salience*, however, is no longer a significant determinant of conflict when a control for distance is employed. Despite this latter difference, one must grant that the spirit of Barbieri's previous findings are still supported.

[26]However, as expected here, when Oneal and Russett employ a full sample of dyads to Barbieri's model, none of the trade variables have a statistically significant impact on MID onsets.

[27]The distance control was operationalized as the natural log of distance between two states' capital cities.

TABLE 3 Duration-dependent logits and the onset of dyadic disputes with Barbieri data: 1948–1992

	Sample 4 Full sample	Sample 5 Politically relevant	Sample 6 Minor-power dyads	Sample 7 Nonminor-power dyads	Sample 8 Mixed-power dyads
Salience $_{t-1}$	13.584	−10.809	15.194	−30.600	−23.421
	(5.026)	(6.208)	(6.983)	(13.926)	(13.196)
	p = 0.007	p = 0.082	p = 0.030	p = 0.028	p = 0.076
Symmetry $_{t-1}$	−6.143	−2.554	−12.656	−3.156	−2.804
	(1.356)	(1.473)	(3.255)	(1.684)	(1.557)
	p = 0.000	p = 0.083	p = 0.000	p = 0.061	p = 0.072
Salience$_{t-1}$ *Symmetry$_{t-1}$	0.038	−0.002	0.087	−0.023	−0.018
	(0.022)	(0.018)	(0.058)	(0.014)	(0.014)
	p = 0.090	p = 0.915	p = 0.139	p = 0.108	p = 0.178
Contiguity$_{t-1}$	2.497	0.914	3.115	0.819	0.767
	(0.164)	(0.216)	(0.179)	(0.247)	(0.277)
	p = 0.000	p = 0.000	p = 0.000	p = 0.001	p = 0.006
Joint democracy$_{t-1}$	−0.010	−0.005	−0.008	−0.013	−0.011
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
	p = 0.000	p = 0.037	p = 0.011	p = 0.000	p = 0.000
Alliance$_{t-1}$	0.105	−0.177	0.143	0.494	0.549
	(0.164)	(0.182)	(0.180)	(0.272)	(0.277)
	p = 0.522	p = 0.332	p = 0.426	p = 0.069	p = 0.047
Relative capabilities$_{t-1}$	−0.115	−0.255	−0.248	−0.370	−0.310
	(0.046)	(0.044)	(0.059)	(0.061)	(0.064)
	p = 0.013	p = 0.000	p = 0.000	p = 0.000	p = 0.000
Peaceyears	−0.427	−0.371	−0.409	−0.416	−0.383
	(0.037)	(0.042)	(0.046)	(0.052)	(0.058)
	p = 0.000	p = 0.000	p = 0.000	p = 0.000	p = 0.000
Spline 1	−0.003	−0.002	−0.003	−0.003	−0.003
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
	p = 0.000	p = 0.000	p = 0.000	p = 0.000	p = 0.001
Spline 2	0.002	0.001	0.002	0.001	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	p = 0.000	p = 0.000	p = 0.000	p = 0.002	p = 0.013
Spline 3	−0.000	−0.000	−0.000	−0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	p = 0.138	p = 0.782	p = 0.088	p = 0.852	p = 0.812
Constant	2.322	1.109	8.240	2.363	1.627
	(1.415)	(1.556)	(3.262)	(1.815)	(1.712)
	p = 0.101	p = 0.476	p = 0.012	0.193	p = 0.342
χ^2	1095.39*	562.29*	905.93*	320.64*	228.74*
Log-likelihood	−3684.75	−2182.29	−2351.54	−1114.39	−1039.72
Pseudo R^2	0.23	0.20	0.29	0.19	0.15
N	119,296	20,669	103,394	15,868	15,561

Note. Robust standard errors are clustered by dyad in parentheses. Two-tailed significance tests.
$^*p \leq 0.001$.

A politically relevant set of dyads as determined by major-power status and direct contiguity is then employed in Sample 5.[28] As expected, this sample, which is biased towards great powers, provides results that show salient trade has a significant, negative impact on the onset of dyadic disputes ($p = 0.082$ for a two-tailed test). Symmetrical trade similarly leads to a decreased probability of disputes. However, this politically relevant sample provides no significant multiplicative effect for *Salience* and *Symmetry* on the likelihood of disputes.

As noted above, we should expect minor-power dyads to have a weak relationship between bilateral trade dependence and conflict, while major- and mixed-power dyads should have a stronger, negative relationship between trade dependence and conflict. Samples 6 through 8 illustrate that this is indeed the case. For minor-power dyads, salient trade increases the likelihood of dyadic disputes, while symmetrical trade decreases the likelihood. However, salient trade significantly *decreases* the probability of dyadic disputes when a sample of nonminor-power dyads (i.e., mixed- and major-power dyads) and mixed-power dyads is employed. Once again, *Symmetry* has a significant, negative coefficient and *Salience* and *Symmetry* are not shown to have significant, interactive effects on disputes.

For a sample of major-power dyads ($N = 307$), *Salient* trade obtains a negative coefficient and *Symmetry* and *Salience*Symmetry* positive coefficients. However, none of these variables obtain statistical significance and the results are not presented in the above tables. When more simple statistical analyses testing the relationship between *Salience* and conflict are utilized, the negative relationship is confirmed. For example, a t test illustrates that for major-power dyads, the mean level of *Salience* is much higher for nondisputant dyads than for disputing dyads ($t = 4.83$). Likewise, a logit regression without controls ($\chi^2 = 23.75$, $p = 0.000$) illustrates that major-power dyads with *Salient* trade are less likely to engage in conflict (-208.61, $p = 0.002$), while *Symmetry* leads to increased conflict (58.83, $p = 0.009$) and the interaction *Salience*Symmetry* has a negative effect on dyadic conflict (-1.63, $p = 0.001$). Nonetheless, despite the promising findings for simpler statistical tests, the results for major-power dyads must be considered to be inconclusive.

Table 4 presents the previous model tested on a variety of different samples using Gleditsch's data. In comparing results from Barbieri's data with Gleditsch's data, it is important to keep in mind the expanded nature of the latter's data set. Indeed, his data set includes over 180,000 more observations, largely made up of minor-power dyads.

Using a full sample of data in Sample 9, only the *Symmetry* trade variable has a significant, negative effect on disputes. Other trade variables are nonsignificant. When a strictly politically relevant model is employed, *Salience* once again has a significant, negative effect on disputes. However, unlike the results presented in the previous table, *Symmetry* has no significant impact on disputes and the interactive effect of *Salience*Symmetry* has a significant negative effect on disputes. For the sample of minor-power dyads, *none* of the trade variables have a significant impact on dyadic disputes. When samples of nonminor-power dyads (i.e., mixed- and major-power dyads) and mixed-power dyads are employed in Samples 12 and 13, salient trade significantly decreases the likelihood of conflict, as does jointly symmetrical and salient trade (*Salience*Symmetry*). However, independent of salient trade, the degree of trade symmetry has no effect on dyadic disputes. Once again, a major-power dyad sample produces a nonsignificant and negative coefficient for *Salience* and positive coefficients for *Symmetry* and *Salience*Symmetry*.[29]

[28]Note that Russett and Oneal (2001) also consider states to be politically relevant if they are contiguous through a colony. Such a sample is employed in Table 2. The sample used in Tables 3 and 4 employs a more restrictive definition of political relevance consisting of dyads including either a major-power state and/or two states with shared borders.

[29]For a major-power dyad sample, only the level of dyadic democracy and the presence of alliances have any significant impact on the likelihood of disputes.

TABLE 4 Duration-dependent logits and the onset of dyadic disputes with Gleditsch data: 1948–1992

	Sample 9 Full sample	Sample 10 Politically relevant	Sample 11 Minor-power dyads	Sample 12 Nonminor-power dyads	Sample 13 Mixed-power dyads
Salience $_{t-1}$	−0.075	−15.170	1.258	−21.562	−22.617
	(5.19)	(6.205)	(6.803)	(9.735)	(9.940)
	p = 0.988	p = 0.014	p = 0.853	p = 0.028	p = 0.023
Symmetry $_{t-1}$	−2.701	−0.758	−2.230	−0.016	0.016
	(0.460)	(0.525)	(2.959)	(0.857)	(0.838)
	p = 0.000	p = 0.149	p = 0.451	p = 0.985	p = 0.985
Salience$_{t-1}$	0.008	−0.023	0.017	−0.053	−0.053
*Symmetry$_{t-1}$	(0.008)	(0.011)	(0.018)	(0.016)	(0.016)
	p = 0.315	p = 0.042	p = 0.348	p = 0.001	p = 0.001
Contiguity$_{t-1}$	3.801	1.503	4.546	1.558	1.651
	(0.145)	(0.011)	(0.191)	(0.216)	(0.237)
	p = 0.000	p = 0.000	p = 0.000	p = 0.000	p = 0.000
Joint	−0.005	−0.004	−0.005	−0.009	−0.008
democracy$_{t-1}$	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
	p = 0.005	p = 0.035	p = 0.048	p = 0.000	p = 0.001
Alliance$_{t-1}$	0.074	−0.218	−0.095	−0.005	0.027
	(0.151)	(0.144)	(0.150)	(0.336)	(0.365)
	p = 0.623	p = 0.131	p = 0.526	p = 0.989	p = 0.941
Relative	0.046	−0.155	−0.103	−0.291	−0.257
capabilities$_{t-1}$	(0.037)	(0.037)	(0.048)	(0.049)	(0.053)
	p = 0.219	p = 0.000	p = 0.033	p = 0.000	p = 0.000
Peaceyears	−0.370	−0.353	−0.387	−0.312	−0.323
	(0.033)	(0.036)	(0.040)	(0.055)	(0.060)
	p = 0.000	p = 0.000	p = 0.000	p = 0.000	p = 0.000
Spline 1	−0.003	−0.003	−0.003	−0.002	−0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	p = 0.000	p = 0.000	p = 0.000	p = 0.008	p = 0.006
Spline 2	0.002	0.002	0.002	0.002	0.002
	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
	p = 0.000	p = 0.000	p = 0.000	p = 0.022	p = 0.018
Spline 3	−0.001	−0.001	−0.000	−0.001	−0.001
	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)
	p = 0.003	p = 0.008	p = 0.042	p = 0.036	p = 0.034
Constant	−2.476	1.521	−3.510	−1.649	−1.891
	(0.512)	(0.594)	(3.022)	(0.926)	(0.933)
	p = 0.000	p = 0.010	p = 0.245	0.075	p = 0.043
χ^2	1980.79*	720.13*	1252.90*	513.33*	424.40*
Log-likelihood	−3929.44	−2525.56	−2395.96	−1246.16	−1162.76
Pseudo R^2	0.31	0.21	0.37	0.22	0.20
N	303,215	30,693	278,816	24,399	24,014

Note. Robust standard errors are clustered by dyad in parentheses. Two-tailed significance tests. $^*p \leq 0.001$.

Consequently, for both Barbieri and Gleditsch's data (used in Tables 3 and 4), salient trade is shown to decrease the probability of disputes when samples of politically relevant, mixed-power, or mixed- and major-power dyads are employed. For Barbieri's data, however, salient trade increases the likelihood of disputes with a full sample of dyads as well as for a sample of minor-power dyads. Salient trade has no significant impact on disputes for these samples when Gleditsch's data are employed. Differences between data employed in Barbieri and Gleditsch's data sets are thus an important reason for the disparity of results, since the measurements, model, and sample type are identical from one model to the next.

The results from Tables 3 and 4 lend strong support to Polachek, Robst, and Chang (1999). While they posit that trade is more beneficial and conflict less likely between trading states with larger economies, the findings here further suggest that for dyads with smaller economies the benefits from trade are so small as to not have any impact on their conflict propensities. Indeed, only when samples biased towards major powers are employed (i.e., politically relevant, mixed-power, or both mixed- and major-power dyads) does salient trade decrease the likelihood of the onset of dyadic disputes. The results for *Symmetrical* trade and its interaction with salient trade are much less clear. The discrepancies between findings may be due to the high degree of collinearity between the *Salience* and *Symmetry* variables, as suggested by Hegre (2001).

In addition, Oneal and Russett (2003) have recently tested a revised model of trade and conflict on a fuller sample of dyads. When using the estimation technique employed here, a sample of all dyads, and reported IMF trade data, they find that trade variables have no significant impact on dispute onsets. However, when they replace missing IMF trade values with imputed values (which expands the number of dyads from 118,466 to 271,262—an increase of 129%) the lowest level of trade dependence is shown to have a negative effect on conflict.[30] Oneal and Russett argue that expanding the IMF trade data "by assuming that when data for trade of IMF members are missing there was no (or negligible) bilateral commerce" allows them to "model conflict for the largest number of dyads possible" (2003, 145). Nevertheless, this approach to data generation (and to some extent, the imputation methods employed by Gledtisch) can be critiqued as trading off quality for quantity. For those who prefer to focus on findings which are based on collected rather than generated data, the former results would be preferred.

The difference of results between Samples 4 through 8 and Samples 9 through 13 as well as Oneal and Russett's (2003) results suggests that there are indeed heterogeneous relationships between trade dependence and dyadic disputes based upon the size of states in a dyad. Consequently, any study of the relationship between interdependence and conflict should employ a full sample of states and include controls for the size of the economies of the dyad in question. Indeed, if we are trying to explain the relationship between trade and conflict, then the factors by which it is determined should be found in the model rather than in the construction of the sample.[31] These previous findings lead to the expectation that there is an interactive relationship between the size of economies in a dyad and the importance of bilateral trade.

Table 5 tests this proposition using both Barbieri's and Gleditsch's data. Using a full sample of dyads, both of the models illustrate that trade dependence and the economic size of a dyad have a multiplicative effect on disputes. In Samples 14 and 15, larger states

[30]This model also includes a control for the distance between states. In addition, when Oneal and Russett (2003) estimate their model using a General Estimating Equation (GEE), they find that the lower level of trade dependence is a significant determinant of conflict. However, Beck (2003, 174, 166) argues that "the GEE results, which show a much stronger pacific impact of trade, are not correct" because "their GEE analyses do not adequately correct for temporal dependence in the data."

[31]I would like to thank an anonymous reviewer for emphasizing this point.

TABLE 5 Duration-dependent logit of the onset of dyadic disputes (controlling for size): 1948–1992

	Sample 14 Barbieri data	Sample 15 Gleditsch data
Salience_{t-1}	3.915	−5.820
	(3.517)	(3.718)
	p = 0.266	p = 0.118
Symmetry_{t-1}	−1.642	−2.551
	(1.087)	(0.521)
	p = 0.131	p = 0.000
Dyadsize_{t-1}	0.0000006	0.00000005
	(0.000)	(0.000)
	p = 0.000	p = 0.000
$\text{Salience*Dyadsize}_{t-1}$	−0.019	−0.000003
	(0.011)	(0.000)
	p = 0.078	p = 0.018
Contiguity_{t-1}	2.573	3.729
	(0.144)	(0.142)
	p = 0.000	p = 0.000
$\text{Joint democracy}_{t-1}$	−0.010	−0.006
	(0.002)	(0.002)
	p = 0.000	p = 0.003
Alliance_{t-1}	0.181	0.002
	(0.157)	(0.150)
	p = 0.248	p = 0.992
$\text{Relative capabilities}_{t-1}$	−0.141	−0.004
	(0.041)	(0.034)
	p = 0.001	p = 0.916
Peaceyears	−0.415	−0.353
	(0.037)	(0.034)
	p = 0.000	p = 0.000
Spline 1	−0.003	−0.003
	(0.000)	(0.001)
	p = 0.000	p = 0.000
Spline 2	0.001	0.002
	(0.000)	(0.000)
	p = 0.000	p = 0.000
Spline 3	−0.000	−0.001
	(0.000)	(0.000)
	p = 0.269	p = 0.004
Constant	−2.262	−2.632
	(1.134)	(0.560)
	p = 0.046	p = 0.000
χ^2	1148.42*	3590.56*
Log-likelihood	−3606.41	−3872.18
Pseudo R^2	0.25	0.32
N	118,964	303,215

Note. Robust standard errors are clustered by dyad in parentheses. Two-tailed significance tests.

$^{*}p \leq 0.001$.

as expected are more likely to engage in conflict; consequently, *Dyadsize* ($GDP_i + GDP_j$) obtains a significant, positive coefficient. *Salience* is not significant in either of these models, while *Symmetry* only has a significant, negative impact on disputes when Gleditsch's data is employed. However, the interactive variable *Salience***Dyadsize* illustrates that larger dyads with salient trade are significantly less likely to engage in dyadic disputes using data from both Barbieri ($p = 0.078$) and Gleditsch ($p = 0.018$).[32] While the results are not presented here, a significant, negative coefficient ($p = 0.01$) is also obtained when a weakest-link approach is employed (i.e., the interactive effect of the lowest level of GDP and *Salience*) and Barbieri's data are used.

Conclusions

This article attempts to more definitively answer the question of whether the level of dyadic trade dependence has any effect in reducing the likelihood of dyadic disputes. Using politically relevant samples or samples of states with larger economies, much previous work has answered in the affirmative (Oneal et al., 1996; Oneal & Ray, 1997; Oneal & Russett, 1997, 1999; Russett & Oneal, 2001; Reed, 2003). In contrast, using a fuller sample of dyads, Barbieri suggests that salient levels of trade dependence lead to increased conflict (Barbieri, 1996, 2002; Barbieri & Schneider, 1999). The results presented here show that each of these perspectives requires modification: salient trade does lead to decreased conflict, but only when the trading relationship is especially valuable.

In short, this article's findings confirm that size does matter in the relationship between interdependence and conflict. Nowhere is this more apparent than when one examines the impact of trade salience on disputes using samples of all dyads: minor-power dyads, politically relevant dyads, and nonminor-power dyads. In the first two samples, salient trade is shown to have either a positive effect or no significant effect on dyadic disputes, depending upon the data set in use (Barbieri, 2002 or Gleditsch, 2002, respectively). Yet for the latter two samples, which are biased toward major powers, salient trade *always* has a negative, significant effect on disputes. These results therefore suggest that economic size has an important moderating effect on the relationship between trade and conflict. This hypothesis is strongly supported by the analyses in Table 5. Using both Barbieri's and Gleditsch's data, the interaction of salient trade and the size of dyadic economies is shown to have a significant, negative impact on dyadic disputes.

The findings of this paper thus have three important implications for future research on the study of trade dependence and conflict. First, politically relevant samples should not generally be employed for the study of this topic. More importantly, this article should aid in the consolidation of future research by supplying a theoretical justification to avoid the use of such a sample. As noted by Polachek, Robst, and Chang (1999), trade dependence with a larger economy should lead to greater benefits and thus a lower likelihood of conflict than the same level of trade dependence with a smaller economy. For this reason, any sample that is more heavily weighted toward larger economies will produce results biased towards obtaining a negative relationship between trade dependence and conflict. Consequently, either a random sample of all dyads or the largest possible dyadic sample should be employed whenever trade dependence is used as an explanans for dyadic conflict.

[32]In a similar vein, Oneal and Russett (2003) have tested for the interaction of dyadic power status (rather than economic size) and the lower level of trade dependence ($Depend_L$). Using the estimation technique employed here and imputed IMF data, they find that the interaction of major power dyads and $Depend_L$ has no significant impact on the likelihood of disputes. However, in support of the results presented here, they find that the interaction of nonrelevant dyads and the lowest level of trade dependence significantly increases the probability of dispute onsets.

Second, the results presented here emphasize the necessity of including the size of states' economies as a control variable in estimating the relationship between interdependence and conflict. Lastly, these findings point to the potential usefulness of directed dyads in studying the relationship between trade and conflict. Studies using nondirected dyads paint only a partial picture of the relationship between interdependence and conflict. In brief, the importance of trade cannot be determined outside of the reference to a state's trading partner. Salient trade, in and of itself, does not lead to decreased conflict.

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