

Democracy, Interdependence, and the Sources of the Liberal Peace

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Abstract

We argue that the sensitivity of national leaders to the costs of trade disruption depends critically on their state's domestic regime. Democratic leaders rely on the support of relatively broader minimum winning coalitions than do autocratic leaders. In order to remain in office democratic leaders must rely on public policy successes such as economic growth to a greater degree than autocratic leaders. Since trade can help promote growth, democratic leaders should be more likely than autocratic leaders to avoid the trade disruption that accompanies international conflict. For autocratic states, however, interdependence should have little effect on leaders' ability to hold office, and thus no systematic impact on the likelihood that they will risk disrupting those economic ties by initiating military conflicts. We find robust support for these expectations in our analysis of trade integration and international conflict initiation by democratic and autocratic states from 1950-1992. These results have sobering implications for the view that trade dependence can be a mechanism for preventing autocratic states from using military force.

INTRODUCTION

Can the world be made more peaceful through commerce? For more than a century, and particularly during the past decade, this question has constituted an important focal point of scholarly debate in the field of international relations.¹ We suggest that, by virtue of the domestic political institutions in which their leaders operate, democratic states react to greater trade integration with a reduced propensity to initiate militarized disputes with their partners. On the other hand, while some autocratic leaders might react to growing trade integration with a determination to avoid conflict, such leaders do not face institutional constraints to do so. Thus, for autocratic states, we expect no systematic relationship between their level of trade integration with trade partners and their propensity to initiate military conflicts against those partners. We find robust support for these expectations in our analysis of trade integration and international conflict initiation from 1950-1992.

Our research addresses two methodological problems that have plagued the literature on trade and conflict. First, most arguments in the literature consist of directional arguments about trade dependence and military conflict, but most tests of these arguments have used non-directional data. That is, while authors have argued that state A's dependence on state B will prevent A from using force against B, they have often simply tested whether pairs of states trade with one another and whether they engage in conflict. Such designs do not pay sufficient attention to which states are trade dependent and which states are initiating military conflicts. Second, much of the

quantitative research on trade and conflict has been plagued by the substantial amount of missing trade data. We rely on new methods for coping with this problem.

Our discussion proceeds in two main stages. First, we present our argument that links bilateral trade flows to the preference of individual leaders to retain office and their interest in peace. This argument leads to our hypothesis that the relationship between economic interdependence and the initiation of military conflict is contingent upon the domestic political regimes of the country in question. Second, we develop and execute a statistical test of this argument.

THE INTERACTION OF TRADE, DEMOCRACY, AND CONFLICT

We ground our argument in two assumptions. First, military conflict is typically the result of deliberate decisions made by national leaders. Second, regardless of the political institutions in which they operate, national leaders wish to retain office. Leaders may wish to do so out of selfish motives or altruistic concerns, or some combination of the two, but in all circumstances retaining office is a necessary condition for the achievement of whatever goals are motivating leaders.

Given these two assumptions, we ask the question, how will the disruption of trade as a result of military conflict influence the ability of democratic and autocratic leaders to retain office? In developing our response, we find useful the recent work by Bueno de Mesquita, Smith, Siverson, and Morrow (1999a; 1999b; 2003).

Bueno de Mesquita et.al. assume that leaders wish to retain office. They further contend that any polity may be analyzed along two dimensions: 1) the range of citizens who participate in the selection of national leaders (the “selectorate”), and 2) the

minimum size of the coalition of within selectorate whose support leaders must enjoy in order to attain and retain national leadership (the “minimum winning coalition”). They point out as well that, compared to autocratic systems, democracies tend to be characterized by broader selectorates, and leaders must gain the support of significantly broader “minimum-winning-coalitions” or what Olson (1993, 2000) called encompassing interests, in order to maintain office.

Bueno de Mesquita et.al. observe that leaders try to stay in office by providing benefits to the members of their minimum winning coalition. One type of benefits consists of “private goods” granted directly and enjoyed exclusively by the coalition members, and a second consists of public policy successes that are enjoyed by the citizenry as a whole. They argue further that the required breadth of winning coalitions in democracies makes it difficult for leaders to retain office through payments of private goods, and thus democratic leaders generally need instead to provide policy successes whose benefits are consumed by the public. One key type of policy success, Bueno de Mesquita et.al. emphasize (2003, 101-102, 149-161), is economic growth. On average, then, the tenure of democratic leaders should be more sensitive to economic growth than in the cases of autocratic leaders. Bueno de Mesquita et. al. present statistical analyses consistent with this expectation (2003, 306-308).

It is at this point that we may expect trade to be of greater interest to democratic than to authoritarian leaders. Although not without controversy, the main expectation in the field of economics--that is, in the “standard” model of trade and in new “endogenous growth” theories--is that trade generally promotes the growth of per capita national income. The capacity of international trade integration to so improve the aggregate

growth rate of a country during the period in which integration is occurring has long been emphasized by proponents of the standard model of trade. Newer “endogenous growth” theories also highlight opportunities for trade to boost the economic growth rates of most nations.² By consequence, we may expect democratic leaders to be more concerned than autocratic leaders about the prospective effects of the breakdown of foreign trade as the result of a militarized dispute, for it is in democracies where the delivery of economic growth is more uniformly important to national leaders.³

Trade may have a second source of relatively greater value for democratic leaders, namely, its impact on consumer welfare. Politically inspired interruptions of trade, such as tariffs or sanctions, reduces the utility enjoyed by consumers because they face higher prices for goods and a constricted range of goods on the market. In the same way that losing growth opportunities as a result of military conflict and trade disruptions would produce bigger penalties for democratic than for autocratic leaders, losing consumption opportunities and consumer surplus would probably also produce a bigger political cost for democratic leaders.⁴

Hence, we expect that:

Hypothesis 1: Increases in a state's trade dependence on another country *will reduce* the likelihood that the state will initiate militarized conflicts against its trading partner, *to the extent that the state is democratic.*

ALTERNATIVE HYPOTHESES ON THE EFFECT OF ECONOMIC INTERDEPENDENCE ON WAR AND PEACE

During the decade of the 1980s, a body of research began to indicate that dyadic trade improved political relations between states (Polacheck 1980, 1990; Gasiorowski 1986). Beginning with Maoz and Russett (1992, 1993), a series of articles suggested

further that economic interdependence reduced the incidence of militarized disputes (Oneal, Oneal, Maoz, and Russett 1996, Oneal and Ray 1997, Oneal and Russett 1997, 1999, and Russett and Oneal 1999, 2001).

The empirical focus in the Russett and Oneal research program is on yearly observations of country-dyads, or pairs of countries.⁵ Their project's dependent variable is defined as *onset* of a militarized dispute between a pair of countries for each year in the data set. This measure does not attempt to identify the initiator of the military action, but merely measures the presence of military conflict. Russett and Oneal further employ a "weak link" measurement strategy. That is, the economic dependence level (bilateral exports and imports relative to national economic activity) they assign to the dyad is the trade dependence of the less dependent country. Similarly, the democracy score that characterizes each pair of countries is the score of the less democratic country.

Russett and Oneal ground this "weak link" measurement strategy on a crucial assumption. If a conflict occurs, then Russett and Oneal assume that it had to have been the less democratic and/or less economically dependent country that started the conflict. For example, in regard to their interdependence variable, they stipulate that "We assume that the state with the lower bilateral trade-to-GDP measure is the one less constrained from using force and, therefore, that it has the greater influence on the likelihood of dyadic conflict. This state has greater freedom to initiate violent conflict because its economic costs and the beneficial effect of communication would be less" (Russett and Oneal, 2001, 142).

The problem with the weak-link measurement strategy is that if conflict occurs within a dyad, we cannot be sure if it was in fact the "less constrained" state that initiated

the militarized dispute. Hence, we believe, following the analysis by Morrow (1999, 484), Bennett and Stam (2004, 2000a, 656-657), and Hegre (2004, 417), that it is more efficient to employ directed-dyadic data in estimating models of military dispute initiation. Testing the Russett and Oneal's argument in this manner allows us to examine the causal mechanism in a straightforward manner rather than asserting its presence based on more aggregated data. Using such data, Russett and Oneal's logic implies the following hypothesis:

Hypothesis 2: Increases in a state's trade dependence on another country *will reduce* the likelihood that the state will initiate militarized conflicts against its trading partner, *regardless of the state's regime type.*

Oneal and Russett (1997, 1999, 2001) do not explicitly make a theoretical claim that the constraining effect of trade dependence is interactive. That is, they do not construct an argument as to whether state A's trade dependence will constrain it from initiating a dispute against state B to the extent that state B is also dependent on state A. However, their measure of interdependence--the lower of the two dependence scores in the dyad--effectively models such an effect. In the democratic peace literature the "low democracy" score has been used to capture such an interactive effect (i.e. A's democracy constrains it from initiating to the extent that B is also democratic). Moreover, other prominent works focusing on trade and conflict contend that it is when both states are dependent on one another that military conflict is least likely (Keohane and Nye 1971, Rosecrance 1986). Such arguments about interdependence yield the following hypothesis:

Hypothesis 3: Increases in a state's trade dependence on another country *will reduce* the likelihood that the state will initiate militarized conflicts against its

trading partner, *to the extent that the two states are mutually dependent on one another.*

Finally, Barbieri (1996, 2002), in a line of analysis similar to that put forward by Waltz (1970), has suggested that economic interdependence does not dampen, but instead increases the risk of militarized conflicts between countries. Working with a revised data set on trade dependence, but working with non-directional data, Barbieri finds that growing economic interdependence does might in fact exacerbate, the likelihood of conflict between countries. Framed in terms of its causal mechanism, Barbieri's argument implies the following hypothesis:

Hypothesis 4: Increases in a state's trade dependence on another country *will increase* the likelihood that the state will initiate militarized conflicts against its trading partner, *regardless of its regime type.*

DATA AND RESEARCH DESIGN

We test our hypotheses on a sample of directed interstate dyad-years from 1950 to 1992. The data for all variables in our analyses, with the exception of trade dependence, were generated with the EUGene data management program (Bennett and Stam, 2000b). Each directed dyad-year identifies one state as the challenger in the dyad and the other state as the target.⁶ Consistent with King and Zeng (2001), we construct our dataset by randomly sampling 100% of the directed dyad-years during which there was the initiation of a militarized dispute and 5% of the directed dyad-years in which there was no such dispute initiated. The resulting dataset includes 40,100 dyad-year observations. Slightly less than 4% of these dyad-years in the sample witnessed the initiation of a militarized dispute; this compares to slightly less than 0.2% of the dyad-years in the larger

population having been characterized by the initiation of a militarized dispute. Following the procedures outlined by King and Zeng (2001) we adjust for this over-sampling in the estimation of substantive effects from the models.⁷

This over-sampling procedure generates a more manageable sized dataset that allows us to create a more robust measure of our central variable of interest: trade dependence. As noted above, the two most commonly used data sources for dyadic trade dependence are the measures created by Oneal and Russett and by Barbieri.⁸ These trade measures differ from one another in a variety of ways, but by far the most substantial difference between the datasets is their treatment of missing trade data. Many pairs of states do not report any dyadic trade to the International Monetary Fund (IMF). For most of these cases Oneal and Russett assume that states did not trade with one another if they did not report that trade to the IMF, and they impute a value of 0 for trade dependence in these cases.⁹ Barbieri, on the other hand, leaves these cases as missing data and deletes the observations from her analyses.

Recent work on the impact of missing data suggests that neither of these procedures is an appropriate method for coping with large amounts of missing data (King, Honaker, Joseph, and Scheve, 2001). At a minimum, Oneal and Russett's procedure exaggerates our level of certainty that no trade occurred within the non-reporting dyads. Consequently, their analyses are likely to exaggerate our confidence in hypothesis tests based on those data. Furthermore, if any set of the non-reporting dyads differs systematically from zero trade, then Oneal and Russett's imputation procedure threatens to bias the estimated effect of trade. On the other hand, Barbieri's decision to

delete these cases also threatens to bias her analyses except in the very unlikely circumstance that states that choose not to report trade completely at random.

Following King et al.(2001), we rely on multiple imputations to fill in the missing trade dependence values. Multiple imputation is a systematic method for coping with missing data that avoids the potential for biased estimates and accounts for the uncertainty inherent in imputing missing values. Schafer (1999) has developed software for the imputation of missing values with a multivariate normal model. Using this software, we transformed the variables to approximate normal distributions and estimated an underlying distribution for each of the missing values.¹⁰ We then made five independent draws from these distributions and imputed five separate datasets for the missing values. Conducting analyses across five imputed datasets allows us to use the available information about the likely values of the missing cases while also accounting for our uncertainty about the true values. The coefficients presented in our analyses represent the average estimates across these five imputed datasets and the standard errors account for the variance in the estimated coefficients across the imputed datasets. Thus our analyses reflect the uncertainty regarding the true values of the missing data because they incorporate information about the variance of the imputed values.

Our measurements for the conflict initiation, trade dependence, democracy, and our control variables follow from data sources and coding procedures that are standard in the literature. All data except for the directional dyadic trade dependence data were obtained from EUGene (Bennett and Stam, 2000b). Directed dyadic data on trade dependence were obtained from Oneal and Russett and Barbieri. Full data and

documentation for replicating these results--including the process of multiple imputation --can be obtained at (XXXXXX).

Initiation of Militarized Dispute

The dependent variable is the initiation of militarized dispute by the challenger state against the target during a given year. We coded the initiation of militarized disputes based on the basis of the COW Militarized Inter-State Disputes (MID) dataset. We identify the first state to threaten or use military force as the initiator of the dispute. If the challenger initiated a dispute against the target in a particular year this variable takes on a value of 1; a value of 0 is coded otherwise.

Challenger and Target Trade Dependence

Because of the important debates over the construction of trade dependence measures, we conducted our analyses on both the Oneal and Russett and Barbieri datasets. Following Oneal and Russett, we code the challenger's trade dependence as the level of dyadic trade as a proportion of GDP. That is, we calculate:

$$\frac{\text{Challenger's Exports to Target} + \text{Challenger's Imports from Target}}{\text{Challenger's Gross Domestic Product}}$$

And for the target state's level of trade dependence, we calculated:

$$\frac{\text{Target's Exports to Challenger} + \text{Target's Imports from Challenger}}{\text{Target's Gross Domestic Product}}$$

Joint Trade Dependence

This interaction term allows us to estimate changes in the impact of challenger trade dependence as the target's level of trade dependence varies. The variable is calculated as challenger's trade dependence multiplied by the target's trade dependence.¹¹

Challenger Democracy Score

As has become standard practice in the literature, for each state we subtract the autocracy score from the democracy score. The result is a variable ranging from -10 to 10. A score of -10 represents an extreme autocracy and a score of 10 represents a full democracy.¹² In order to allow for a proper estimation of the interaction between the challenger's democracy and trade dependence, we re-scale the democracy score from 1 to 21.

Challenger Trade Dependence x Challenger Democracy Score

This variable is the interaction term tests our argument that the constraining effects of trade are contingent on the presence of democratic political institutions. It was constructed by multiplying the challenger's trade dependence score by its democracy score.

Control Variables

In addition to the variables of central theoretical interest for our analysis, we also included a number of control variables that have become standard in the study of militarized conflict.

Joint Democracy

Consistent with much of the previous research on this topic, we measure the joint democracy of the dyad by multiplying the challenger democracy score by the defender democracy score. The resulting variable ranges from 1 to 441 with low values reflecting relatively autocratic dyads and high reflecting relatively democratic dyads.

Relative Military Capabilities

We code this measure as the proportion of dyadic military capabilities controlled by the challenger. That is, we calculate:

$$\frac{\text{Challenger Proportion of Global Capabilities}}{\text{Challenger Proportion of Global Capabilities} + \text{Target Proportion of Global Capabilities}}$$

Difference in Alliance Patterns

Consistent with much of the previous work on international conflict, we measure common security interests through the similarity of alliance portfolios (Bueno de Mesquita, 1981; Bueno de Mesquita and Lalman, 1992). We calculate the alliance similarity “S” score between each state and the United States (Signorino and Ritter, 1999). We then measure the difference in security interests between the challenger and defender as the absolute value of the difference in these similarity scores. This variable ranges from a minimum of 0 (reflecting identical portfolios) to a maximum of 2 (indicating diametrically opposed security ties).

Major Power Dyad

Our measure of major power status takes on a value of 1 if either state in the dyad is a major power. It is coded zero otherwise. For the period, 1950 to 1992, the major powers are the United States, Russia/USSR, the People's Republic of China, Britain, and France.

Contiguous Dyad

This dummy variable takes on a value of 1 if the states share a border (including colonial borders) or are separated by less than 150 miles of water. A value of 0 is coded otherwise.

Log of Distance Between Capitals

This variable is the natural log of the distance between capital cities of the two states in the dyad. Because of their tremendous size and their access to both the Pacific and Atlantic Oceans, distances to the United States, Canada, and Russia/USSR are calculated to the nearest major port city in those countries.

Peace Years

Consistent with Beck, Katz and Tucker (1998), we correct for temporal dependence in this binary time-series cross-sectional analysis by accounting for the number of years that have elapsed since the previous conflict. We model the impact of time with a series of coefficients that create a spline function.¹³

DATA ANALYSIS

As noted above, we test our hypotheses on five datasets with missing values assigned via multiple imputation. The coefficients and standard errors that we report below represent averaged effects that were calculated from the analyses of the five imputed datasets in order to account for the uncertainty involved in the imputation of missing values (King et al, 2001). The results of these analyses are displayed in Table 1

Table 1 About Here

Models 1A and 1B respecify the arguments presented by Oneal and Russett and Barbieri for the analysis of directed-dyadic data. As noted above, we analyze the Oneal and Russett trade data as well as the Barbieri trade data – with imputed values for missing data – in order to ensure that our results are not influenced by other coding decisions and data sources used by differing scholars. As articulated in hypothesis 2, the causal logic presented by Oneal and Russett suggests that the challenger’s level of trade dependence should have a statistically significant and negative impact on the initiation of disputes. Hypothesis 3 suggests that trade dependence may have an interactive effect, and that only challengers in jointly dependent dyads will be less likely to initiate. This argument suggests that the coefficient for the joint trade dependence interaction term should be negative and statistically significant. Finally, Barbieri’s causal logic, as articulated in hypothesis 4, suggests that the challenger’s trade dependence should have a positive impact on the initiation of disputes.

The first three coefficients in Models 1A and 1B do not appear to support any of these arguments. The coefficient for the challenger’s trade dependence is slightly negative in both models – utilizing both Oneal and Russett and Barbieri’s trade data -

But in neither case does the coefficient approach statistical significance. Moreover, the coefficient for the interactive impact of joint trade dependence is positive in both models – though it once again does not achieve statistical significance.¹⁴

However, the coefficients and t-tests for models 1A and 2A do not provide a complete test of hypotheses 2, 3 and 4 because of the interaction effect specified in the models. In particular, the coefficient for the challenger's trade dependence in models 1A and 2A represents the impact of that variable when the defender's trade dependence is equal to zero. The coefficient for the joint dependence interaction term represents the change in the impact of the challenger's trade dependence for each one unit change in the defender's trade dependence. In principle, it is possible that these coefficients could combine to create a statistically significant relationship between challenger trade dependence and dispute initiation under some circumstances even if the coefficients by themselves are not significant. In order to provide a more direct and complete test of hypotheses 2, 3 and 4, we present the predicted net impact of challenger trade dependence on dispute initiation as the target's trade dependence varies across a wide range of values. Specifically, we vary the target's trade dependence from zero up to the 95th percentile of its total variation in each dataset. The coefficients for the net impact of challenger trade dependence and their tests for statistical significance are displayed in Table 2.

Table 2 About Here

Clearly these results do not support hypotheses 2, 3, or 4. That is, the net impact of challenger trade dependence remains slightly negative but does not approach statistical significance across the full range of variation in target trade dependence. This pattern of

coefficients suggests two central conclusions about the impact of trade on conflict. First, trade dependence on the part of a potential challenger does not – either by itself or in combination with trade dependence on the part of the potential defender – reduce the probability that the potential challenger will initiate a dispute. And second, challenger trade dependence also does not exacerbate the incidence of dispute initiation.

Thus with regard to ONeal and Russett’s previous findings (1997, 1999, 2001) our results suggest that the association between dyadic trade dependence and the onset of militarized disputes that they observe is due to an association between target trade dependence and peace.¹⁵ Contrary to the expectations of their posited causal mechanism, we find no evidence of a general link between challenger trade dependence and dispute initiation. Second, with regard to Barbieri’s previous findings (1996, 1999) our results suggest that the positive association that she observed between dyadic trade and conflict may be due to the influence of missing data on her analysis. Using multiple imputation to ameliorate the problems with missing data appears to get rid of the positive association between trade and conflict that she observes.

We now turn our attention to an evaluation of our argument, as articulated in hypothesis 1, that the effect of trade is contingent on democratic political institutions. Models 2A and 2B in Table 1 evaluate this argument. Consistent with our expectations, the coefficient for the interaction between challenger trade dependence and challenger democracy is negative and statistically significant across both the ONeal and Russett and Barbieri trade data. This coefficient indicates that the relationship between challenger trade dependence and dispute initiation becomes increasingly negative as the challenger becomes more democratic. However, the coefficient for challenger trade dependence is

positive in both models – although it does not approach statistical significance. This combination of coefficients raises the same question regarding the net effect of challenger trade dependence that we addressed in Models 1A and 1B. Thus we calculate the net impact of challenger trade dependence across the full range of challenger regime types. The estimated coefficients and statistical significance tests are presented in Table 3. Consistent with hypothesis 1, challenger trade dependence has no significant impact on dispute initiation for autocratic states (challenger democracy score = 1). For mixed regime types (challenger democracy score = 11) trade dependence appears to have some constraining effect on dispute initiation, although its statistical significance varies across the two models. For fully democratic challengers, however, trade dependence clearly has a significant impact on dispute initiation across the two data sources. Specifically, the coefficient for the impact of trade dependence on dispute initiation for a fully democratic challenger is -5.02 ($p < .009$) in Model 2A and -3.22 ($p < .008$) in Model 2B. These results provide clear and consistent support for hypothesis 1 and for our contention that the effects of trade are contingent on the presence of democratic political institutions.

The coefficients for all of the control variables are consistent with our expectation and with numerous previous studies of dispute initiation. The negative coefficient for the joint democracy variable indicates that challengers are less likely to initiate disputes within democratic dyads. It is worth noting that we find this effect in addition to the significant coefficient for the challenger's democracy alone. Thus our analysis finds support *both* for the hypothesis that democracies are less likely to initiate disputes against one another *and* for the hypothesis that democracies are less likely to initiate disputes in general (Rousseau, Gelpi, Reiter, and Huth, 1996).

The rest of the coefficients are quite straightforward. The positive coefficient for relative military capabilities indicates that challengers are more likely to initiate disputes when they have an advantage in military capabilities. The positive coefficient for the difference in alliance patterns indicates that challengers are more likely to initiate disputes against states with opposing security interests. The positive coefficients for major power dyads and contiguous dyads also indicate that challengers are more likely to initiate disputes in these contexts. Finally, the negative coefficient for distance indicates that challengers are less likely to initiate disputes against states that are distant from them.

While the coefficients in Table 1 can describe the direction of each variable's impact and whether each one is statistically significant, they cannot illustrate the substantive effects of these variables on the probability that a challenger will initiate a dispute. These substantive effects are displayed in Table 4. Since militarized dispute initiation is a very rare event, the absolute probability of dispute initiation by the challenger in any given dyad-year is quite small. Recall that the mean probability of initiation in the population from which we drew our sample is about 0.2%. Consistent with other studies of such rare events, we express the substantive impact of the variables in terms of the change in the relative risk of dispute initiation. The change in the relative risk of initiation is calculated as the ratio of the probability of initiation the independent variable is held at one value to the probability of initiation when the independent variable is held at another value. Thus if a change in the democracy score of the challenger from 1 to 21 reduced the probability of initiation from 1% to 0.5%, this would represent a 50% reduction in the relative risk of a dispute.

Table 4 About Here

Turning to Table 4, we can see once again that increasing levels of trade dependence do not constrain autocratic challengers from initiating militarized disputes. The first row in Table 5 describes the impact of trade dependence on the probability of dispute initiation for challengers with a democracy score of 1. According to the ONeal and Russett data, changing such a challenger's trade dependence from 0 to 5% of the challenger's GDP (approximately the 95th percentile of our observations) actually increases the relative risk of initiation by 4%. According to Barbieri's data, same change in trade dependence increases the risk of an autocratic challenger initiating a dispute by 9%. These results would seem to indicate little or no net impact of trade on the behavior of autocratic challengers – especially since none of these effects are statistically significant.

As the second row of Table 4 indicates, however, trade has a different effect on democratic challengers. Here we can see that the same change in trade dependence for a democratic challenger reduces the relative risk of dispute initiation by 22% according to the ONeal and Russett trade measure and by 24% according to the Barbieri trade measure. Both of these changes are statistically significant. As expected by hypothesis 1, democratic challengers do appear to be less likely to disrupt significant trading relationships.

But while trade does constrain democracies--and not autocracies--as anticipated by our argument, it is also important to compare the impact of trade dependence to that of other variables in our model. Clearly the impact of trade is negligible on autocratic challengers, but even for democratic challengers the impact of trade is tricky to assess.

On the one hand, the impact of trade dependence compares favorably to the impact of relative military capabilities. A shift in military capabilities from an overwhelming (99:1) advantage for the challenger to an overwhelming (1:99) advantage for the target reduces the risk of dispute initiation by about one-third. Given that military capabilities play a central role in almost any traditional model of international conflict, it is impressive that trade can be almost as powerful constraint on the behavior of democratic states as are military capabilities.

On the other hand, the impact of trade on democratic states is substantially smaller than that of several other variables in the model. Not surprisingly, dispute initiation is much more likely in contiguous dyads and major power dyads. As Table 4 indicates, the relative risk of dispute initiation is about 90% lower in non-contiguous and non-major power dyads. Perhaps of greater relevance in judging the importance of trade as a source of peace, however, is the fact that democracy appears to exert a substantially larger impact on the risk of dispute initiation than trade dependence does. For example, the risk of dispute initiation by a democratic challenger against a democratic defender is 75% than the risk of initiation between autocratic states. Thus the constraining effect of trade is contingent on the presence of democracy, but even in these circumstances democracy appears to have a larger impact on the risk of conflict than any additional changes in trade dependence.

ILLUSTRATING THE EFFECTS OF INTERDEPENDENCE

Calculations about the changes in the relative risk of a militarized dispute give us one view of the substantive impact of the variables in our model, but in order to place these findings more completely in context, it is also important to examine the impact of trade on the absolute probability the democratic or authoritarian states will initiate militarized disputes. Figure 1 depicts the predicted probability of dispute initiation by the challenger in various types of dyads. Specifically, we examine the impact of trade dependence on autocratic challengers facing both democratic and autocratic targets, as well as the impact of trade dependence on democratic challengers facing both democratic and autocratic targets. Finally, we also estimate the impact of trade dependence on the likelihood of dispute initiation between a pair of mixed regime types. Because the predicted values for the probability of conflict were virtually identical for both sets of trade data, we report estimated effects for the Oneal and Russett Data. All other variables were set to their median values, with the one exception that we created predictions for a “major power dyad” since much of the discussion of interdependence relates to its likely effect on major powers such as the United States.

FIGURE 1 ABOUT HERE

As we have already emphasized, increasing levels of trade between an autocratic and democratic country are unlikely to constrain the former from initiating militarized disputes against the latter. As depicted in Figure 1, our analysis indicates that an increase in trade dependence by an autocratic challenger on a democratic target from zero to 5% of the former's GDP would increase the probability of the challenger's dispute initiation from about 0.31% to 0.29%. Thus, the overall probability of dispute initiation by an autocratic country against a democracy is fairly high (given the rarity of disputes) at

nearly .3% per country per year. Moreover, increased trade does little or nothing to alter that risk. Increases in trade dependence also have little effect on the likelihood that one autocracy will initiate a conflict with another. In this instance, the probability of dispute initiation remains constant at 0.33% regardless of the challenger's level of trade dependence.

On the other hand, the predicted probability of dispute initiation by a democratic challenger is significantly lower than for an autocratic challenger regardless of its level of trade with the target. Specifically, according to our analysis of the O Neal and Russett trade data, the same shift in democratic trade dependence from zero to 5% of GDP reduces the probability of dispute initiation against an autocratic target from 0.19% to 0.14%. Thus with trade levels set to zero, a democratic country is about 0.1% less likely to initiate a dispute than is an authoritarian country. With trade set to 5% of GDP this gap increases to about .15%. The impact of trade dependence on the likelihood of conflict between two democracies is proportionally similar – although it is somewhat muted in absolute terms because two democracies are already so unlikely to fight. Specifically, the probability of dispute initiation by a democratic challenger against a democratic target drops from 0.11% to 0.08% as trade dependence increases from 0 to 5% of the challenger's GDP.

So how large is the impact of the impact of interdependence on democracies? Our answer is of the half-full or half-empty variety. A reduction of 0.04% per dyad-year in the probability of initiation is not an effect that should be ignored given the overall rarity of militarized disputes. Moreover, when aggregated across many potential trading partners and across longer periods of time this difference might accumulate into

substantial changes in the total number of disputes that a democracy would initiate over the period of a decade or more.

At the same time, it is important to recall that the changes in trade dependence used to generate these effects are quite large. The effects depicted in Figure 1 envision a shift in trade dependence from zero trade up to a level of trade dependence slightly greater than the current relationship between the United States and Canada. And, as Figure 1 illustrates, even these changes in trade dependence generate effects that are only about half as large as the impact of changing a state's domestic political structure from authoritarian to democratic.

Hence we conclude that the constraining effects of trade on conflict, while significant, are secondary to the impact of democracy in at least two ways. First, trade *only* acts as a constraint on the leaders of democratic states. Second, although our analysis indicates that democratic leaders are constrained by the potential costs of disrupting trading relationships, the probability of democratic leaders initiating militarized disputes is already significantly lower than for authoritarian leaders regardless of their levels of trade.

To be sure, increased levels of trade among democratic states can, at the margin, reduce the likelihood of military conflict. Such a web of trading relationships among democratic states might shift the decision to use military force from the category of "very unlikely" to the category of "virtually unthinkable." In this sense, trade may represent part of the glue that cements the "liberal peace" together. Moreover, our analysis finds little support for the argument that increased levels of trade exacerbates the risk of military conflict between states. Thus one might contend that increasing trade openness

is a laudable goal in its own right, and so it is important to know that increased trade does not carry the risk of increasing military conflict. Yet, our analyses indicate that increased levels of trade dependence cannot, on their own, become an engine for creating a “zone of peace.” Instead, our analyses indicate states must democratize before increased trade ties can make them more peaceful.¹⁶

CONCLUSION

These results have sobering implications for the view that trade can be a mechanism for preventing military conflict. The effect of trade depends upon the prior presence of democracy. But democratic states are already so unlikely to initiate military conflict that the constraining effect of trade, while statistically significant, is substantively modest and is smaller than the effect of changing a state’s regime type, regardless of the level of trade. Nonetheless, we would invoke two caveats regarding generalizations from our analysis. First, as we have already noted, it remains possible that some autocratic leaders will attempt to retain office through the fostering of economic growth. Our argument would suggest that such autocrats will be constrained by trade from initiating military disputes with trading partners. Nonetheless, we would note that such leaders are *choosing* to be constrained by trade, and thus they could choose to alter their strategies for retaining office if necessary. Unlike democratic leaders, autocrats retain the option of ensuring loyalty through the payment of private goods if the provision of growth and consumption becomes too costly, or, at least in the short run, of applying repression in order to stay in power.

Second, it remains possible that certain types of international economic linkages may have a greater constraining impact than the overall levels of trade that we measure above. One of the principal factors that may undermine the costs of trade disruption is the availability of alternative markets and substitute goods. Certain types of economic ties--such as foreign direct investment or trade in fossil fuels--may leave states with relatively fewer options for recouping the costs of trade disruption. It is possible that the costs of a disruption of such specific ties could be large enough to constrain even autocratic leaders.

What we can state with confidence, however, is that trade dependence is not *in general* a constraint on the conflict behavior of autocratic leaders. Moreover, we can state that the likelihood of democratic leaders initiating military conflict is *in general* relatively low and the additional impact of trade does not appear to be as large as the impact of being democratic. Thus, at a minimum, our analysis indicates that the advocates of interdependence and engagement need to refine and re-specify the conditions under which trade may be an important cause of peace.

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TABLE 1: TRADE DEPENDENCE, DEMOCRACY AND DISPUTE INITIATION				
	Joint Dependence		Trade & Democracy	
	Model 1A: Oneal/Russett Data	Model 1B: Barbieri Data	Model 2A: Oneal/Russett Data	Model 2B: Barbieri Data
Challenger Trade Dependence	-1.714 (1.32)	-0.418 (0.58)	0.532 (0.31)	1.269 (1.19)
Target Trade Dependence	-4.349 (2.52)*	-2.649 (2.31)*	-4.045 (2.43)*	-2.492 (2.19)*
Joint Trade Dependence	11.407 (1.73)	3.114 (0.84)	11.731 (1.62)	4.364 (0.86)
Challenger Trade X Democracy			-0.265 (1.98)*	-0.214 (2.62)**
Challenger Democracy			-0.025 (3.95)**	-0.024 (3.77)**
Joint Democracy	-0.003 (8.43)**	-0.003 (8.92)**	-0.002 (4.03)**	-0.002 (4.41)**
Relative Military Capabilities	0.314 (3.39)**	0.338 (3.62)**	0.366 (3.93)**	0.384 (4.07)**
Difference in Alliance Patterns	1.957 (10.90)**	1.942 (10.82)**	2.060 (11.37)**	2.034 (11.19)**
Major Power Dyad	2.189 (25.36)**	2.183 (24.87)**	2.206 (25.63)**	2.202 (25.07)**
Shared Border	2.596 (22.34)**	2.597 (22.28)**	2.579 (22.16)**	2.578 (22.09)**
Ln of Distance	-0.642 (13.86)**	-0.635 (13.65)**	-0.652 (14.02)**	-0.646 (13.82)**
Peace Years Spline 1	-0.412 (15.47)**	-0.411 (15.51)**	-0.414 (15.51)**	-0.413 (15.48)**
Peace Years Spline 2	-0.064 (2.12)*	-0.064 (2.13)*	-0.064 (2.11)*	-0.064 (2.13)*
Peace Years Spline 3	-0.028 (1.05)	-0.028 (1.06)	-0.028 (1.06)	-0.028 (1.07)
Peace Years Spline 4	0.025 (1.47)	0.024 (1.41)	0.027 (1.58)	0.026 (1.52)
Constant	2.223 (5.77)**	2.173 (5.62)**	2.377 (6.13)**	2.326 (5.96)**
Observations	40100	40100	40100	40100
Absolute value of z statistics in parentheses calculated with Huber-White robust standard errors				
* significant at 5%; ** significant at 1%				

TABLE 2: OVERALL IMPACT OF CHALLENGER TRADE DEPENDENCE ON DISPUTE INITIATION IN JOINT DEPENDENCE MODEL				
	Coefficient	Std. Error	T-Ratio	Prob.> T
Model 1A: Oneal and Russett Data				
Challenger Trade Coefficient if Target Trade = 0	-1.71	1.30	-1.32	0.118
Challenger Trade Coefficient if Target Trade = .005	-1.66	1.28	-1.29	0.197
Challenger Trade Coefficient if Target Trade = .01	-1.60	1.27	-1.26	0.206
Model 1B: Barbieri Data				
Challenger Trade Coefficient if Target Trade = 0	-0.42	0.72	-0.58	0.563
Challenger Trade Coefficient if Target Trade = .01	-0.39	0.71	-0.54	0.587
Challenger Trade Coefficient if Target Trade = .02	-0.36	0.70	-0.51	0.613

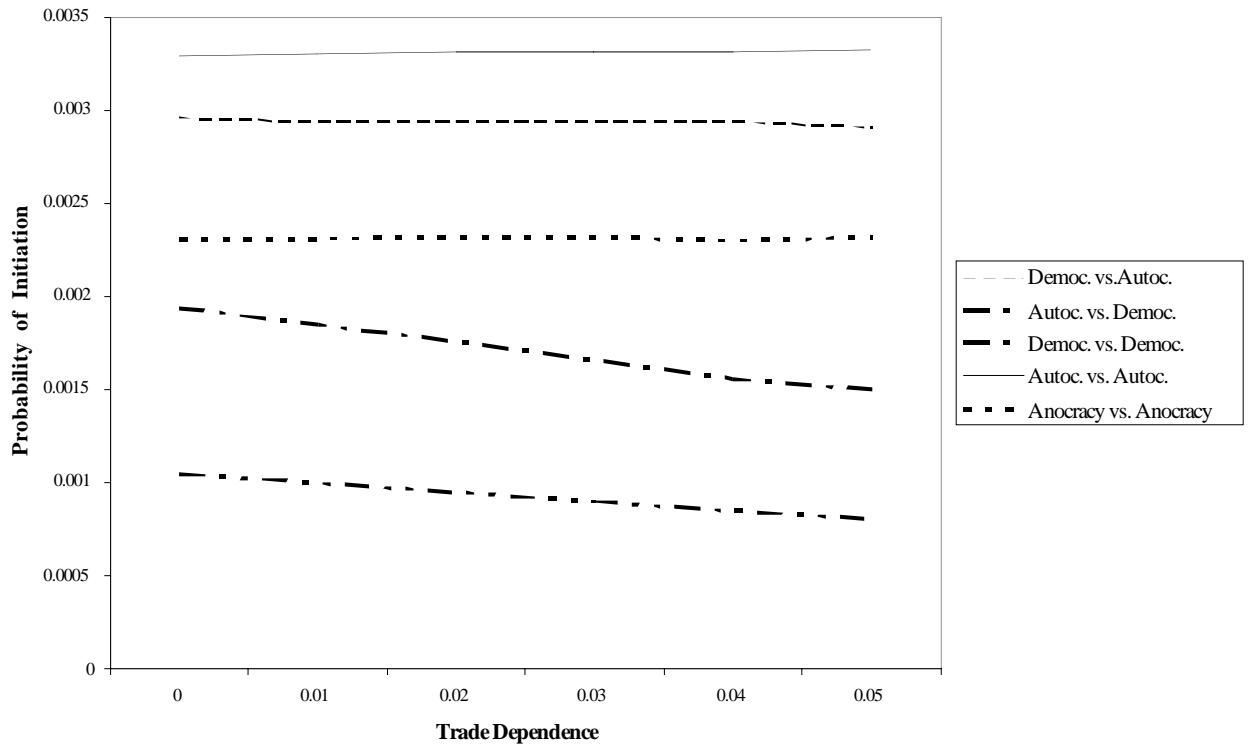
TABLE 3: OVERALL IMPACT OF CHALLENGER TRADE DEPENDENCE ON DISPUTE INITIATION IN TRADE AND DEMOCRACY MODEL				
	Coefficient	Std. Error	T-Ratio	Prob.> T
Model 2A: Oneal and Russett Data				
Challenger Trade Coefficient if Challenger Democracy = 1	0.27	1.60	0.17	0.867
Challenger Trade Coefficient if Challenger Democracy = 11	-2.37	1.16	-2.06	0.041
Challenger Trade Coefficient if Challenger Democracy. = 21	-5.02	1.92	-2.61	0.009
Model 2B: Barbieri Data				
Challenger Trade Coefficient if Challenger Democracy = 1	1.06	1.01	1.05	0.294
Challenger Trade Coefficient if Challenger Democracy = 11	-1.08	0.76	-1.43	0.153
Challenger Trade Coefficient if C Challenger Democracy. = 21	-3.22	1.21	-2.66	0.008

TABLE 4: IMPACT OF SELECTED VARIABLES ON THE RELATIVE RISK OF DISPUTE INITIATION

Explanatory Variables	Change in Explanatory Variable	Change in Relative Risk of Dispute	
		Oneal & Russett Data	Barbieri Data
Challenger Trade Dependence			
Autocratic Challenger	0% to 5%	+4%	+9%
Democratic Challenger	0% to 5%	-22%	-24%
Joint Democracy	Min to Max	-71%	-72%
Relative Military Capabilities	99:1 to 1:99	-31%	-32%
Difference in Alliance Patterns	+2 std. dev. to 0	-74%	-74%
Major Power Dyad	Yes to No	-89%	-89%
Contiguous Dyad	Yes to No	-92%	-92%

Note: Relative risk is calculated based on predicted probabilities generated from Models 2A & 2B in Table 1. Predicted probabilities were generated by varying each independent variable while holding others at their means or modes.

Figure 1: Predicted Impact of Trade Dependence on Dispute Initiation in Various Dyads



Footnotes

¹ On the development of this literature, see Mansfield and Pollins (2003).

²See, for example, Krueger (1997), and Edwards (1993, 1998); and Lawrence and Weinstein (1999). For an important critique of such arguments, see Rodrik (1999).

³This is the argument that Papayouanou (1996) puts forward in respect to the key case of the onset of World War I in Western Europe. An alternative mechanism linking democracy, economic interdependence, and the probability of conflict concerns signaling and interstate bargaining prior to the use of force. Morrow (1999) in respect to trade and Gartzke, Li, and Boehmer (2001) in regard to financial flows have suggested that, because democratic leaders sustain bigger political losses if trade or financial ties with other countries are broken, or using the language introduced by Crescenzi (2003), they face greater “exit costs” if economic integration is interrupted, then, for a given level of integration, they send a stronger signal of resolve in diplomatic disputes than do autocratic leaders, and thereby are better able to resolve such disputes with autocracies and among themselves without recourse to the use of force. The constraining-cost and bargaining-cost logics yield identical implications for democracy, trade dependence and the initiation of militarized disputes, but they imply different mechanisms: our analysis suggests that democracies seek mutually satisfactory resolutions of disputes out of a mutual fear of losing the benefits of trade; the crisis signaling argument suggests that relatively more dependent democratic states can bully both authoritarian and democratic partners. Future analysis should undertake to adjudicate between these two different processes linking economic integration to regime type to peace.

⁴ We thank the editor for highlighting this point for us.

⁵ This is also true of the work by Mansfield and Pevehouse (2000).

⁶ Thus each set of annual dyadic interactions comprises two directed dyad-years. For example, the US and PRC in 1950 becomes US vs. PRC in 1950 and PRC vs. US in 1950. Standard errors allow for clustering because such cases are not likely to be independent of one another.

⁷ Specifically, we utilize the rare event logit (relogit) correction for the STATA statistical software package (Tomz, King, and Zeng 1999). ReLogit can be obtained from <http://GKing.Harvard.edu>. We use the prior correction method for giving proper weights to the oversampled dispute dyads. Data on overall frequency of disputes for estimating weights were obtained from Eugene (Bennett and Stam 200b).

⁸See Gartzke and Li (2003), replies by Barbieri and Peters (2003) and Oneal (2003), and additional commentary by Gartzke and Li (2003), and on the matter of incorporating differences in the sizes of countries, see Hegre (2004).

⁹ ONeal and Russett do not impute zero values for trade between the command economies of communist countries, but opt to leave these cases as missing.

¹⁰ In addition to the variables included in our analysis of disputes, our imputation model also included data on each state's GDP, GDP per capita, energy consumption, urban population, annual capital investment and consumer savings. Along with variables such as the distance between states, sharing a border and other variables from our model of dispute initiation, these variables provided a stable imputation model that converged relatively quickly. The five imputed datasets and the procedures for imputation can be found at <http://XXXXX>

¹¹ As noted above, this effect has sometimes been measured by coding the lower dependence score in the dyad. Our use of the interaction term allows us to model any changes in the impact of challenger dependence more directly. Empirically, however, there may be little difference between these approaches. The correlation between "low dependence" and "joint dependence" ranges from .87 to .94 across the 5 imputations of the ONeal and Russett and Barbieri data.

¹² This coding rule has the effect of assigning regimes that are in "transition" as a democracy score of 11 (a mixed regime type that is neither democratic nor autocratic). We believe that this coding is reasonable since such transitional and partially formed governments are unlikely to possess the institutional characteristics of a strong democratic or authoritarian government. However, in order to ensure that our results were not influenced by this coding decision, we reestimated all of the models in Table 1 with all of the transitional and missing regime cases dropped from the analysis. The results remained robust. In particular, trade dependence continues to constrain democratic challengers, but not autocratic ones. Moreover, we also reestimated the analyses in Table 1 using a dummy variable to identify democratic challengers (democracy score > 16). Rather than assigning a specific democracy score to transitional regimes, this coding procedure simply identifies such states as not being democratic. Once again, the results remained robust. Only democratic challengers were constrained by trade.

¹³ The spline function is a natural spline constructed with knots placed at each 20th percentile of the peace-years variable. The coefficient for the first spline variable reflects the impact of years of peace on the probability of dispute initiation from their minimum value (0) up to the 20th percentile (5 years). The coefficient for the second spline captures marginal change in the probability of dispute initiation for each year that passes from the 20th to the 40th percentile (years 5 to 11) and so on.

¹⁴ The fact that Models 1A and 1B include a number of independent variables that are related to one another (including the interaction terms) raises the possibility that the coefficients are statistically insignificant due to multicollinearity problems. However, auxiliary regressions revealed colinearity levels for all the variables in these models were quite low. Specifically, the auxiliary r-squared for each of the trade dependence variables and the interaction term remained below 0.40. Auxiliary r-squared values for the control

variables were significantly lower – usually below 0.10. The auxiliary r-squared values for models 2A and 2B are very similar, with the exception that the variable capturing the interaction between challenger democracy and challenger trade dependence has a somewhat higher level of colinearity. Specifically, the auxiliary r-squared for that variable was approximately 0.7. Given the very large number of cases, this level of colinearity does not appear to be too severe – especially since that interactive term is statistically significant in both Models 2A & 2b.

¹⁵ While challenger trade dependence appears to have little impact on dispute initiation, trade dependence by the target state *does* appear to reduce the incidence of dispute initiation. The coefficient for target trade dependence is negative and statistically significant across all four models. This finding invites further inquiry. One possible hypothesis is that the target's trade dependence may be negatively associated with dispute initiation because target states can anticipate which states are likely to initiate disputes against them and curtail their trade in advance of any conflict (Nishino 2002). Alternatively, highly dependent target states might be more willing to make concessions to the challenger in order to avoid military conflict and the disruption of trade.

¹⁶ We are focusing on liberal arguments about a zone of peace created through trade. Neither our arguments nor our data can address at present other possible mechanisms for creating “zones of peace,” such as those highlighted in theories of autocratic peace (Gleditsch and Hegre 1997; Raknerud and Hegre 1997).