

*Causes of Peace: Democracy, Interdependence,
and International Organizations, 1885-1992*

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Over the past twenty years, social scientific research on the causes of war has progressed rapidly by focussing on the interstate relations of pairs of states (dyads) observed through time. The analysis of dyadic time series marks an important advance on the previous strategies of analysing international relations at either the global or the state level. Attention to the behavior of pairs of states directly addresses the questions of greatest concern to political scientists and policy makers alike: which states are likely to fight one another, and which will remain at peace? Thus, dyadic analyses escape the ecological fallacy that plagued previous research at the systemic level. One important advantage of the new focus of research is that the political and economic character of individual states and the influence of the international system can be incorporated into our explanations of interstate conflict. Thus, we are able to assess both the effects of states' political regimes and the relevance of hegemonic power on the incidence of militarized disputes, while estimating the influences of purely dyadic factors, such as the balance of power or the existence of an alliance. Research at the dyadic level of analysis has resulted in a significant advance in our understanding of the separate peace that has existed among democratic states for over a hundred years.

The beneficial influence of democracy on interstate conflict does not exhaust the theoretical insights of the classical liberals, however. In his *Perpetual Peace: A Philosophical Proposal* (1927 [1795]), Immanuel Kant suggested that international peace could be established on a foundation of three elements: republican constitutions, “cosmopolitan law” embodied in free trade and economic interdependence, and international law and organizations. Kant's tract is remarkable for several reasons. His very interest in the problem of war is noteworthy because he believed that peace—a lasting peace, not just a lull in fighting between wars—was possible. Most people then, as many still do today, thought that war was inherent in human nature. Kant proposed, however, that the world would weary of war; and democracy, interdependence, and international organizations could constrain states from fighting. This was a visionary proposal. There were very few democracies in the world in the late 1700s and no international organizations as we now know them. There was trade; but most countries followed mercantilist principles: subordinating the economy to the interests of the state, seeking economic independence where possible, and pursuing economic gains through the use of force itself. Though Kant presented his ideas over 200 years ago, it has only recently become possible to evaluate his “philosophical proposal” scientifically because the triangle of institutions he emphasized has come into existence in substantial parts of the world. As we have reported elsewhere (Oneal and Russett 1999c, Russett and Oneal 2001), we find significant support for the pacific benefits of democracy, interdependence, and international organizations over the years 1885-1992.

In this paper, we focus on the causal character of the relations between the Kantian influences and peace. Though dyadic analyses have added to our understanding of international relations, few have exploited the dynamic quality of the information contained in the pooled time series. We ask whether economically important trade, institutionalized democracy, and joint memberships in intergovernmental organizations (IGOs) affect the likelihood of militarized interstate disputes, holding constant the influence of past conflicts. Answering these questions is important if we are to recommend to policy makers that they promote democracy and trade

* This paper is the outgrowth of my collaboration with Bruce Russett. We intended to be co-authors, but other commitments prevented this. I have, nevertheless, written in the third person plural to indicate my debt to my good friend and colleague. Future versions of the manuscript will be a collaborative effort. I am indebted intellectually to Michael Berbaum, Håvard Hegre, J. Lew Silver, Frances Oneal, and Peter van den Dugen for helpful advice on difficult issues. I gratefully acknowledge the institutions that have supported research on the Kantian peace: the Carnegie Corporation of New York, the Ford Foundation, The Norwegian Nobel Institute, the U.S.-Norway Fulbright Foundation for Educational Exchange, and the National Science Foundation. Send all correspondence to John Oneal, Norwegian Nobel Institute, Drammensveien 19, N-0255, Oslo, Norway; gf7@nobel.no. After 1 August 2000, contact joneal@tenhoor.as.ua.edu.

internationally and participate in international organizations as means of increasing the prospects for peace.

Previous research, though strongly suggestive, is not conclusive on this point. It is likely that there are important reciprocal relations between the Kantian influences (and some realist variables) and the probability of interstate violence. A history of conflict may cause a nation to restrict personal liberties or even suspend democracy, becoming a “garrison state” as Lasswell (1941) feared. Similarly, states’ willingness to participate in IGOs with others may depend on the tenor of their relations. This causal influence may dominate the effect of international organizations on the likelihood of conflict: states may share membership in many international organizations only when they have a history of peaceful relations, and these shared links may have no causal influence on the prospects for continued peace. The problem of reciprocal causation is most evident, however, when we consider the interaction of interdependence and peace. Kant and other classical liberals expected states to be constrained from resorting to force when they share important commercial relations because of the economic costs incurred. Interdependence is thought to promote peace because conflict endangers interdependence. Moreover, economic agents are unlikely to trade and invest abroad if military conflict is expected.

To clarify the causal effects of democracy, interdependence, and intergovernmental organizations on the likelihood of dyadic conflict, we use vector autoregression analysis or Granger’s test of causality. Granger (1969) proposed that a variable X might be a cause of Y if past values of X can be used to predict Y more accurately than using past values of Y alone. Thus, we determine if past values of the Kantian influences allow a better prediction of the current likelihood of a dyadic dispute than using only the history of their past disputes. We take advantage of the possibility for dynamic analysis inherent in our pooled time series to address two other issues: 1) Does the process of democratization increase the risk of conflict (Mansfield and Snyder 1995, 1996)? 2) Is a transition in power a particularly dangerous time (Organski and Kugler 1980)?

In the next section, we justify our research by looking briefly at the results of our previous work on the Kantian peace and at studies that have explicitly addressed the reciprocal relations between democracy, trade, and IGOs, on the one hand, and peace, on the other. We then discuss the methods of our analysis, define our variables, and identify the sources of our data. We present the results of our VAR analyses in section four and close with a brief conclusion.

The Kantian Peace

In an examination of the period 1885-1992, we estimated the likelihood of a dyadic dispute as a function of the following factors (Oneal and Russett 1999): the character of the two states’ political regimes, the economic importance of their bilateral trade, the number of IGOs in which they shared membership, whether the two states were allied, and the bilateral balance of power. The importance of these influences was estimated while controlling for contiguity, the distance separating the two states of a dyad, and whether one state in the dyad was a major power. We found strong support for liberal theory. Compared with a “typical” pair of states, the annual probability of a militarized interstate dispute drops by 36 percent if the level of democracy in the less democratic state in the dyad—the state less constrained politically—is higher by one standard deviation, all other variables held constant. The likelihood of conflict increases by 56 percent if the less democratic state is autocratic.¹

Economic interdependence, too, constrains states from resorting to force. The probability of a dispute declines by 49 percent, in comparison to the typical dyad, if both states are economically dependent on their commercial relations. The effect of the third element of the Kantian triad, joint memberships in intergovernmental organizations, is not as great when all possible pairs of states are analyzed. For this set of cases, an increase in joint memberships in IGOs reduces the likelihood of conflict by only 2 percent; but among the contiguous dyads and those that contain a major power, the effect is more substantial: the probability of conflict falls by 13 percent with an increase of one

standard deviation in the number of shared memberships. In a slightly different analysis of these so-called “politically relevant” dyads, the effect of intergovernmental organizations is larger still (Russett and Oneal 2001). A dense network of IGO involvement is associated with a 24 percent decline in disputes. This is notable because the politically relevant pairs account for 87 percent of all disputes, though they constitute just 22 percent of all the dyads for which we have data. Thus, this set of countries is 24 times as likely to experience a militarized dispute as dyads we have deemed to be “irrelevant.”

The substantive importance of the Kantian variables is made apparent if their pacific benefits are compared to those associated with changes in the influences that realists emphasize: alliances and the balance of power. A preponderance of power reduces the likelihood of conflict, and a one standard-deviation increase in the capabilities of the larger state in the dyad relative to its rival is associated with a decline in the probability of a dispute of 31 percent. This result can be misleading, however, because to achieve such a reduction in the incidence of conflict would require that the stronger state increase its capabilities more than four-fold. Since the population and industry of states, as well as the size and capabilities of their military, are considered in assessing the balance of power, this is hardly a basis for recommending that national policy makers seek peace through military superiority. An alliance was also found to lower the incidence of interstate violence: states joined by an entente, non-aggression pact, or defense treaty are 24 percent less likely to fight than non-allied states—a benefit less than that derived from democracy or a high level of economically important bilateral trade.²

This summary of our most recent research understates the pacific benefits of the Kantian peace because we have discussed the independent contributions of each of its three elements. In the real world, democracy or interdependence or involvement in IGOs does not normally increase while the others remain constant. As Kant anticipated, these elements of liberalism are integrally related. By institutional and normative means, the leaders of democratic states are constrained from resorting to force against other democracies; but democracy, because of its recognition and encouragement of individual liberty and responsibility, fosters entrepreneurship and the expansion of commerce, ultimately beyond a nation’s boundaries. As the economic activities of citizens make countries interdependent, there is need for institutions that can regulate and facilitate commercial relations. International law and organizations are the natural response. Thus, there is a logical sequence that links the freedom of citizens in democratic states to expanding commerce over a widening geographical area and to the growth of international institutions. The three elements of the Kantian peace are parts of a whole that contributes to a stable peace (Kant 1927 [1795]; Doyle 1992).³ If all the Kantian influences are increased simultaneously, the probability of a dispute drops 71 percent below the rate for the typical pair of states. As Kant boldly suggested, peace is possible.

These strong results in support of the democratic peace and the constraining influence of economically important trade are consistent with our earlier work (Oneal et al. 1996; Oneal and Ray 1997; Oneal and Russett 1997, 1999a,b,c) and most other recent research. The separate peace among democracies has been substantiated in a great variety of tests over the years. Gleditsch (1992), Chan (1997), Ray (1998), and Russett and Starr (2000) provide reviews of this vast literature. There have been fewer investigations of the benefits of economic interdependence, but support for the liberal view is, nevertheless, extensive and growing (McMillan 1997, Barbieri and Schneider 1999). The contribution of international organizations has not been widely examined and the results are not as consistent.

Bennett and Stam (2000) provide a valuable independent assessment of the Kantian peace. They use several alternative estimators and specifications, and they control for a number of other influences thought to affect the incidence of dyadic conflict. Importantly, their tests include an indicator that conflict is likely based on a game-theoretic model of the interaction of self-interested, expected-utility maximizers (Buono de Mesquita and Lalman 1992). Bennett and Stam’s results are consistent with the democratic peace in all twelve of their tests involving non-directed dyads.⁴ Economic interdependence is significantly related to peaceful relations in nine of the twelve: the

same number as the indicator of whether a dyad includes a major power and more than any other theoretically interesting variable except democracy. Joint membership in IGOs was not statistically significant in any test; but this may be due to their sample of cases. Bennett and Stam include all possible pairs of states in their study. As noted earlier, evidence for the pacific benefits of IGOs is much greater when analyses are restricted to the politically relevant dyads (Oneal and Russett 1999c).

The important substantive effects that the Kantian influences have on the likelihood of interstate violence and the corroboration of these results by most other studies is encouraging. In our view, peace is not only possible but becoming more and more likely. The prognosis for the future of international relations is good because democracy is likely to spread and interdependence to increase. The reasons are simple: most people prefer self-government to authoritarian rule, and they would rather enjoy the prosperity that comes from globalization than remain independent and poor. This is not idealism. A reduction in interstate violence is a likely by-product of the rational pursuit of people's self-interested desire for freedom and well-being. Peace does not depend, therefore, on moral conversion, as long as even devils can calculate (Kant 1927 [1795]). Of course, realist principles still dominate interstate relations outside the Kantian system; and our results and those of many others (Organski and Kugler 1980; Kugler and Lemke, eds. 1996; Bremer 1992, 1993; Bennett and Stam 2000) show that a preponderance of power reduces the likelihood of conflict. But as weapons of mass destruction became accessible to more and more states, it is essential to find a safer, more sure foundation on which to build a peaceful international system. Democracy, interdependence, and international organizations offer this promise.

Accounting for Reciprocal Relations

If we are to have confidence in this prognosis and encourage policies promoting liberal institutions and values, we must be as sure as science will allow that the Kantian influences *cause* a reduction in interstate conflict. Of course, as Hume cautioned, we can never establish causal relations beyond doubt; but we must do what we can to guard against the possibility that causality runs only from peace to the Kantian factors or that the correlations are spurious, evidence of the influence of some unknown cause or causes. Indeed, it is very likely that there are important reciprocal relations between democracy, interdependence, and involvement in IGOs, on the one hand, and peace, on the other. As noted in the introduction, this is most evident in the case of commerce: in the liberal view, it is the fear that conflict will disrupt beneficial commerce that leads a state to refrain from using military force against another.⁵ Thus, the relationship between interdependence and peace is expected to be reciprocal: each is endogenously determined; neither is exogenously given.⁶

There have been efforts to address this issue. In early investigations of the effects of trade, Polachek (1980, 1997; Gasiorowski and Polachek 1982) used two-stage and three-stage least squares regression analysis to take into account past levels of political and military conflict; and Mansfield (1994) estimated a system of two simultaneous equations, one predicting the level of global trade and the other the number of wars in the international system. All these studies found that trade reduces the incidence of conflict, independent of past levels of violence. More recently, Kim (1998) used simultaneous equations to disentangle the reciprocal relations between trade and interstate conflict, 1950-85. Her work is particularly important because she uses a dyadic analysis, considers only militarized disputes and war (not political tensions), and has a large number of cases. She uses sophisticated models to account for both bilateral trade and the likelihood of a dyadic dispute. Kim concludes that the effect of trade on conflict is stronger than the effect of conflict on trade. This is the same result reported in Hegre and Kim's (2000) analysis of economic openness (the total trade-to-GDP ratio) and involvement in military conflict at the national level of analysis.

An alternative method to deal with the effect of past levels of conflict on the current probability of a dispute has been proposed by Beck, Katz, and Tucker (1998). They note that the time series of pooled analyses are not composed of independent observations. This temporal

dependence violates one of the assumptions of regression analysis. Beck et al. suggest borrowing the insight central to statistical hazard models and estimating the effects of theoretically interesting variables while controlling for the length of time that has elapsed since the dyad's last dispute. With this technique (and our data), they found that democracy had important pacific benefits but that the bilateral trade-to-GDP ratio no longer was significantly related to a reduced probability of conflict. Subsequently, it has been demonstrated that, with longer time series or a variety of alternative specifications, the benefits of economically important trade are statistically significant and substantively important even controlling for the history of dyadic disputes (Oneal and Russett 1999a,c; Bennett and Stam 2000; Hegre 2000; Mousseau 2000; Hegre and Kim 2000).⁷

Neither a system of simultaneous equations (or the related statistical techniques of two- and three-stage least squares analysis) nor controlling for the years of peace since a dyad's most recent conflict (using either hazard analysis or Beck et al.'s (1998) method) is entirely satisfactory. The first approach depends upon the assumption that the reciprocal effects are simultaneous, i.e., that conflict in a particular year affects trade only in the same year and vice versa. It seems more likely that the occurrence of a militarized dispute in one year will affect the decisions of investors and traders for some number of years into the future. This is the essential insight of Beck et al. But it is also likely that important commercial relations, too, have a long-term effect: the likelihood of conflict will be lower in future years for a dyad with a long history of close economic ties, even if it is currently involved in a dispute, than if the two states had never been interdependent. Controlling for the years of peace does not allow for this possibility. Indeed, it assumes that the number of years elapsed since the last dispute is independent of the influences of the theoretical variables included in the regression analysis (Beck and Tucker 1996). It is much more likely that the years of peace that a dyad has enjoyed is itself a function of the past character of the two states' political systems, the level of their trade, etc.

The problem inherent in simply controlling for the years of peace is particularly evident in the case of interdependence. Trade falls with the occurrence of a dispute. Commerce rises over time after a dispute has ended as traders' confidence in the durability of peace increases. Thus, commercial relations are expected, on theoretical grounds, to be correlated with the years of peace. It is not surprising, then, that the statistical significance of interdependence often declines in the presence of such a control.⁸ Decisions on how to treat temporal dependence involve important theoretical questions as well as methodological ones, as Bennett (1999), too, has observed.

We should also note the recent critique of pooled cross-sectional and time-series analysis by Green, Kim, and Yoon (2001) because it, too, is motivated by a desire to insure that our analyses reveal causal relations. Green et al. recommend taking into account differences among dyads in their experience of conflict by estimating a regression equation that includes indicators for the individual pairs of states. The inclusion of these dyadic indicators does not address the problem of endogeneity; but by producing separate regression lines for each dyad, it does increase our confidence that statistically significant results describe the effects of theoretical variables through time rather than only cross-sectionally. A fixed-effects model loses a great deal of information when used to explain the incidence of militarized disputes, however, because many dyads have not experienced any armed conflict. Consequently, their experience does not enter into the estimation. Because of the loss of these cases and for other reasons, we are not convinced that the fixed-effects model is the best method for testing our theories of interstate conflict (Oneal and Russett 2001); but we do consider this issue below.

Vector autoregression (VAR) or Granger-causality testing is an additional way to address the issue of endogeneity (Reuveny and Kang 1996). Using Granger's (1969) logic, democracy, economically important trade, etc. can plausibly be considered causes of peace if their past values can be used to predict the current likelihood of a dispute more accurately than using dyads' histories of disputes alone. This approach has several advantages. First, it does not assume that reciprocal effects are simultaneous but allows for conflict to affect the likelihood of conflict over a period of years. Second, it controls for temporal dependence in the time series in a manner that is substantially

richer and more complete than a count of the time elapsed since the last dispute. In estimating the current likelihood of conflict, it would distinguish, for example, between a dyad that enjoyed nineteen years of peace then suffered a military dispute from a pair of states that was involved in a dispute every year for twenty years. Third, it allows the past values of the variables of theoretical interest to influence the current likelihood of conflict. Thus, long-term benefits of interdependence, etc. that ameliorate the harmful effects of a recent conflict can be detected. Fourth, it provides some protection against accepting a spurious correlation as evidence of a causal relation, because the lagged indicators of dyads' involvement in militarized disputes act as proxies for explanatory variables omitted from the regression equation (Burkhart and Lewis-Beck 1994). Finally, and not least important, it is simple to implement and easy to understand.

Historical Domain, Key Variables, and Sources of Data

We analyze dyadic interstate behavior, 1885 - 1992. Thus, we examine the effects of democracy, economic interdependence, and international organizations over a long period before the cold war and a few years after. All but the first year of World War I and II are omitted because bilateral trade data are fragmentary, as they are for the immediate postwar years, 1919-20 and 1946-49. Omitting all but the first year of the world wars, which consisted of conflicts between democracies and autocracies or between two autocracies, biases our results against the democratic peace; but it also provides assurance that our results are not determined by these dramatic but atypical events, a concern raised by Farber and Gowa (1997). Our variables and data are very similar to those used in Oneal and Russett (1999c), which can be consulted for additional information.

Dependent Variable: Onset of a Militarized Disputes

We use the Correlates of War (COW) data on militarized interstate disputes (Bremer 1996; Jones, Bremer, and Singer 1996). We mark the first year that a dyad was involved in a dispute. The variable ONSET equals 1 if one or both states threatened to use force, made a demonstration of its military capabilities, or actually used force against the other; it equals 0 otherwise. We also estimated our key analyses using a measure of dispute involvement, in which all years of a dispute are coded 1; and the results changed little.

Independent Variables:

Democracy. We use the Polity III data (Jaggers and Gurr 1995, 1996) to compute a summary measure of the political character of regimes, subtracting from each country's score on the democracy scale its score on the autocracy scale. The resulting variable (DEM_i) ranges from -10 for an extreme autocracy to +10 for the most democratic states. Because a dispute can result from the actions of a single state, the likelihood of conflict should be primarily a function of the degree of constraint experienced by the less constrained state in each dyad. That state is the weak-link in the chain of peaceful relations (Dixon 1994). We expect, therefore, that the less democratic state (DEM_L) in a dyad determines most strongly the danger of interstate violence: the more democratic this state, the more constrained from engaging in a dispute it will be, and the more peaceful the dyad.

Economic Interdependence. For most of the post-World War II era, the measurement of this Kantian variable is straightforward: the International Monetary Fund reports statistics regarding bilateral trade (International Monetary Fund 1993). Since trade is expected to influence dyadic relations only if it is economically important, we divide the sum of a country's exports and imports with its partner by its GDP (Summers et al. 1995). As with the influence of democratic institutions, we expect the likelihood of a dispute to be primarily a function of the freedom of the less constrained state to use military force. This is indicated by the bilateral trade-to-GDP ratio of the state less economically dependent on trade with its dyadic partner ($DEPEND_L$). For earlier years,

going back to 1885, both bilateral trade data and estimates of GDP of sufficient scope and quality are harder to acquire.

For the years 1920-1938, we use the data on bilateral trade in current values and the exchange rates compiled by the League of Nations (various years). Before World War I, the annual editions of *The Statesman's Yearbook* are the closest approximation. Because the data before 1950 are less standardized, the appropriate exchange rates for converting the data to a common unit are less certain, and there are more missing data, we collected alternative estimates for bilateral trade in the 1885-1949 period (Mitchell 1981, Barbieri 1999), compared them to the data from *The Statesman's Yearbook* and the League of Nations, and adjusted the data from our principal sources accordingly.⁹ No comprehensive collection of GDP data exists for the pre-1959 era, but Angus Maddison (1995) provides estimates for 56 countries in all regions of the world for 1870-1992. We regressed these on estimates of annual energy consumption (Singer and Small 1995), which is a good correlate of individual incomes (Morgenstern, Knorr, and Heiss 1973; Oneal 1989). Then, for countries for which there were no GDP estimates, we then used these coefficients, data on energy consumption, and other information to create estimates of their GDPs.¹⁰

Joint IGO memberships. The influence of international organizations on interstate conflict, the last Kantian variable, is assessed by counting the number of IGOs in which both states in a dyad share membership as indicated in the *Yearbook of International Organizations* (various years).¹¹ This is by no means an ideal measure of the importance and effectiveness of international organizations. It includes organizations that are weak and strong, regional and global, functional and multipurpose. Ideally, the total should be broken down and some organizations given special weight, but this is hard to do as a practical matter and there is little theory to guide the attempt. Consequently, we use the simple count of joint memberships; this variable is labeled IGO.

Capability ratio. Realists emphasize the importance of the balance of power in determining the character of interstate relations. The belief that an equal distribution of power deters conflict has deep historical roots, as does the idea that a preponderance of capabilities, by reducing uncertainty as to which side would win a contest of arms, is more likely to preserve the peace. Recent empirical work suggests, however, that it is preponderance that deters military action (Bremer 1992, 1993; Kugler and Lemke, eds. 1996). Our index of relative power (CAPRATIO) is the natural logarithm of the ratio of the stronger state's military capability index to that of the weaker member in each dyad. We use the COW project's data (Singer and Small 1995) on population, industry, and military forces to calculate the military capabilities of states.

Alliance. Allies are thought to fight each other less than other states because they share common security interests. They often share other political and economic interests as well. We control for this influence using a variable (ALLIES) that equals 1 if the members of a dyad were linked by a mutual defense treaty, neutrality pact, or entente; it equals 0 otherwise.¹²

Contiguity and distance. The potential for interstate violence exists when at least one member of a dyad can reach the other with militarily effective force. For most states, the ability to do so, especially the farther back one goes in history, is determined foremost by geographic proximity. Furthermore, neighbors are likely to have the most reasons to fight—over territorial boundaries, natural resources, irredentism, etc. Thus, distance reduces the capability to fight and most of the incentives to do so as well, a finding that is extremely strong in previous research. Because of the importance of this influence, we include two different terms in our regression analyses to capture it as fully as possible. DISTANCE is the natural logarithm of the great circle distance in miles between the two states' capitals (or major ports for the largest countries); using the logarithm acknowledges a declining marginal effect. We also include NONCONTIG, a measure that equals 1 if two states are not directly or indirectly contiguous (via colonies or other dependencies). It equals 0 if they share a land boundary or are separated by less than 150 miles of water. Because of widespread colonial empires for much of the period we analyze, these two measures are not highly correlated ($r = 0.46$), especially prior to World War I.

The effect of distance in constraining conflict, however, is less for the great powers: those with the land, sea, or (in the last half-century) air capability to deliver substantial forces or destructive power globally. These major powers have been identified by the COW project based on the consensus of historians. To give a full opportunity for the realists' concerns to affect our results, we add a third variable, MINORPWRS, coded 1 if a dyad is composed of minor powers and 0 for those that include at least one great power.

Results

To clarify the causal relations connecting the Kantian influences to the onset of a militarized interstate dispute, we use vector autoregression analyses of pooled cross-sectional and time series data, 1885-1992. We use logistic regression because the variable on the left-hand side of the equation is dichotomous; and we calculate statistical significances using robust standard errors (StataCorp 1999). To respond to the concerns expressed by Green et al. (2000), we also estimate a VAR analysis that includes controls for the fixed effects associated with individual dyads. Our model of disputes is:

$$\begin{aligned} \text{ONSET}_t = & \text{DEM}_{L,t-1} + \dots + \text{DEM}_{L,t-18} + \text{DEPEND}_{L,t-1} + \dots + \text{DEPEND}_{L,t-18} + \text{IGO}_{t-1} + \dots + \text{IGO}_{t-18} \\ & + \text{CAPRATIO}_{t-1} + \dots + \text{CAPRATIO}_{t-18} + \text{ALLIES}_{t-1} \dots + \text{ALLIES}_{t-18} + \text{NONCONTIG}_{t-1} \\ & + \text{DISTANCE} + \text{MINORPWRS}_{t-1} + \text{ONSET}_{t-1} + \dots + \text{ONSET}_{t-18} \end{aligned} \quad (1)$$

We account for the onset of a dispute for a pair of states in year t using eighteen lagged values of each of the main liberal and realist variables. Their influences are estimated while controlling for the history of dyadic disputes over the same period, whether the two states shared a border (either directly or through a dependency), the distance separating them, and whether the dyad included a major power. The last three variables are considered strictly exogenous, so only one value is included. For the other variables, the number of lags to be included was determined by adding terms until additional lags of ONSET were no longer statistically significant. In this way, we seek to insure that the influence of past disputes on the current likelihood of conflict has been taken fully into account. If the other variables still add to the explanation of interstate conflict, a causal relation is plausible.

The results of estimating equation 1 are reported in Table 1. Instead of reporting the coefficients for all the individual terms, we give the sum of the eighteen coefficients for DEM_L , DEPEND_L , etc.; the χ^2 statistic for each of these sets of variables; and the probability that the individual coefficients are jointly significant. The sum of the coefficients indicates the net effect of a variable if its value remained constant over the eighteen-year period; the probability associated with the χ^2 statistic is the likelihood that this net effect is zero. The coefficient, standard error, and the probability associated with the Wald test are reported for the strictly exogenous variables.

As seen in the column 1, all the influences are statistically significant at the .0001 level. The sums of the coefficients of each of the Kantian variables— DEM_L , DEPEND_L , and IGO —are negative, showing that higher levels of democracy, interdependence, and involvement in international organizations reduce the likelihood of a dyadic dispute. A preponderance of power, indicated by a large capability ratio, lowers the incidence of conflict; but surprisingly, allied states appear to fight more than non-allied states. States that do not share a border and states distant from one another have fewer disputes, as do minor powers. As expected, a history of disputes increases the likelihood of a conflict in the current year.

There are two unexpected results in this analysis. Allied states have a greater incidence of conflict, all other things equal, than non-allied states; and joint memberships in intergovernmental organizations are more closely associated with peaceful outcomes in this VAR analysis than in

previous research. These findings are related. Inclusion of the lagged values of IGO causes the net effect of an alliance on the likelihood of conflict to change from negative to positive. Of course, multilateral alliances are intergovernmental organizations, so they add to the count of joint IGO memberships.¹³ Indeed, the two variables are more closely correlated ($r = .39$) than ALLIES is with either the trade-to-GDP ratio ($r = .19$) or the lower democracy score in each dyad ($r = .09$). It is also surprising that the lagged values of IGO are so significant. Moreover, this greater statistical significance is reflected in a much larger substantive effect, as we will see.

We have generally found in our research that allies are less likely to fight than non-allied states, but the effect of an alliance is not as consistent as one might expect. Alliances with a major power carry some danger, as we have reported previously (Oneal and Russett 1997, 1999a). They sometimes use force against their smaller allies, presumably in an attempt to enforce their spheres of influence. Alliances among minor powers are more consistently associated with peaceful relations. The pacifying effect of an entente, non-aggression pact, or defense treaty also varies through time, however. It was much stronger during the cold war than in the years before World War II; and the effect was particularly uncertain in the interwar years, 1920-1939 (Russett and Oneal 2000). Bennett and Stam (2000) also report variation in the consequences of an alliance. Allies prove significantly less likely to fight in only two of their twelve tests for non-directed dyads.

Ultimately, it is the *substantive* significance of the Kantian and realist influences that matters. If interdependent states, for example, were less likely to fight than others, but the change in the probability of conflict were small, the result would be “merely academic.” We hope for results that are substantively important (indicated by the magnitude of the regression coefficients) as well as reliable and consistent (revealed by the tests of statistical significance)—especially if a variable is amenable to manipulation by deliberate national policy. It becomes increasingly important to consider the practical implications of our findings as the size of the sample increases.¹⁴ It is not easy, however, to interpret the coefficients of logistic regression analyses because the curve that is fitted is S-shaped rather than linear.

We can make our results more concrete by estimating the effect that each theoretical variable has on the likelihood that a militarized dispute will begin. First, we calculated a baseline probability against which to make comparisons. We assumed that the dyad had not had a dispute in the last eighteen years, and we set all the lags of each of the continuous variables at the same relatively low level, the value taken by a dyad at the tenth percentile among the contiguous pairs of states. We postulated that the members of the dyad shared a border, were not allied, and were not major powers. The distance between their capitals was set at the mean for the contiguous dyads. We estimated the annual probability of the onset of a militarized dispute for this “typical” dyad, using the estimated coefficients in column 1, Table 1. To show the substantive effects of the theoretically interesting variables, we increased each of them, one at a time, to the value taken by a dyad at the ninetieth percentile among the contiguous dyads, or made the states allies.

As seen in Table 2, the probability of the onset of a dispute for our typical dyad is .030. Increasing the lower democracy score reduces this by 25 percent. Raising the bilateral trade-to-GDP ratio, while holding all other variables at their baseline values, lowers the probability of a dispute from .030 to .015, a reduction of 50 percent. Increasing the pair’s involvement in IGOs from the tenth to the ninetieth percentile causes the likelihood of conflict to drop by 81 percent—an effect much larger than in our previous analyses (Oneal and Russett 1999c), even when these were restricted to the politically relevant dyads. Increasing the preponderance of the more powerful state also lowers the risk of a militarized dispute, from the baseline rate of .030 to .012. As we have noted before, however, this can hardly be taken as support for a policy of peace through strength. To go from the tenth to the ninetieth percentile means increasing the superiority of the more powerful state from 1.3:1 to 44.7:1. Such an increase is well beyond the capacity of policy makers even in the long term. An alliance is associated with an increase in the likelihood of a dispute of 23 percent.¹⁵

These results provide strong support for the benefits of democracy, interdependence, and international organizations; but again we have only considered the independent effects of each of the Kantian influences, holding the others constant. As discussed earlier, Kant envisioned that the three elements would go together: democracies would become interdependent and collaborate in IGOs. There is substantial empirical support for Kant's view (Kim and Russett 1996; and Russett 1998; Russett, Oneal, and Davis 1999; Russett and Oneal 2000). Important commercial relations and intergovernmental contacts in international organizations may also promote democracy. It is relevant, therefore, to estimate the effect of increasing all three Kantian factors simultaneously. Then, the annual probability of a militarized dispute drops by 93 percent, from .030 to .002.

We next consider some alternative scenarios in order to illustrate the dynamic effects of trade, democracy, and power. It is important to address the effects through time of interdependence in order to clarify its causal influence. We can also take advantage of the dynamic qualities of our VAR analysis to clarify the consequences of democratization and a power transition.

In the comparisons above, we assumed that the dyads had not experienced a dispute during the previous eighteen years, the period over which past conflict influences the present likelihood of a dispute. Because we assumed a prolonged period of peace, the probability of conflict in the current year is relatively low: the baseline rate is .030. Instead of assessing the benefits of trade by comparing dyads that have enjoyed peaceful relations, we now consider states with a history of conflict. Imagine that two states experienced three disputes over the previous eighteen years: ten, fourteen, and eighteen years ago. Assume that there has been no trade between the two states, and hold all other variables at the baseline rates described above. The probability of a dispute in the current year for this dyad is .132, more than four times the baseline value calculated earlier. Now assume that these two states settle their political differences after their last dispute and that economic actors, believing that conflict is now unlikely, increase bilateral commerce such that the trade-to-GDP ratio goes from zero to the ninetieth percentile over four years. In this event, the probability of conflict is .081, 39 percent lower than if there has been no trade.

Consider the same two dyads—one that reaches a political settlement that leads to a high level of trade after a period of conflict and one that continues to avoid commercial relations—but assume now that each experiences a new dispute in the sixteenth year. What is the probability of a dispute three years later for the two pairs of states? It is .25 for the states with no trade, but only .12 for those that are currently interdependent, a reduction of 54 percent.

Democratization. The dynamic quality of our analysis allows us to reconsider whether democratization increases the risk of conflict, as Mansfield and Snyder (1995, 1996) have suggested. The turbulent political changes associated with the end of the cold war and the wave of democratization in Eastern Europe and the former Soviet Union led to fears in many quarters of a surge of international conflict fuelled by domestic instability. International relations scholars have long sought to determine whether internal unrest increases the likelihood of external violence, but Mansfield and Snyder (1995, 1996) offered new reason to consider this “diversionary” theory of war. Countries in transition from dictatorship to democracy, they suggest, are conflict-prone because nationalism becomes a rallying theme for demagogues seeking political support in an unstable political environment. Xenophobia and jingoism are effective political strategies in this context because the populous is inexperienced with democratic political processes and the responsibilities of citizenship.

In fact, dramatic changes in government, like those in the eastern bloc, often do occur at times of social and economic turmoil; and it is possible that a domestic crisis may encourage a new regime, particularly in a democracy, to pick a quarrel with another state in order to solidify its support at home. It is also plausible that democratization would produce instability that tempts neighboring states to attack while the government is weak and not fully in control of the resources of the nation. It is not obvious, however, that we should expect new democracies, because they are unstable, to be prone to conflict. The opposite possibility also exists: new democratic governments

may be afraid to engage in conflict with their neighbors because they are weak domestically and unsure if they can count on popular support.

We can ascertain empirically the effects of democratization on the likelihood of conflict using the results of our previous analysis. The historical dynamics of government, i.e., the character of the less democratic state in each dyad through time, affect the likelihood of a current dispute just as their history of conflict over eighteen years does. The question is: does a recent transition from autocracy to democracy increase the probability of conflict? To answer this question, we compare three probabilities of the onset of a dispute: for a dyad that has been democratic for eighteen years, for a dyad that has included an autocracy for the entire period, and the average for four dyads that contained an autocracy until it became democratic in year fourteen, fifteen, sixteen, seventeen, or eighteen. We use the average of the last four dyads to indicate whether democratization increases the risk of conflict, because their individual probabilities are not meaningful. The lagged values of DEM_L are highly correlated; the correlation for $DEM_{L,t-1}$ and $DEM_{L,t-2}$ is .97, for example. Consequently, the estimated coefficients of the individual lags should not be given too much weight.

The probability of a dispute for a dyad containing a state that has consistently been autocratic is .030. It is .022 or 27 percent less for a dyad composed of two stable democracies. The average value for the dyads in which a state has experienced a transition from autocracy to democracy sometime in the previous five years is slightly lower still, .020. Thus, there is no evidence that democratization increases the likelihood of conflict, as some have feared. This result is consistent with other recent research (Oneal and Russett 1997; Thompson and Tucker 1997; Ward and Gleditsch 1998; Enterline 1998a,b; Russett and Oneal 2000; Gleditsch and Ward 2000). Our VAR analysis indicates that, if there is any effect of a recent democratization, it is too small to make a dispute somewhat less likely.

Power-transition theory. The dynamic quality of our regression model also allows us to assess power-transition theory. Originally formulated by Organski (1968) and developed by his students and others (Organski and Kugler 1980; Lemke and Kugler, eds. 1996, Kugler and Lemke 2000), this theory draws attention to the danger of change, especially when rapid, in the distribution of military capabilities. When most others believed an equal balance of power led to peace, Organski argued that an imbalance of power (or power preponderance) made the use of force either unnecessary (for the strong) or impractical (for the weak). The belief that a clear preponderance of power makes war unlikely had often been advanced before. Organski stressed the need to take a dynamic view. A balance of power is dangerous in comparison to a situation where one state has a clear advantage, but war is most likely when a state that formerly enjoyed predominance sees its advantage deteriorate and is overtaken by its rival. This period of transition in the relative capabilities of the two states is said to be particularly dangerous because power is the basis for determining the status quo. A powerful state dictates the nature of its relations with others in order that it benefits disproportionately. A shift in power allows the rising power to redress the situation. Lenin (1929 [1916]) made a similar argument in advancing what he called the law of uneven development. According to Organski, the more rapid the transition, the less likely it is that the two states will be able to adjust their relations peacefully to accommodate the changed circumstances of power.

To determine if a transition in power increases the prospect of interstate conflict, we compare the predicted probabilities of a dispute for four dyads: a pair of states in which one has been 50 percent larger than its rival throughout the previous eighteen years, two states that have experienced an equal balance of power during this whole period, and two dyads that experience a transition in power. The first power-transition takes place gradually over eighteen years, the second over the last nine years. Thus, the capability ratio of the first dyad is always 1.5; and for the second, it is fixed at 1.0. Dyad number three starts with a capability ratio of 1.5 but moves incrementally to 1.0 at the end of eighteen years. The capability ratio for the fourth pair of states equals 1.5 for the first nine years, after which a relatively rapid shift in power occurs with a transition again occurring

just prior to the year in which the likelihood of a dispute is estimated. All the other variables in equation 1 are held constant at their baseline values.

The results are consistent with Organski's theory. The most peaceful dyad of the four is the one characterized by a preponderance of power over the whole period of eighteen years. The probability of a dispute is .029. A dyad with an equal but stable balance of power has an 11 percent greater chance of conflict, but the greatest danger comes with a transition in power. If the shift in capabilities occurs over a long time, the prospect of war is .038, 32 percent higher than when one state enjoys a stable preponderance of power. A rapid transition is also dangerous. A decline in the capability ratio from 1.5 to 1.0 over the previous nine years raises the danger of a dispute to .034, 20 percent higher than when there is a preponderance. Thus, a rapid transition is not associated with the greatest danger of war; but the argument of Organski and his colleagues regarding the danger of a transition is substantially confirmed.

Differences across space vs. change over time. Finally, we address the concern raised by Green et al. (2001) by estimating a fixed effects model. As noted earlier, it is important to determine whether the pacifying benefits of the Kantian influences are evident for individual dyads through time. Certainly a stronger case can be made for the causal role of democracy, trade, and intergovernmental organizations if their association with peaceful interstate relations is not limited to cross-sectional comparisons, though these might reflect their more important, long-term consequences. We have already established that the association of democracy and trade with reduced probability of conflict holds, even in a fixed-effects analysis, over the long period we analyze here (Oneal and Russett 2001; also see Bennett and Stam 2000). We now incorporate separate dyadic indicators into our VAR analysis to confirm the causal inference over time for democracy and trade on conflict. If a VAR analysis with dyadic fixed effects is estimated, it is necessary to include only three lagged values for each of the variables. Fewer lags are needed because for the great majority of dyads the experience of the recent past is sufficient to determine the likelihood of a current conflict.

The results of estimating our VAR regression with dyadic fixed effects are given in the second column of Table 1.¹⁶ As seen there, the pacific benefits of democracy and interdependence are still evident. Both of the liberal variables are significantly related to peace: economically important trade at the .04 level and democracy at .0001. The substantive effects, too, are large. An increase in democracy in the less democratic state from the tenth to the ninetieth percentile level reduces the probability of conflict by 66 percent. An increase of a comparable amount in the lower bilateral trade-to-GDP ratio lowers the incidence of a dispute by 27 percent. This is nearly equal to the effect of an alliance, which in this analysis reduces the danger of violence by 32 percent. The effect of joint memberships in IGOs has also changed. An increase in contacts in international organizations is associated with a slight increase of 10 percent in the likelihood of conflict. The effect of a preponderance of power is negligible. Because only dyads with a history of some conflict contribute to the fixed-effects analysis, there is a substantial loss in the number of observations. There are now only 15,715 cases, compared to nearly 32,000 previously, in spite of the fact that only three lags of the variables on the right-hand side of the regression equation are used.

Again, we can consider the cumulative effect of increasing all the Kantian variables simultaneously from a low to a high level. The result is to lower the danger of conflict by 76 percent.

Conclusion

In this paper, we have tried to assess the causal effects of democracy, interdependence, and joint memberships in intergovernmental organizations on the likelihood that a pair of states will become involved in a militarized interstate dispute. We have used vector autoregression or Granger-causality tests for this purpose, examining all possible pairs of states for the period 1885-1992. The pacific benefits of democracy and economically important trade are statistically significant, substantively important, and robust. If the less democratic state in a dyad is a democracy, the likelihood of a dispute is 25 – 66 percent less than if the state is an autocracy. Nor do we find any

evidence that this benefit is reduced by a recent transition to democracy. New democracies, like old ones, tend to be peaceful. Increasing the importance of economic interdependence reduces the incidence of conflict by 27 – 50 percent. It is important to remember that these effects have been calculated while holding the history of dyadic conflict constant. The benefits of democracy are more apparent when dyadic fixed effects are included; the relative importance of commerce is greater when they are not.

The consequence of joint memberships in IGOs is more variable, as previous research (Oneal and Russett 1999c, Russett and Oneal 2001, Bennett and Stam 2000), too, has reported. In a simple pooled VAR analysis, intergovernmental organizations reduce the probability of the onset of a dispute by 81 percent; but when fixed effects are included, an increase in the number of joint memberships increases conflict by 10 percent. The influence of international organizations warrants additional research because, although the results are not consistent, they are sometimes quite strong.

We have emphasized that it is not the independent benefits of the three Kantian influences that is of primary importance, because the three generally go together. Democracies are more interdependent and join the same international organizations. Interdependence encourages the growth of IGOs to manage states' mutually beneficial commerce. Trade and international contacts may also make it difficult for authoritarian governments to survive. If all three Kantian elements are increased simultaneously, the incidence of conflict drops by 76 – 93 percent.

The pacific benefits of democracy and economic interdependence are all the more apparent if they are compared to the effects of alliances and a preponderance of power—the elements stressed in realist theories of international politics. With a fixed effects VAR model, an entente, non-aggression pact, or mutual defense pact does reduce the likelihood of conflict, by 32 percent; but in our simple pooled analysis, an alliance is associated with increased danger: allies are 23 percent more likely to fight than non-allies. The effect of a military commitment has not proven consistent, varying by time period (Russett and Oneal 2001) and according to whether a great power is involved (Oneal and Russett 1997, 1999b). The effect of a preponderance of power, too, is not as robust as the liberal influences. In the analyses we report here, an increase in the capability ratio reduces conflict by 59 percent when fixed effects are not included, but it has no effect when they are. In any event, the former effect is only attained by increasing the ratio of militarily significant capabilities from 1.3:1 to 44.7:1. Because the measure of national capabilities that we use includes population and industry, this is clearly irrelevant for devising national strategy. Peace through strength is not attainable for most states on their own.

The evidence we have presented for the pacific benefits of the Kantian influences is probably most important for our assessment of economic interdependence. Though free trade was advocated as a means of promoting peace before any state had become truly democratic, contemporary social scientists have been relatively slow to appreciate the role that interstate commerce, too, can play. The reciprocal influence of conflict on states' commercial relations is generally conceded, but not a causal effect of interdependence on the likelihood of interstate violence. This is in large part a legacy of the First World War, which shattered confidence in the liberal view.

In 1908, Norman Angell (1939) published the first edition of *The Great Illusion*. Few other social science works have been so well received. It was translated into seventeen languages and sold over a million copies. Many believed that Angell had shown, on the basis of deductive analysis, that war was impossible because the states of Europe were interdependent. The events of 1914-19 demonstrated that it was not. The tremendous financial cost of the Great War I—not to mention the loss of ten million lives—and the collapse of the international economy in the Great Depression proved that Angell had not been mistaken: it *was* an illusion to believe that the Europeans could fight a war and avoid tremendous economic loss. Nevertheless, many concluded that financial costs alone did not have a significant deterrent effect on the use of military force. Alfred Thayer Mahan (quoted in Miller 1986, 38-39; also, p. 79), for example, argued that nations fight for “ambition, self-

respect, resentment of injustice, sympathy with the oppressed, hatred of oppression,” even if substantial economic losses will be incurred.

Certainly, nations fight for a variety of reasons; and sometimes knowingly accept a high price in treasure and human life in pursuit of their objectives. Economic interdependence (like democracy) will not prevent all conflicts, but our results indicate that a high level of economically important trade does have important pacific benefits. The results we have reported provide grounds for greater optimism than Kant enjoyed (Waltz 1962). Only in the last hundred years have a sufficient number of interdependent, democratic states bound together in international organizations come into existence that social scientific methods can be used to evaluate his plan for peace. Kant’s bold theory was purely speculative; but even without the benefit of significant historical evidence, Kant (1927 [1795]) believed that there was sufficient grounds for action:

States are forced—not, indeed, by a fine regard for morality—to promote noble peace and prevent war . . . [N]ature guarantees perpetual peace through the mechanism of human proclivities; not, indeed, with a certainty sufficient to permit of theoretical prophecy with regard to man’s future, yet great enough for all practical purposes, and to make it a duty to work for this not chimerical object (p. 41)

For the foreseeable future, military force will remain an important tool for preventing and, when necessary, rebuffing aggression; but it no longer needs to be nor, because of the dangers created by modern weapons, can it continue indefinitely to be the principal means of maintaining international peace. A different kind of world is possible, one in which most conflicts of interests are not managed primarily by the threat of violence. The current unipolar character of the world is inevitably transitory, but the position of the liberal Western states does provide an opportunity to create a peace based less on military force than on Kantian principles.

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Notes

¹ Our analyses show not only that democracies do not fight other democracies but that they are more peaceful on average, as individual states, than autocracies. This contravenes the conventional wisdom that, individually, democracies fight as often as non-democracies. But the greater peacefulness of democracies follows from the fact that the likelihood of dyadic conflict goes down or remains constant if an autocracy is transformed into a democracy (Oneal and Russett 1999c; Russett and Oneal 2001): Its relations with other democratic states become dramatically more peaceful, while the danger of war with autocracies is unchanged. Previous efforts to measure the peacefulness of democracies at the national level of analysis failed to consider adequately other factors that influence the probability of conflict. Democracies act according to realist principles in their dealings with autocracies, but they are no more likely to fight with an autocracy than is another autocratic state.

² The constraining influence of an alliance is greater if the analysis is limited to the politically relevant dyads (Russett and Oneal 2001). An alliance reduces conflict by 40 percent in this set of cases compared to 33 percent for democracy, 33 percent for interdependence, and 24 percent for joint IGO memberships.

³ In addition, democracies tend to be interdependent and members of the same IGOs (Kim and Russett 1996; Bliss and Russett 1999; Russett, Oneal, and Davis 1999; Russett and Oneal 2000). There are also important feedback loops connecting trade and international organizations (Russett and Oneal 2001). It may also be that economically important trade opens societies to external influences, making it difficult to sustain authoritarianism. It is encouraging that, in Kant's view (1927 [1795]), democracy is the prime mover in the process by which anarchy is transformed into cooperative international relations. In the analyses we have reported over the years and those of others (Beck et al. 1998, Bennett and Stam 2000), the pacific benefit of democracy is the most consistent of the Kantian influences. Though in many cases a little smaller than the conflict-reducing consequence of trade, it is more reliable.

⁴ Tests using non-directed dyads do not attempt to predict which state in a dyad will initiate conflict. We prefer this approach because we are primarily interested in identifying dyads that are prone to violence—and the factors that make them dangerous—so policies can be adopted to improve the prospects of peace. There are questions derived from rational choice theory that require directed analyses, but tactical considerations may lead one state (i.e., the weaker) to act pre-emptively when it knows that the probability of conflict is high, as Poland did against Germany in 1939. We lack data on terrain, lapses in preparedness, etc. that influence this choice so we rely on the analysis of non-directed dyads.

⁵ Constructivist explanations of the liberal peace do not emphasize this economic argument. Rather, trade is thought to expose people to the ideas and perspectives of citizens of other countries on a wide range of issues (Russett 1963, Rosecrance 1986). Economic interdependence can contribute ultimately to the creation of a "security community" (Deutsch et al. 1957), as between the U.S. and Canada or within much of Europe today, in which the use of force is unimaginable.

⁶ Most attention has been paid to the reciprocal relations of trade and conflict. James, Solberg, and Wolfson (1999) consider democracy and conflict, but they do so in a manner we find inadequate (Oneal and Russett 2000a). Maoz (1997), Raknerud and Hegre (1997), Mousseau and Shi (1999), addressing the same issue, find that democracy reduces the likelihood of a dispute even when the reverse effect is considered. The early work of Wallace and Singer (1970) suggested that the formation of IGOs was more a response to the end of major wars than

a cause of peace; but Wallensteen (1984) thought they did limit the frequency and intensity of subsequent wars.

⁷ The pacific benefits of trade are statistically significant if the number of years each dyad has been at peace is calculated from 1816, the start of the period covered by the Correlates of War data, rather than from 1950, as Beck et al. (1998) did.

⁸ To guard against the danger of wrongly rejecting a true hypothesis, we have most often estimated the coefficients of our logistic analyses using the General Estimating Equation (StataCorp 1999) while assuming that the time series exhibit a first-order autoregressive process. This allows for temporal dependence in the time series but does so in a way that gives the theoretical variables primacy in accounting for the incidence of disputes.

⁹ By drawing upon all sources, using the data of one state to replace missing data of a trading partner, and interpolating between known values, we have trade data for 61% of the dyads 1885-1913 and 1920-1938. We used various tests (Oneal and Russett 1999c) to insure that our results for the pre-World War II period were robust.

¹⁰ These procedures are described in greater detail in Russett and Oneal (2001); they differ slightly from those used in Oneal and Russett (1999c). Our earlier estimates exaggerated the GDP of some small states; but the two sets of data are highly correlated ($r = .98$), and the slight differences do not alter the results we reported earlier.

¹¹ We extended the data originally reported in the sources cited in Russett, Oneal, and Davis (1999).

¹² We updated the data in Singer (1995) using Rengger with Campbell (1995).

¹³ A purely bilateral alliance is not considered an intergovernmental organization.

¹⁴ There is a common, but erroneous, belief that a large sample guarantees a statistically significant finding. A large sample only increases the likelihood that small substantive effects will be detected. This is the reason it is important to examine their magnitudes.

¹⁵ If the lagged values of IGO are dropped and the coefficients in our regression equation re-estimated, the sum of the coefficients of ALLIES is $-.197$, the χ^2 for the test that the coefficients are jointly equal to zero is 54.3, and the reduction in the likelihood of conflict of an eighteen-year alliance is 18 percent.

¹⁶ With fixed-effects regression, the probability of a dispute is estimated for each group as a whole. These estimates are conditional on the number of positive outcomes in a group. To illustrate each substantive effect, we have calculated the percentage reduction in the probability of a dispute assuming that the initial probability was $.030$, the baseline rate for the typical dyad estimated using the simple pooled analysis, and that the fixed effect is zero.