
Trade Blocs, Trade Flows, and International Conflict

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The relationship between foreign trade and political conflict has been a persistent source of controversy among scholars of international relations. For centuries, commercial liberals have claimed that open trade inhibits hostilities. For just as long, observers have challenged the liberal position, arguing that unfettered commerce often contributes to belligerence or that trade is unrelated to interstate disputes. Recently, various empirical studies have attempted to resolve these debates by analyzing the effects of trade flows on conflict. These studies, however, have largely ignored the institutional context in which trade is conducted.

In this article we present some of the first quantitative results pertaining to the links between international commercial institutions and military disputes. Our analysis centers on preferential trading arrangements (PTAs), a broad class of institutions that include free trade areas, common markets, and customs unions.¹ We argue that parties to the same PTA are less prone to disputes than other states and that hostilities between PTA members are less likely to occur as trade flows rise between them. Moreover, we maintain that heightened commerce is more likely to inhibit conflict between states that belong to the same preferential grouping than between states that do not.

Because preferential arrangements promote commercial liberalization and coordination, reduce the scope for opportunism, and increase the leverage of members in negotiations with third parties, states have reason to anticipate the realization of economic gains from participating in a PTA. For parties to arrangements marked by

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1. For discussions of the various types of PTAs, see Anderson and Blackhurst 1993; and de Melo and Panagariya 1993.

dense commercial ties, these future gains are likely to seem especially large. As a result, the combination of PTA membership and a high level of trade is quite likely to discourage belligerence. Military conflict imperils economic relations between combatants and any PTA in which they participate, placing the future gains from membership at risk and threatening to exact a particularly heavy toll on PTA members that trade extensively. Such states therefore have a strong incentive to avoid involvement in military disputes. Furthermore, preferential groupings establish a forum for bargaining and negotiation that dampens interstate tensions, promotes reciprocity, and facilitates the resolution of conflicts before they escalate.

To test this argument, we analyze the effects of bilateral trade flows and PTAs on interstate military disputes during the period from 1950 to 1985. Our results indicate that trade flows have relatively little effect on the likelihood of disputes between states that do not participate in the same PTA. Within PTAs, however, there is a strong, inverse relationship between commerce and conflict. Parties to such an arrangement are less likely to engage in hostilities than other states, and the likelihood of a military dispute dips markedly as trade increases between them.

The Debate About Trade and Conflict

The claim that open trade inhibits war can be traced to philosophers and theologians writing almost two millennia ago.² Voiced most forcefully by the nineteenth-century Manchester liberals, this claim remains influential and rests on a number of core arguments.³ The first argument is that by increasing contact among traders and consumers located in various countries, free trade fosters a sense of international community as well as the development of mutual respect and harmonious relations that reduce interstate tensions. The second, on which contemporary studies place particular emphasis, is that unfettered commerce dampens political conflict by promoting economic dependence. Liberal trade encourages specialization in the production of goods and services, rendering private traders and consumers dependent on foreign markets. These actors have an incentive to avoid wars with key trading partners, since any disruption in commercial relations stemming from hostilities would be costly. Governments, which have reason to respond to demands made by constituents and to enhance a country's economic performance, face similar incentives.

Liberals stress that trade benefits all participants, since open international markets foster the efficient utilization of domestic resources. However, Albert O. Hirschman has pointed out that the gains from trade often do not accrue to states proportionately and that the distribution of these gains can affect interstate power relations.⁴ Moreover, shifts in power relations are widely regarded as a potent source of military

2. Irwin 1996, chap. 1.

3. For discussions of the liberal position on the relationship between trade and military conflict, see Doyle 1997; Keohane 1990; Levy 1989; Moravcsik 1997; Rosecrance 1986; and Stein 1993. Note that not all liberal theories emphasize international trade and that only those explanations that do stress commerce are addressed in this article.

4. See Hirschman [1945] 1980. See also Baldwin 1980; and Keohane and Nye 1977.

conflict.⁵ In the same vein, the extent to which trade partners depend on their commercial relationship often varies substantially among the constituent states. If one partner depends on a trading relationship much more heavily than another partner, the costs associated with attenuating or severing the relationship are far lower for the latter than the former state. Under these circumstances, trade may do little to inhibit the less dependent state from initiating hostilities.

Still another view at odds with the liberal thesis is that states have political reasons to minimize their dependence on foreign commerce and that military expansion offers one way to achieve this end. Hence, as trade flows and the extent of interdependence increase, so do the incentives for states to take military actions to reduce their economic vulnerability.⁶ Furthermore, as commerce rises, so do the range of economic issues over which disputes can emerge. Kenneth Waltz, for example, argues that since "close interdependence . . . the [liberal] myth of interdependence . . . asserts a false belief about the conditions that may promote peace."⁷ As such, heightened trade and interdependence actually might stimulate belligerence. Finally, many scholars argue that no systematic relationship exists between trade and political disputes, a position most strongly held by realists who maintain that international hostilities are primarily attributable to variations in the distribution of political-military capabilities among states.⁸

Despite persistent disagreements about the relationship between trade and conflict, the competing claims advanced by commercial liberals and their critics have not been subjected to much empirical scrutiny. Lately, the widely recognized need to fill this gap has spawned a number of quantitative studies, most of which address whether bilateral commercial flows influenced political disputes during the Cold War.⁹ The results of these studies usually point in the direction predicted by commercial liberals. For example, based on an analysis of thirty pairs of states during the period from 1958 to 1967, Solomon W. Polachek concluded that higher levels of trade dampen conflict.¹⁰ Mark Gasiorowski and Polachek found that heightened commerce between the United States and the Soviet Union from 1967 to 1975 contributed to a reduction in tensions and the onset of *détente*.¹¹ More recently, John R. Oneal, Frances Oneal, Zeev Maoz, and Bruce Russett reported that higher levels of trade inhibited military disputes during the era from 1950 to 1985, especially between contiguous states.¹² Their results have been confirmed in studies by Oneal and Russett, by Russett, Oneal, and David R. Davis, and by Erik Gartzke.¹³

However, support for the liberal thesis is by no means universal. Katherine Barbieri, for instance, found that higher levels of commerce increased the prospects of

5. See, for example, Gilpin 1981; Levy 1989; Mearsheimer 1990; and Organski and Kugler 1980.

6. See Gilpin 1981, 140–41; and Liberman 1996.

7. Waltz 1970, 205, 222.

8. See, for example, Buzan 1984; Gilpin 1987; and Mearsheimer 1990.

9. For overviews of this literature, see McMillan 1997; and Stein 1993.

10. Polachek 1980.

11. Gasiorowski and Polachek 1982.

12. Oneal et al. 1996.

13. See Oneal and Russett 1997; Russett, Oneal, and Davis 1998; and Gartzke 1998.

hostilities between 1870 and 1938 but inhibited conflict throughout the post–World War II era.¹⁴ In addition, Gasiorowski maintains that trade flows were inversely related to the onset of conflict during the Cold War but that conflict became more pervasive as the costs of severing commercial relations rose.¹⁵ The empirical support for the liberal argument has been challenged on methodological grounds as well. Several recent studies have criticized the statistical techniques used in much of the existing research on trade flows and conflict, arguing that more appropriate techniques yield little evidence that commerce affects the likelihood of military disputes.¹⁶

Preferential Trading Arrangements and International Conflict

Largely neglected in the burgeoning empirical literature on the relationship between trade flows and political conflict are the international institutions designed to guide commerce. Particularly important in this regard are PTAs, commercial institutions that have become increasingly pervasive over the past fifty years.¹⁷ Here we argue that military disputes are less likely to occur between PTA members than between other states and that parties to the same preferential arrangement are less prone to conflict as the flow of trade expands between them. We also argue that heightened commerce is more likely to dampen hostilities between parties to the same PTA than between other states.

The claim that PTAs reduce the prospect of military conflict is hardly new. In 1889, for example, Wilfred Pareto argued that “customs unions and other systems of closer commercial relations [could serve] as means to the improvement of political relations and the maintenance of peace.”¹⁸ At the conclusion of World War I, John Maynard Keynes echoed this view, speculating that “a Free Trade Union, comprising the whole of Central, Eastern, and South-Eastern Europe, Siberia, Turkey, and (I should hope) the United Kingdom, Egypt, and India, might do as much for the peace and prosperity of the world as the League of Nations itself.”¹⁹ Since World War II, scholars have continued to advance the argument that PTAs dampen hostilities between participants, and policymakers have established various preferential groupings in an effort to stimulate peace as well as prosperity.²⁰

But though interest in the links between PTA membership and political conflict is longstanding, empirical analyses of these links have been scarce.²¹ Furthermore,

14. Barbieri 1996a,b.

15. Gasiorowski 1986.

16. See Beck and Katz 1997; Beck, Katz, and Tucker 1998; and Beck and Tucker 1996.

17. On the increasing number of PTAs, the rising membership in these institutions, and the growing amount of trade covered by PTAs, see WTO 1995.

18. Quoted in Machlup 1977, 143.

19. Keynes 1919, 249.

20. See Fernández and Portes 1998; Nye 1971; OECD 1993, 25–26; and Schiff and Winters 1998.

21. For some exceptions, see Mansfield, Pevehouse, and Bearce 1999–2000; and Nye 1971. For a recent analysis of the welfare implications of PTAs based on the premise that these arrangements contribute to peace, see Schiff and Winters 1998.

virtually no evidence has been accumulated on whether preferential arrangements influence the relationship between trade flows and hostilities. The purpose of this article is to generate some initial quantitative results bearing on these key topics.

The Effects of PTA Membership and Trade Flows on Political Conflict

The effects of PTAs on conflict stem partly from the economic benefits that states expect to derive from membership.²² As these expected gains increase, so do the economic costs of military disputes, which threaten to degrade economic relations between states and to damage PTAs. Preferential arrangements reduce trade barriers among members and limit the capacity of participants to subsequently raise these barriers. Hence, a state entering a PTA helps to insure against the possibility of future surges in protectionism on the part of other members.²³ From that state's standpoint, the benefits of obtaining such insurance grow if the other members include its key trade partners, since increases in protection by these partners are likely to yield considerable harm. The benefits of PTA membership also grow if states fear that they will be left without adequate access to crucial international markets unless they belong to a preferential grouping, a concern that has contributed heavily to the recent rush of states entering PTAs.²⁴

Parties to a preferential arrangement have reason to anticipate a rise in investment as well. Firms can generate substantial benefits from locating assets in a PTA member because doing so vests them with preferential access to each participant's market. Equally, since PTAs diminish the capacity of governments to engage in opportunistic behavior, firms investing in a preferential grouping limit the prospect that the profitability of their assets will be jeopardized due to state actions.²⁵ Even if states' economies are not highly complementary, thereby restricting the gains from commercial liberalization, they may form a preferential grouping in the hopes of luring foreign investment, as occurred in the case of the Association of Southeast Asian Nations (ASEAN).²⁶ Furthermore, countries joining a PTA frequently expect to enhance their position in international economic negotiations, since in relation to third parties they are likely to exert greater leverage as a group than individually. It is widely acknowledged, for example, that entrants into the European Economic Community expected this organization to bolster their bargaining position with respect to the United States

22. Of course, not all segments of society stand to gain from participating in a PTA or from high levels of trade. The domestic political power of those segments that stand to benefit relative to those segments likely to be adversely affected by PTA membership and heightened trade flows may influence whether these factors inhibit conflict. The extent to which policymakers value PTA membership and trade may also be important in determining whether these factors dampen belligerence. However, it is beyond the scope of this article to analyze whether, and if so, how, domestic politics affect the impact of PTAs and trade flows on military disputes.

23. See Fernández and Portes 1998; Mansfield 1998; Whalley 1998; and Yarbrough and Yarbrough 1992.

24. See de Melo and Panagariya 1993, 5–6; Perroni and Whalley 1996, 57; and Yarbrough and Yarbrough 1992, 105–106.

25. See Fernández and Portes 1998; and Yarbrough and Yarbrough 1992.

26. Saxonhouse 1993, 410–11.

and that various developing countries have formed PTAs in an effort to improve their leverage in economic negotiations with advanced industrial counterparts.²⁷

Interstate conflict can hamper the ability of states to realize these expected gains from PTA membership by undermining commitments to sustain commercial liberalization, inhibiting investment by firms that are reluctant to operate in unstable regions, and damaging the bargaining power of members in negotiations with third parties. Even if trade flows are sparse and states actually derive few economic gains from membership—conditions that have characterized various efforts at regional integration since World War II—preferential groupings can reduce the prospect of hostilities if participants anticipate that sizeable economic benefits will be forthcoming. The repeated efforts that countries have made to invigorate dormant PTAs and the rarity with which these arrangements have been cast aside without a replacement quickly being established suggest that members of unsuccessful PTAs have harbored such hopes.²⁸

For states that trade heavily, however, the future stream of gains from participating in a preferential arrangement is likely to appear especially large. The institutional mechanisms that PTAs provide to deepen integration and avert the future breakdown of economic relations help to ensure that ties between key trade partners will be sustained, if not expanded. As Miles Kahler argues, extensive economic interaction within a regional institution contributes to “perceptions that enhance the prospects for cooperation and reinforce institutions: an expectation that interactions will continue and a declining discount rate in evaluating future payoffs from those interactions.”²⁹ By jeopardizing existing trade relations and the realization of potentially significant future economic benefits, military conflict threatens to exact a particularly heavy toll on states that have dense commercial ties and belong to the same PTA.³⁰ Although the effects of hostilities on both trade flows and a PTA’s vitality may not be immediate, conflicts can persist and escalate, drawing in other members and gradually undermining the arrangement itself as well as economic relations among participants.³¹ As such, PTA members that trade extensively have a strong incentive to avoid military confrontations.³²

27. See Haggard 1997; Pomfret 1997; and Whalley 1998.

28. There are numerous instances where a struggling PTA has been replaced. For example, the Latin American Integration Association replaced the Latin American Free Trade Association, the Central African Customs and Economics Union succeeded the Equatorial Customs Union, and the Caribbean Community and Common Market replaced the Caribbean Free Trade Association. In addition, some PTAs have been adjusted over time in an attempt to increase regional integration. See Foroutan 1993; Nogués and Quintanilla 1993; and WTO 1995.

29. Kahler 1995, 29.

30. For an analysis of how the anticipation of future gains from trade can reduce the prospect that commercial partners will become embroiled in political disputes, see Copeland 1996.

31. On the influence of military disputes on trade flows and PTAs, see Mansfield, Milner, and Rosen-dorff 1998; and Morrow, Siverson, and Taberes 1998.

32. Clearly, this argument is subject to qualification. If states anticipate that they could easily replace the economic benefits from PTA membership or if they heavily discount these benefits (for example, because the arrangement has been faltering for some time, members seem likely to abrogate the PTA, or distributional squabbles are likely to arise between participants), then PTAs may do little to inhibit hostility-

In addition, PTAs can inhibit antagonism by establishing a forum for bargaining and negotiation among members, thereby facilitating the resolution of interstate tensions prior to the outbreak of open hostilities.³³ Various preferential groupings have crafted dispute-settlement mechanisms to mediate economic conflict, institutional devices that may prove especially useful for states that trade heavily.³⁴ Heightened commerce raises the costs of military conflict, but it also can generate economic conflict that, unless contained, has the potential to sow the seeds of political discord.³⁵ Preferential arrangements aid in containing and resolving economic disputes before they damage political relations. Moreover, many PTAs have become venues for addressing political disputes between participants and fostering cooperation. Observers have widely acknowledged, for example, that ASEAN has helped to manage tensions in Southeast Asia.³⁶ Mercado Común del Sur (MERCOSUR) has done likewise, improving political-military relations throughout the Southern Cone.³⁷

Furthermore, PTAs can help to address concerns about the distribution of gains stemming from economic exchange that, in the view of many observers, impede international cooperation.³⁸ One way they can do so is by promoting reciprocity among members. As Kym Anderson and Richard Blackhurst point out, "the reciprocal nature of the preferential treatment which the participants accord to one another" is a central feature of all PTAs.³⁹ Such arrangements help to guarantee that economic concessions made by one party will be repaid, rather than exploited, by its counterparts.⁴⁰ Another way PTAs can address such concerns is by providing information about the gains and losses that members have accrued, thereby reducing uncertainty about the distribution of benefits from economic exchange. More generally, preferential arrangements facilitate the construction of focal points that forestall breakdowns in cooperation by shaping states' expectations about what constitutes acceptable behavior and facilitating the identification of deviations from such behavior.⁴¹

Through the mechanisms described earlier, PTAs are likely to inhibit conflict between members. Moreover, we expect the conflict-inhibiting effect of preferential arrangements to grow larger and stronger as trade flows rise. We also expect that heightened commerce will be more likely to dampen hostilities between PTA members than between other states.

ties, regardless of the volume of trade that countries conduct. Even if these benefits appear large and are not heavily discounted, a state may calculate that attacking a PTA partner would yield still larger gains. However, so long as key trade partners expect that the benefits from PTA membership will outweigh the costs of participation and the potential benefits associated with military disputes, the prospect of antagonism is likely to be small. See Mansfield, Pevehouse, and Bearce 1999–2000.

33. Nye 1971, 109.

34. Yarbrough and Yarbrough 1997.

35. Stein 1993.

36. See Huxley 1996; and Snitwongse 1998.

37. See Manzetti 1993; and Smith 1993.

38. See Grieco 1988; Mastanduno 1991; and Mearsheimer 1994.

39. Anderson and Blackhurst 1993, 5.

40. Fernández and Portes 1998, 213.

41. Garrett and Weingast 1993.

Research Design

To test these hypotheses, we extend a recent study by Oneal and Russett, who sought to explain militarized interstate disputes (MIDs) within pairs of states that either were geographically contiguous or included a major power during the period from 1950 to 1985.⁴² Oneal and Russett's primary purpose was to evaluate "classical liberal" theories of conflict, which stress the pacifying influences of democracy and economic interdependence. Besides these factors, they also controlled for the effects of power relations between states, political-military alliances, and economic growth, each of which has been linked to the onset of conflict in prior research. But like other studies of the relationship between commerce and conflict, Oneal and Russett did not take into account the institutions designed to guide international trade.⁴³

There are various reasons to use Oneal and Russett's study as a point of departure for our analysis. First, they examined a far larger sample of country-pairs than most previous research addressing the effects of trade on hostilities, and using a more comprehensive and representative data set has obvious advantages. Second, a growing number of studies have relied on Oneal and Russett's data, including some that challenge their conclusions.⁴⁴ Using the same basic data employed in these studies should facilitate comparisons of our results to prior work and provide continuity to the burgeoning empirical literature on the relationship between commerce and conflict.⁴⁵

Although we rely on data compiled by Oneal and Russett, our analysis of the relationship between trade and conflict is somewhat different than theirs. As noted earlier, Oneal and Russett focused on explaining MIDs, which are incidents where one state threatens to use, displays, or actually uses military force against another state.⁴⁶ They assessed the factors affecting whether states are involved in a MID in a given year, regardless of whether the dispute began in that year. Our argument, however, pertains to the conditions precipitating the outbreak of hostilities. Consequently, we focus on explaining the onset of MIDs, although we briefly examine whether PTAs and trade flows influence involvement in MIDs as well.

Furthermore, in analyzing the effects of foreign commerce on MIDs, Oneal and Russett emphasized the ratio of bilateral trade to gross domestic product (GDP), which they viewed as a rough measure of commercial dependence.⁴⁷ For each pair of

42. Oneal and Russett 1997.

43. In a subsequent study, Russett, Oneal, and Davis examined the effects of membership in intergovernmental organizations (IGOs) on MIDs. Russett, Oneal, and Davis 1998. But their focus clearly differs from ours, since PTAs compose only a small portion of IGOs. Later in this article, we directly compare the effects of IGOs and PTAs on disputes (see Table 3).

44. See, for example, Beck and Katz 1997; Beck, Katz, and Tucker 1998; Beck and Tucker 1996; and Gartzke 1998.

45. It should be noted that Oneal and Russett have recently extended the data analyzed here in a study covering the era from 1885 to 1992. Oneal and Russett 1999. However, we rely on their earlier data set since comprehensive data on PTAs do not exist for the period prior to World War II. Furthermore, as noted earlier, various studies have used Oneal and Russett's initial data. Relying on the same compilation as these studies should enhance the comparability of our results to their (often disparate) findings.

46. See Gochman and Maoz 1984, 587; and Jones, Bremer, and Singer 1996.

47. Oneal and Russett 1997, 275 fn. 11.

countries, i and j , Oneal and Russett divided the sum of i 's annual exports to and imports from j by the annual GDP of i . They also divided the sum of j 's annual exports to and imports from i by the annual GDP of j . They defined $DEPEND_L$ as the lower of these two values and $DEPEND_H$ as the higher value.⁴⁸

Using the ratio of bilateral trade to GDP to gauge the extent of commercial dependence is a common practice in empirical studies of international relations, but it is not without drawbacks. First, the size of the flow of trade between states (taken either by itself or as a percentage of GDP) may not furnish an accurate indication of the costs they would bear if their economic relations were disrupted. The magnitude of these costs is central to assessing the extent of commercial dependence.⁴⁹ States trading heavily that can easily locate close substitutes for the goods being exchanged clearly are not very dependent on each other; states conducting little trade that would have great difficulty locating substitutes for the goods being exchanged are quite dependent. Unfortunately, developing precise measures of commercial dependence requires data on export and import elasticities that are not available for many countries analyzed here. For reasons outlined earlier, the combination of extensive trade ties and PTA membership is likely to reflect at least some degree of economic interdependence, so our analysis may provide some insight into the nature and strength of the links between interdependence and conflict. However, it is obvious that various states (for example, the United States and Japan) that trade extensively but do not belong to the same PTA are quite interdependent and that other countries that participate in a PTA and trade relatively heavily (for example, the members of the Central American Common Market during the 1960s) are much less so.⁵⁰ Considerable caution therefore needs to be exercised in drawing conclusions about the relationship between interdependence and conflict based on the following results.

Second, absent a better measure of interdependence, including the national income of each trade partner in analyses of commerce and conflict provides a useful way to account for the importance of trade to each partner's economy. Existing theories, however, offer no compelling reason to control for national income by evaluating the ratio of bilateral trade to GDP. Studies relying solely on this ratio assume that trade flows and GDP have an interactive effect on hostilities and ignore the independent effects of these factors. Yet an assessment of the independent effects of trade and national income is needed to ensure that any observed relationship between the ratio of bilateral trade to GDP and hostilities does not stem from the influence of national income alone. Previous analyses, for example, have rarely considered the possibility that an inverse relationship between this ratio and conflict might owe little to the effects of trade and might emerge instead because economically larger states tend to

48. To define these variables, Oneal and Russett used data on bilateral imports and exports compiled by the International Monetary Fund; and they used data on GDP generated by Summers and Heston. See the IMF's *Direction of Foreign Trade* (various years); and Summers and Heston 1988 and 1991.

49. See Baldwin 1980; Gasiorowski 1986; Hirschman [1945] 1980; and Keohane and Nye 1977.

50. On trade within the Central American Common Market, see OECD 1993, 56. On the links between economic flows and PTA membership, on the one hand, and interdependence, on the other, see Keohane and Nye 1975.

be politically powerful and thus disproportionately prone to belligerence.⁵¹ We address this possibility in the subsequent analysis.

Statistical Model of Trade, PTAs, and Conflict

To begin, we estimate the following model:

$$\begin{aligned}
 MID_{ij} = & \beta_0 + \beta_1 DEM_L + \beta_2 DEM_H + \beta_3 GROWTH_L + \beta_4 ALLIES_{ij} \\
 & + \beta_5 CONTIG_{ij} + \beta_6 CAPRATIO_{ij} + \beta_7 TRADE_{ij} + \beta_8 GDP_L \\
 & + \beta_9 GDP_H + \beta_{10} PTA_{ij} + \beta_{11} (TRADE_{ij} \times PTA_{ij}) \\
 & + \beta_{12} (GDP_L \times PTA_{ij}) + \beta_{13} (GDP_H \times PTA_{ij}) + \beta_{14} HEGEMONY + e_{ij}.
 \end{aligned} \tag{1}$$

The observed value of the dependent variable is dichotomous: it equals 1 if a military dispute breaks out between countries i and j in year t , and zero otherwise.⁵²

The first six independent variables in equation (1) are taken directly from Oneal and Russett's study. DEM_L and DEM_H measure the regime types of i and j . Constructed by Keith Jagers and Ted Robert Gurr, both variables take on values ranging from 10 to -10 , where larger (smaller) values correspond to more democratic (autocratic) countries.⁵³ For each pair of countries, DEM_L is the smaller value of these two variables (that is, the value for the least democratic state), and DEM_H is the larger value (that is, the value for the most democratic state) in year t . Theories about the democratic peace predict that pairs of democracies are less likely to become involved in wars than other pairs. The implication drawn by Oneal and Russett is that, as the least democratic state in any given pair becomes more democratic, the prospect of interstate hostilities should decline.⁵⁴

$GROWTH_L$ is a measure of economic growth that Oneal and Russett calculated as the percentage change in per capita GDP during the three-year interval before year t for the country in each dyad experiencing the smallest change.⁵⁵ It is included since lagging growth can generate incentives for governments to launch "scapegoat" wars that divert public attention away from deteriorating economic conditions.⁵⁶ Furthermore, high rates of growth benefit both governments and various segments of society, reducing the incentives to enter political conflicts that could jeopardize these gains.

51. On the relationship between a country's economic size and its proneness to military conflict, see Organski and Kugler 1980; and Polachek 1997.

52. Data on MIDs are taken from Gochman and Maoz 1984; and Jones, Bremer, and Singer 1996.

53. Jagers and Gurr 1995.

54. On this point, see also Bueno de Mesquita and Lalman 1992.

55. Data for this variable are taken from Summers and Heston 1991. Note that in cases where growth cannot be assessed over three-year periods due to missing data, two-year or one-year periods are used instead.

56. Levy and Vakili 1992.

To control for the effects of alliances on military disputes, $ALLIES_{ij}$ is included. If i and j are political-military allies or if both of them are allied with the United States in year t , this variable equals 1. If neither of these conditions is met, $ALLIES_{ij}$ equals zero.⁵⁷ We previously mentioned that Oneal and Russett's sample is restricted to country-pairs that are geographically contiguous or that include a major power. To determine whether these types of pairs differ in their proclivity toward military disputes, $CONTIG_{ij}$ is included in equation (1). If i and j are contiguous, $CONTIG_{ij}$ equals 1. This variable equals zero if i and j are not contiguous and if either state is China, France, the Soviet Union, the United Kingdom, or the United States—the five countries listed by the Correlates of War (COW) Project as major powers during the period covered in our analysis.⁵⁸

In addition, $CAPRATIO_{ij}$ measures the distribution of capabilities between i and j in year t , a factor that is frequently emphasized in studies of military conflict. Following previous research, each state's political-military capacity is measured by averaging its share of the international system's total population, urban population, military expenditures, military personnel, iron and steel production, and energy consumption.⁵⁹ $CAPRATIO_{ij}$ is the ratio of the share of these capabilities controlled by the larger state to the share controlled by the smaller state.

Our analysis of bilateral trade flows centers on $TRADE_{ij}$, which is the sum of i 's exports to and imports from j in year $t - 1$, expressed in real terms. To enhance the comparability between Oneal and Russett's findings and our results, we start with their annual values of $DEPEND_H$ (that is, the larger ratio of bilateral trade to GDP for each pair of states). Then, each value of $DEPEND_H$ is multiplied by the real GDP of i and by the real GDP of j (expressed in 1985 U.S. dollars), generating two annual values of $TRADE_{ij}$ for every dyad. Where discrepancies exist between these two values of bilateral commerce, the larger one is used.⁶⁰ As previously discussed, it is useful to account for the national income of each trade partner in studies of the links between commerce and conflict. In equation (1), GDP_L is the real GDP of the state in each pair having the smaller national income, and GDP_H is the real GDP of the state having the larger national income. Each variable is expressed in 1985 U.S. dollars and is measured in year $t - 1$.⁶¹

The independent effects of PTA membership are analyzed by introducing PTA_{ij} into the model. PTA_{ij} equals 1 if i and j are parties to the same preferential trading arrangement in year $t - 1$, and zero otherwise.⁶² Central to our argument is the

57. Data on alliances developed by the COW Project are used to code this variable. See Singer and Small 1968; and Oren 1990.

58. Singer and Small 1994.

59. See, for example, Mansfield 1994; and Singer, Bremer, and Stuckey 1972. These data are taken from Singer and Small 1993.

60. Not surprisingly, these two values of $TRADE_{ij}$ are very highly correlated ($r = .99$).

61. Data on GDP are taken from Summers and Heston 1991. Where they do not provide data for countries included in Oneal and Russett's study, we use data in Maddison 1995; and in the *World Bank Development Indicators* (various years).

62. Most of the PTAs included in this analysis were notified to GATT under either its Article XXIV or the Enabling Clause. These PTAs are listed in WTO 1995, 77–91. In addition, various PTAs formed outside of GATT are also included. These are listed in de Melo and Panagariya 1993; Hartland-Thunberg 1980; Mansfield and Bronson 1997, 105; and Pomfret 1997. It should be noted that, based on

interaction between PTA membership and trade, since we maintain that PTA members are less prone to military disputes as the flow of commerce expands between them and that heightened trade is more likely to inhibit hostilities between PTA members than between other states. To test this argument, we include $TRADE_{ij} \times PTA_{ij}$, as well as both $GDP_L \times PTA_{ij}$ and $GDP_H \times PTA_{ij}$.

Furthermore, we want to control for features of the international system that are likely to influence the prospect of interstate disputes. Our analysis of these features centers on *HEGEMONY*, a variable pertaining to the strength of the most powerful state relative to other states in the global system. Various studies have found that major-power conflict is less likely to occur when a stable hegemon exists than when hegemony is either eroding or altogether absent.⁶³ However, there is evidence that the global distribution of power is related to hostilities between smaller states too.⁶⁴ The existence of a stable hegemon might inhibit military disputes throughout the international system if this state has the capacity to manage crises between smaller countries before they escalate and an incentive to intervene in such crises to make sure they do not spin out of control. In addition, previous research indicates that hegemony affects both the propensity of states to enter a PTA and the openness of trade.⁶⁵ Hence, including hegemony in our model is crucial to ensuring that this factor does not account for any observed relationship between either trade flows or PTA membership and military disputes. To this end, we define *HEGEMONY* as the percentage of total global GDP generated by the state with the largest GDP in year $t - 1$, a measure of hegemony which is closely related to that used in many previous studies.⁶⁶ Finally, e_{ij} is a stochastic error term.⁶⁷

our sample, there do not seem to be any problems of collinearity between trade flows and PTA membership ($r = .03$).

63. See, for example, Gilpin 1981; and Organski and Kugler 1980.

64. Mansfield 1994.

65. See Gilpin 1981 and 1987; and Mansfield 1994 and 1998.

66. See Krasner 1976; McKeown 1991; and Russett 1985. To compute total global GDP, we rely on the sources in footnote 61. For each year in our analysis, the United States is the country with the largest GDP. Note that, in addition to *HEGEMONY*, we also analyzed the effects of other features of the international system. We replaced *HEGEMONY* with a variable measuring the concentration of capabilities among the major powers in the international system; we replaced it with dummy variables pertaining to the climate of superpower relations (namely, one dummy variable corresponding to years during the height of the Cold War and another corresponding to years during détente); and we replaced it with a dummy variable for each year but one to model the effects of systemic conditions that change from year to year. All of these supplementary analyses yield estimates of the remaining variables in equation (1) that are very similar to those reported here. So do analyses where *HEGEMONY* is measured in year t rather than $t - 1$. For discussions of the concentration of capabilities and the difference between it and hegemony, see Mansfield 1994; and Singer, Bremer, and Stuckey 1972.

Note that estimating our model without systemic factors has little substantive bearing on the results. Nonetheless, we include *HEGEMONY* in the following analyses because various observers argue that it should be included in models of commerce and conflict. See, for example, Oneal and Russett 1999; and Stein 1993, 264–65. Furthermore, while few previous studies of the relationship between trade and military disputes control for the effects of hegemony, the following results indicate that this factor has a very strong influence on MIDs.

67. Note that unit-specific effects are almost never included in models of the relationship between commerce and conflict. To enhance the comparability of our findings with previous results on this relationship, the following estimates are therefore derived without including such effects in equation (1). How-

Since the observed value of MID_{ij} is dichotomous, the parameters in equation (1) are estimated using logistic regression.⁶⁸ Nathaniel Beck, Jonathan N. Katz, and Richard Tucker have pointed out that using a standard logit model to analyze data that are observed annually for a fixed group of dyads will yield misleading results if the data are temporally dependent.⁶⁹ To address this problem, they propose including in models of MID's a spline function of the number of years since i and j last engaged in a dispute.⁷⁰ Beck, Katz, and Tucker further recommend conducting tests of statistical significance using Huber standard errors, which take account of any heteroskedasticity and the grouped nature of the data (in the present case, by country-pairs). For our purposes, it is especially important to apply these techniques, since Beck, Katz, and Tucker have found that using them to analyze Oneal and Russett's data yields a substantially weaker relationship between trade and military disputes than Oneal and Russett report. Hence, the following tests of statistical significance are based on Huber standard errors and the estimates presented are generated after including in equation (1) a natural spline function with three knots of the number of years since a MID last began between i and j , although to conserve space we do not report the estimates of the spline function.⁷¹

ever, we also conduct two supplementary analyses to address whether our results are robust with respect to inclusion of unit-specific effects. First, we estimate equation (1) using a fixed-effects specification. In a recent study, Beck and Tucker argue against including pair-specific fixed effects in models like ours, where time-series cross-section data are used to analyze a binary dependent variable corresponding to a rare event (that is, a dependent variable that almost always equals zero and that rarely equals 1). Beck and Tucker 1996. (See also fn. 68.) They argue that if there is reason to include fixed effects in such an analysis, it is preferable to do so by modeling the fixed effect for each pair as the sum of the fixed effects for each of the two countries making up the pair. As such, we estimate equation (1) after including country-specific fixed effects. Second, we treat the pair-specific effects as randomly distributed rather than fixed across pairs. It has been argued that, in analyses of a dichotomous dependent variable, a probit model is better suited to a random-effects treatment than a logit model. Greene 1993, 655–57. Hence, we used a random-effects probit model to conduct this analysis. The results of these analyses indicate that including unit-specific effects has little bearing on our findings: both the fixed-effects logit model and the random-effects probit model yield results that are very similar to those reported here.

68. A MID begins in only about 3 percent of the dyad-years included in our sample. Gary King and Langche Zeng have pointed out that using logistic regression to analyze rare events, like MID's, can yield biased estimates. King and Zeng forthcoming. Hence, we also estimate equation (1) using a technique developed by King and Zeng to correct for any such bias. The results generated using this technique are very similar to those we report here, indicating that our results are not afflicted by a rare-events bias.

69. See Beck and Katz 1997; Beck, Katz, and Tucker 1998; and Beck and Tucker 1996.

70. In a recent article, Oneal and Russett claim that it is preferable to use the general estimating equation to address problems of temporal dependence in data like ours, rather than relying on the spline function suggested by Beck, Katz, and Tucker. Oneal and Russett 1999. Note that we also estimated equation (1) using the general estimating equation and modeling the temporal dependence as a first-order autoregressive process. The results are virtually identical to those reported here.

71. In all of the following analyses, the base of this function and each knot in it are statistically significant. Following Beck, Katz, and Tucker, we start counting the number of years since i and j last initiated a MID in 1951, the first year for which complete data are available in Oneal and Russett's data set. See Beck and Katz 1997; Beck, Katz, and Tucker 1998; and Beck and Tucker 1996. Whereas this procedure leads us to disregard MID's that occurred between i and j prior to 1951, we also construct another spline function based on the length of time since a MID last began, regardless of when since 1816—the first year of the MID data set—that it broke out. Except for the estimate of *HEGEMONY*, our results do not depend on which of these spline functions is used.

Statistical Results

Logit estimates of the parameters in equation (1) are shown in the first column of Table 1. These findings indicate that the flow of trade has only a weak effect on the likelihood of military conflict between states that do not belong to the same PTA. The estimate of $TRADE_{ij}$ is negative, but it is not statistically significant. Consistent with our argument, however, participants in the same PTA are less prone to hostilities than other states and the likelihood of military disputes between PTA members declines as the amount of commerce they conduct rises. The estimates of PTA_{ij} and $TRADE_{ij} \times PTA_{ij}$ are negative, and the estimate of the latter variable is statistically significant.⁷²

To further assess the effects of trade flows and PTA membership, we use the estimates in the first column of Table 1 to generate predicted probabilities of a military dispute. The results are presented in Table 2. Initially, we compute the baseline probability of a dispute between PTA members and between states that do not belong to the same PTA, evaluating all of the continuous variables in the model (regime type, growth, the distribution of capabilities, the level of trade, both values of GDP, hegemony, and the terms in the spline function) at their respective means and assuming that i and j are both contiguous and nonallied. These probabilities are relatively small, reflecting the rarity of MIDs. On average, however, the likelihood that a pair of states will experience the outbreak of hostilities is about 50 percent lower if they belong to the same PTA than if they do not. Moreover, preferential arrangements are increasingly likely to inhibit military conflict as trade flows expand. Evaluating the lowest observed value of $TRADE_{ij}$ for example, the predicted probability of a dispute's onset is about 15 percent smaller between PTA members than between other states, considerably less than the corresponding reduction in the likelihood of hostilities generated by PTA membership when $TRADE_{ij}$ is assessed at its mean. In addition, heightened trade has a far larger effect on conflict within than outside preferential groupings. For parties to the same PTA, the predicted probability of a MID dips by roughly 45 percent if the flow of trade rises from its lowest observed value to its mean, whereas the corresponding dip for countries that do not belong to the same arrangement is negligible.

We argued earlier that it is important to consider the independent effects of trade and national income on military disputes rather than focusing solely on their interaction via the ratio of bilateral trade flows to GDP. Our findings indicate that, holding constant GDP and the other factors in equation (1), the flow of trade has a strong and relatively large effect on the likelihood of conflict between PTA members but not on the likelihood of hostilities between other states. However, national income also influences military conflict. The estimates of GDP_L and GDP_H are positive and statis-

72. Note that we attach little importance to whether the estimate of PTA_{ij} is statistically significant. In equation (1), β_{10} (which is the coefficient of PTA_{ij}) is interpreted as the change in the intercept (β_0) stemming from a shift in the value of PTA_{ij} from zero to 1 (that is, a shift from the absence to the existence of a PTA between states i and j). By itself, β_{10} therefore indicates the effect of PTA membership on disputes between states that have no national income and that conduct no trade. Obviously, there is no case in which either state i or j has a national income equal to zero, so there is no case in which $TRADE_{ij} \times PTA_{ij}$, $GDP_L \times PTA_{ij}$, and $GDP_H \times PTA_{ij}$ all equal zero. As such, the estimate of PTA_{ij} is of little substantive importance. On this issue, see Friedrich 1982.

TABLE 1. *Estimates of the effects of trade flows, GDP, PTAs, regime type, alliances, contiguity, the distribution of capabilities, growth, and hegemony on MIDs, 1950–85*

Variable	Multinomial Logit			
	Logit MID	Nonviolent MID	Violent MID	Logit DISPUTE
<i>Intercept</i>	-1.238** (-2.65)	-1.549 (-1.29)	-2.473** (-3.83)	1.036* (2.19)
<i>DEM_L</i>	-0.042** (-3.13)	-0.026 (-1.43)	-0.049** (-3.12)	-0.053** (-3.96)
<i>DEM_H</i>	0.030** (2.98)	0.039* (2.26)	0.031** (3.01)	0.026* (2.39)
<i>GROWTH_L</i>	-0.018 (-1.59)	0.007 (0.27)	-0.031** (-2.61)	-0.004 (-0.35)
<i>ALLIES_{ij}</i>	-0.129 (-0.76)	0.108 (0.36)	-0.204 (-1.09)	-0.144 (-0.86)
<i>CONTIG_{ij}</i>	1.340** (8.66)	1.339** (4.72)	1.412** (8.62)	0.769** (4.25)
<i>CAPRATIO_{ij}</i>	-0.0027** (-2.91)	-0.0058** (-2.93)	-0.0021* (-2.52)	-0.0028** (-2.91)
<i>TRADE_{ij}</i>	-1.24×10^{-8} (-1.25)	-8.93×10^{-8} (-1.39)	-9.81×10^{-9} (-1.21)	-1.32×10^{-8} (-1.12)
<i>GDP_L</i>	$1.76 \times 10^{-9**}$ (4.29)	$2.40 \times 10^{-9**}$ (4.86)	$2.20 \times 10^{-9**}$ (5.35)	$1.72 \times 10^{-9**}$ (4.46)
<i>GDP_H</i>	$2.64 \times 10^{-10**}$ (3.04)	$3.32 \times 10^{-10*}$ (2.00)	$2.42 \times 10^{-10*}$ (2.36)	1.82×10^{-10} (1.92)
<i>PTA_{ij}</i>	-0.212 (-1.23)	-0.228 (-0.65)	-0.155 (-0.80)	-0.199 (-1.09)
<i>TRADE_{ij} × PTA_{ij}</i>	$-3.05 \times 10^{-7**}$ (-3.52)	$-3.97 \times 10^{-7*}$ (-2.02)	$-3.09 \times 10^{-7**}$ (-2.94)	$-3.00 \times 10^{-7**}$ (-2.81)
<i>GDP_L × PTA_{ij}</i>	$6.60 \times 10^{-9**}$ (3.13)	5.19×10^{-9} (0.98)	$7.06 \times 10^{-9*}$ (2.47)	$6.12 \times 10^{-9*}$ (2.26)
<i>GDP_H × PTA_{ij}</i>	-3.48×10^{-10} (-0.83)	-1.29×10^{-10} (-0.11)	-5.23×10^{-10} (-0.83)	-3.65×10^{-10} (-0.64)
<i>HEGEMONY</i>	-6.204** (-4.22)	-11.307** (-2.97)	-4.286* (-2.26)	-9.324** (-6.78)
χ^2	791.74**	1164.30**		928.36**
Log likelihood	-2,176.54	-2,518.58		-2,509.95
N	20,990	20,990		20,990

Note: Each logit model is estimated after including a natural spline function with three knots. The multinomial logit model is estimated after including one natural spline function with three knots for non-violent MIDs and another such function for violent MIDs. Numbers in parentheses are asymptotic z -statistics computed using Huber standard errors.

** $p \leq .01$; two-tailed tests are conducted for all estimates.

* $p \leq .05$; two-tailed tests are conducted for all estimates.

TABLE 2. *Effects of trade flows, PTA membership, and GDP on the predicted probability of a MID*

	Probability of a MID
A. Baseline	
PTA members	.014
Non-PTA members	.029
B. Level of trade at its lowest observed value	
PTA members	.026
Non-PTA members	.030
C. Smaller GDP at its lowest observed value	
PTA members	.009
Non-PTA members	.027
D. Larger GDP at its lowest observed value	
PTA members	.015
Non-PTA members	.024

Note: These predicted probabilities are computed using the logit estimates in the first column of Table 1. It is assumed that i and j are contiguous and not allies (that is, $CONTIG_{ij} = 1$, and $ALLIES_{ij} = 0$). In addition, DEM_L , DEM_H , $GROWTH_L$, $CAPRATIO_{ij}$, $HEGEMONY$, and the terms in the natural spline function are held constant at their means.

tically significant. So is the estimate of $GDP_L \times PTA_{ij}$, although that of $GDP_H \times PTA_{ij}$ is negative and not significant.

The results in Table 2 show that, for states that do not belong to the same preferential arrangement, increasing the GDP of either trade partner from its lowest observed value to its mean generates a relatively modest (approximately 10–20 percent) rise in the predicted probability of hostilities. Within a PTA, however, a similar increase in the smaller value of GDP yields roughly a 50 percent rise in the likelihood of a military dispute; such an increase in the larger value of GDP produces a slight decline in the likelihood of conflict. Equally noteworthy is that PTA membership cuts the predicted probability of a dispute by two-thirds when GDP_L takes on its lowest value but reduces the probability of conflict by only about one-third when GDP_H is evaluated at its minimum.

The preceding findings suggest that PTA members of roughly equal economic size are more prone to disputes than members of very different size. In part, these results may reflect the fact that various arrangements composed of economically small (and thus similarly sized) states have been stillborn. Beset by tensions stemming from the allocation of industries and the distribution of costs and benefits among participants, political conflicts have arisen frequently in such arrangements.⁷³ We will return to this issue later.

The effects of the remaining variables in our model are largely consistent with prior results.⁷⁴ There is evidence that dyads composed of polities with more demo-

73. See Bhagwati 1993; de Melo and Panagariya 1993; Foroutan 1993; Mytelka 1973; and Nye 1971, 228.

74. See, for example, Beck, Katz, and Tucker 1998; Bueno de Mesquita and Lalman 1992; Oneal and Russett 1997; and Russett, Oneal, and Davis 1998.

cratic institutions are less likely to become involved in disputes than other pairs, all else being equal. The estimate of DEM_L is negative and statistically significant, indicating that as the least democratic state in a dyad becomes more democratic, the probability of a MID declines. Furthermore, the estimate of DEM_H is positive and significant, providing evidence that country-pairs composed of a democracy and an autocracy are especially prone to the onset of military conflict.⁷⁵ Our results also confirm that hostilities are more likely to occur between contiguous countries than between noncontiguous countries that include a major power and that disputes are less likely to occur as the distribution of capabilities grows increasingly skewed. The estimate of $CONTIG_{ij}$ is positive and statistically significant; that of $CAPRATIO_{ij}$ is negative and significant. In addition, the negative estimates of $GROWTH_L$ and $ALLIES_{ij}$ suggest that heightened economic growth and alliances dampen hostilities. The weakness of these relationships is obvious, however, since neither estimate is statistically significant. Finally, there is considerable evidence that disputes are increasingly likely to break out as hegemony erodes, since the estimate of $HEGEMONY$ is negative and significant.

Further Statistical Considerations

The preceding results provide considerable support for our argument. Preferential trading arrangements tend to inhibit conflict between members, and this effect becomes more pronounced as the flow of commerce increases within such arrangements. In addition, heightened trade is more likely to reduce the prospect of military disputes between PTA members than between other states. However, it is important to assess the robustness of these findings with respect to the operationalization of both the dependent variable and the independent variables in equation (1). It is also important to determine whether these results are unduly influenced by the European Community (EC) and whether they are threatened by any simultaneity bias that could emerge if MIDs influence either the flow of commerce or PTA membership. We address these issues in this section.

The Dependent Variable

Militarized interstate disputes are events involving the threat, display, or actual use of armed force. We have treated all such events as homogeneous, but it is useful to assess the robustness of the preceding results by distinguishing between MIDs marked by the use of force and those marked by the threat or the display of force. To this end, we redefine MID_{ij} as a nominal trichotomous variable. It equals 2 if a violent military dispute breaks out between i and j in year t , 1 if a nonviolent dispute begins between i and j in year t , and zero otherwise.⁷⁶

75. On these issues, see Oneal and Russett 1997.

76. The architects of the MID data set code disputes on a five-point scale, where higher values correspond to more violent events. See Gochman and Maoz 1984; and Jones, Bremer, and Singer 1996. Like Bruce Bueno de Mesquita and Randolph Siverson, Joanne Gowa, and others, we consider MIDs assigned

We then use a multinomial logit model to estimate equation (1), with the absence of a dispute being the reference category.⁷⁷ The results reported in the second and third columns of Table 1 strongly indicate that the effects of PTAs and trade flows do not depend on whether MIDs are treated as a group or broken down into violent and nonviolent conflicts. Like the binary logit estimates in the first column of Table 1, each multinomial logit estimate of $TRADE_{ij}$ and of PTA_{ij} is negative, none of these estimates is statistically significant, and both estimates of $TRADE_{ij} \times PTA_{ij}$ are negative and significant.

To more fully probe whether the effects of PTA membership and trade flows on nonviolent MIDs differ from the effects of these factors on violent MIDs, we test the following null hypotheses:⁷⁸

$$H_{0(PTA)}: \beta_{10,V} + \beta_{11,V}TRADE_{ij} + \beta_{12,V}GDP_L + \beta_{13,V}GDP_H \\ = \beta_{10,NV} + \beta_{11,NV}TRADE_{ij} + \beta_{12,NV}GDP_L + \beta_{13,NV}GDP_H$$

$$H_{0(TRADE)}: \beta_{7,V} + \beta_{11,V}PTA_{ij} = \beta_{7,NV} + \beta_{11,NV}PTA_{ij}.$$

Coefficients with the subscript *V* pertain to violent MIDs, whereas those with the subscript *NV* pertain to nonviolent MIDs. The first null hypothesis reflects that, in equation (1), the effects of PTAs are conditional on trade flows and GDP. The second one reflects that, in equation (1), the influence of trade is conditional on PTA membership. We use the multinomial logit estimates in Table 1 to conduct nine Wald tests of the first hypothesis. In the initial three tests, GDP_L and GDP_H are set equal to their respective median values and: (1) $TRADE_{ij}$ is evaluated at the 25th percentile of trade found in the data set, (2) at the 50th percentile, and (3) at the 75th percentile. In the next three tests, $TRADE_{ij}$ is again evaluated at the 25th, 50th, and 75th percentile, but GDP_L and GDP_H are each evaluated at the 25th percentile based on our data. In the last three tests, both GDP_L and GDP_H are evaluated at the 75th percentile. These nine tests do not yield a single case in which the null hypothesis is rejected, indicating that the effects of PTAs are statistically indistinguishable with respect to violent and nonviolent MIDs. To address the second hypothesis, we conduct one Wald test after setting PTA_{ij} equal to 1 and another test after setting this variable equal to zero. In neither case can we reject the null hypothesis that the influence of trade flows is statistically indistinguishable with respect to violent and nonviolent MIDs. From our standpoint, then, there is little added benefit from using a multinomial logit rather than a binary logit model to estimate equation (1), so we continue to rely on the latter model in the rest of this article.

the value of 4 or 5 to be violent disputes. When *i* and *j* experience the outbreak of such a dispute, MID_{ij} equals 2. We consider MIDs assigned the value of 1, 2, or 3 to be nonviolent disputes. When a nonviolent dispute begins between *i* and *j*, MID_{ij} equals 1. See Bueno de Mesquita and Siverson 1997; and Gowa 1999.

77. For a discussion of the multinomial logit model, see Greene 1993, 664–76; and Long 1997, chap. 6. Recall that to account for any temporal dependence in the binary logit model, we included in equation (1) a natural spline function of the number of years since a MID began between *i* and *j*. In the multinomial logit model, we include two spline functions. The first pertains to the number of years since a nonviolent MID broke out between *i* and *j*; the second pertains to the number of years since a violent MID broke out between them.

78. This test is closely related to one suggested by Long 1997, 162–63.

Thus far we have focused on explaining the onset of MIDs. Doing so is appropriate since our argument centers on the commercial conditions influencing the outbreak of hostilities. As noted earlier, however, Oneal and Russett and various studies extending their analysis have considered the influence of trade on the existence of MIDs.⁷⁹

To further assess the robustness of our results, we therefore estimate equation (1) after replacing MID_{ij} with $DISPUTE_{ij}$, the dependent variable analyzed by Oneal and Russett. The observed value of this variable is 1 if i and j are engaged in a MID in year t , regardless of whether the dispute began in year t , and zero otherwise.⁸⁰ The estimates shown in the fourth column of Table 1 indicate that our results do not depend on whether the focus is on the outbreak or the existence of military disputes. Analyses of MID_{ij} and $DISPUTE_{ij}$ yield virtually identical estimates of $TRADE_{ij}$, PTA_{ij} , and $TRADE_{ij} \times PTA_{ij}$, as well as most of the other independent variables in equation (1). Hence, our results are quite robust with respect to the operationalization of the dependent variable.

The Influence of the EC

Among the PTAs formed since World War II, the EC has been characterized by unusually dense trade ties and peaceful relations among its members. Indeed, many observers argue that one key reason for the absence of armed conflict in Western Europe over the past half-century has been the extensive economic links among participants in the EC and the European Union.⁸¹ As such, it is important to ensure that the strong, inverse relationship between trade flows and military disputes within PTAs is not attributable to the influence of the EC alone. We do so by removing all observations where both i and j are members of the EC in year $t - 1$ and then generating another set of parameter estimates, which are presented in the first column of Table 3. Clearly, the signs, sizes, and significance levels of the estimates of $TRADE_{ij}$, PTA_{ij} , and $TRADE_{ij} \times PTA_{ij}$ (as well as the other independent variables) correspond very closely to those of the estimates reported in the first column of Table 1, providing strong evidence that our results are not being driven by the EC.⁸²

79. See Beck, Katz, and Tucker 1998; Gartzke 1998; Oneal and Russett 1997; and Russett, Oneal, and Davis 1998.

80. To conduct this analysis, we replace the spline function of the number of years since a MID last began between i and j —which was included in equation (1)—with a spline function of the number of years since these states were last involved in a MID.

81. See, for example, Nye 1971, 115; and Wallace 1994.

82. Because there is no case in which two members of the EC engaged in a military dispute during the period analyzed here, it is not possible to include a variable for the EC in this analysis. We also conduct a series of tests in which EC membership is defined more broadly. To begin, we define a variable, EC_{ij} , that equals 1 if both i and j are members of the EC in year $t - 1$ or if one state is an EC member and the other state has an association agreement with the EC (for example, the Lomè Convention). Otherwise, this variable equals zero. Then, we set PTA_{ij} equal to zero in all cases where EC_{ij} equals 1, and we estimate equation (1) after including EC_{ij} in the model. Again, there is very little difference between the estimates of $TRADE_{ij}$, PTA_{ij} , and $TRADE_{ij} \times PTA_{ij}$ (as well as the other independent variables) generated by this analysis and the estimates shown in Table 1.

TABLE 3. *Logit estimates of the effects of trade flows, GDP, PTAs, regime type, alliances, contiguity, the distribution of capabilities, growth, hegemony, dependence, IGOs, and GATT on MIDs, 1950–85*

Variable	Model			
	(3.1) ^a	(3.2)	(3.3)	(3.4)
<i>Intercept</i>	−1.252** (−2.68)	−1.261** (−2.67)	−1.335* (−2.43)	−1.062* (−2.30)
<i>DEM_L</i>	−0.041** (−3.10)	−0.042** (−2.94)	−0.043** (−3.43)	−0.035** (−2.87)
<i>DEM_H</i>	0.030** (3.00)	0.030** (2.95)	0.029** (2.87)	0.032** (3.14)
<i>GROWTH_L</i>	−0.018 (−1.59)	−0.018 (−1.61)	−0.018 (−1.57)	−0.018 (−1.59)
<i>ALLIES_{ij}</i>	−0.122 (−0.72)	−0.117 (−0.69)	−0.148 (−0.82)	−0.110 (−0.62)
<i>CONTIG_{ij}</i>	1.342** (8.64)	1.342** (8.51)	1.333** (9.00)	1.341** (8.59)
<i>CAPRATIO_{ij}</i>	−0.0027** (−2.91)	−0.0027** (−2.97)	−0.0026** (−2.84)	−0.0027** (−2.91)
<i>TRADE_{ij}</i>	$−1.25 \times 10^{-8}$ (−1.25)	$−1.25 \times 10^{-8}$ (−1.01)	$−1.27 \times 10^{-8}$ (−1.21)	$−1.15 \times 10^{-8}$ (−1.16)
<i>GDP_L</i>	$1.76 \times 10^{-9**}$ (4.30)	$1.80 \times 10^{-9**}$ (4.16)	$1.74 \times 10^{-9**}$ (4.23)	$1.68 \times 10^{-9**}$ (4.10)
<i>GDP_H</i>	$2.64 \times 10^{-10**}$ (3.03)	$2.57 \times 10^{-10**}$ (2.88)	$2.59 \times 10^{-10**}$ (3.04)	$2.66 \times 10^{-10**}$ (3.05)
<i>PTA_{ij}</i>	−0.225 (−1.31)	−0.335 (−1.83)	−0.232 (−1.33)	−0.176 (−1.00)
<i>TRADE_{ij} × PTA_{ij}</i>	$−2.07 \times 10^{-7*}$ (−2.46)	$−4.52 \times 10^{-7**}$ (−2.93)	$−3.04 \times 10^{-7**}$ (−3.53)	$−3.21 \times 10^{-7**}$ (−3.55)
<i>GDP_L × PTA_{ij}</i>	$7.28 \times 10^{-9**}$ (3.21)	$7.31 \times 10^{-9**}$ (3.12)	$6.31 \times 10^{-9**}$ (2.89)	$6.96 \times 10^{-9**}$ (3.16)
<i>GDP_H × PTA_{ij}</i>	$−4.32 \times 10^{-10}$ (−0.99)	6.31×10^{-11} (0.18)	$−3.31 \times 10^{-10}$ (−0.80)	$−3.12 \times 10^{-10}$ (−0.76)
<i>HEGEMONY</i>	−6.165** (−4.20)	−6.138** (−4.17)	−6.023** (−3.83)	−6.555** (−4.42)
<i>DEPEND_L</i>	—	−6.113 (−0.19)	—	—
<i>DEPEND_L × PTA_{ij}</i>	—	38.320 (1.11)	—	—
<i>DEPEND_H</i>	—	0.694 (0.38)	—	—
<i>DEPEND_H × PTA_{ij}</i>	—	−4.098 (−0.68)	—	—
<i>IGO_{ij}</i>	—	—	0.002 (0.36)	—
<i>GATT_{ij}</i>	—	—	—	−0.261 (−1.29)
χ^2	783.81**	858.97**	801.21**	883.47**
Log likelihood	−2,174.52	−2,174.49	−2,172.53	−2,173.91
N	20,583	20,990	20,959	20,990

Note: Each model is estimated after including a natural spline function with three knots. Numbers in parentheses are asymptotic z-statistics computed using Huber standard errors.

^aIn model 3.1, pairs of EC members are excluded.

** $p \leq .01$; two-tailed tests are conducted for all estimates.

* $p \leq .05$; two-tailed tests are conducted for all estimates.

The Independent Variables

Having determined that our findings are robust to the operationalization of the dependent variable and are not heavily influenced by the EC, we now assess whether they are robust with respect to the inclusion of certain factors that are omitted from equation (1). First, foreign commerce and national income are treated as having independent effects on military disputes in equation (1), but we mentioned earlier that existing studies frequently treat these factors as having an interactive effect on conflict via the ratio of bilateral trade to GDP. To address whether the influence of trade flows and GDP is properly specified, we supplement equation (1) by including the two ratios constructed by Oneal and Russett ($DEPEND_L$ and $DEPEND_H$) as well as the interaction between each ratio and PTA_{ij} . The results, which are reported in the second column of Table 3, provide no indication that either the ratio of trade to GDP or its interaction with PTA membership is strongly related to military disputes.⁸³ Thus, based on the data used here, it is more appropriate to treat the effects of trade flows and national income as independent rather than interactive via the ratio of trade to GDP, an especially noteworthy finding in light of the widespread tendency for studies of commerce and conflict to focus solely on this ratio.

Second, some scholars have argued that, in addition to the amount of trade conducted, changes in commerce might affect the likelihood of conflict. Oneal and Russett, for example, analyzed the influence on military disputes of $\Delta DEPEND_H$, which is the change in the ratio of trade to GDP from year $t - 4$ to $t - 1$ for the state in each pair with the highest ratio of bilateral commerce to GDP in year $t - 1$.⁸⁴ They found that $\Delta DEPEND_H$ is inversely related to the existence of a MID, although their subsequent research has cast doubt on the strength of this relationship.⁸⁵ To further assess the robustness of our results, we include both $\Delta DEPEND_H$ and $\Delta DEPEND_H \times PTA_{ij}$ in equation (1). Neither variable has a statistically significant effect on MID_{ij} . Nor does the change in trade flows. We define $\Delta TRADE_{ij}$ as the average annual change in $TRADE_{ij}$ during the interval from year $t - 4$ to $t - 1$ and find no evidence that this variable or its interaction with PTA membership ($\Delta TRADE_{ij} \times PTA_{ij}$) has a significant bearing on military disputes.⁸⁶

Third, in a study extending Oneal and Russett's analysis, Russett, Oneal, and Davis found that the number of intergovernmental organizations (IGOs) to which both i and j are parties in year $t - 1$ is inversely related to the likelihood of a MID between them

83. We also find no evidence that these four variables have a jointly significant effect on military disputes ($\chi^2 = 4.10$, $p = .39$).

84. Note that where $\Delta DEPEND_H$ cannot be measured over three-year intervals due to missing data, either two-year or one-year intervals are used instead.

85. Russett, Oneal, and Davis 1998, 456 fn. 56.

86. We evaluate $\Delta TRADE_{ij}$ from year $t - 4$ to $t - 1$ because this is the procedure used by Oneal and Russett to measure $\Delta DEPEND_H$. Like them, we measure $\Delta TRADE_{ij}$ over either two-year or one-year intervals when it cannot be measured over three-year intervals because of missing data. Since, in addition to the change in trade, the change in GDP may affect the likelihood of MIDs, we also include ΔGDP_L , ΔGDP_H , $\Delta GDP_L \times PTA_{ij}$, and $\Delta GDP_H \times PTA_{ij}$ in the model. However, there is no evidence that any of these variables has a statistically significant effect on military disputes; and the results of a likelihood ratio test indicate that, for each outcome, these terms can be jointly excluded from the model ($\chi^2 = 2.74$, $p = .69$).

in year t .⁸⁷ Since PTAs seem to be among the IGOs analyzed by Russett, Oneal, and Davis and since they relied on the same basic data used in our analysis, it is important to assess whether the observed effects of preferential trading arrangements stem from a more general tendency for IGOs to dampen discord between participants. We therefore estimate equation (1) after including IGO_{ij} , which is the variable Russett, Oneal, and Davis use to measure IGO membership. The results presented in the third column of Table 3 provide no indication that IGO_{ij} influences the outbreak of military disputes or that including it in the model affects the estimate of any remaining variable.⁸⁸

Fourth, although we have focused on the links between PTAs and military disputes, other international commercial institutions may affect the outbreak of conflict as well. Central among these other institutions is the General Agreement on Tariffs and Trade (GATT), which undergirded the global trading system during the period analyzed here. Like PTAs, GATT may have reduced the likelihood of hostilities between participants by leading them to anticipate the realization of future economic benefits that could be scuttled in the event of conflict and by helping to mediate interstate tensions.⁸⁹ In addition, since many PTAs have been formed under the auspices of Article XXIV of GATT and its Enabling Clause, we want to ensure that any observed relationship between PTAs and military disputes is not due to GATT's influence on both factors.

To do so, we include a variable, $GATT_{ij}$, that equals 1 if both i and j are parties to GATT in year $t - 1$, and zero otherwise.⁹⁰ As shown in the fourth column of Table 3, the estimate of $GATT_{ij}$ is negative, but it is not statistically significant. Moreover, the signs, sizes, and significance levels of the remaining variables in equation (1) depend very little on whether GATT membership is included in the model, again pointing to the robustness of our earlier results.

Finally, it is useful to consider whether the observed effects of PTAs and foreign commerce on military disputes are being driven by either the similarity of preferences between states or the degree of underlying tension between them. If states with similar political preferences are more likely to enter PTAs and trade extensively and are less likely to fight, then the extent of preference similarity between i and j might account for our findings. Similarly, between states that have acrimonious relations, if MIDs are more likely to occur, trade flows are more likely to contract, and PTAs are

87. Russett, Oneal, and Davis 1998.

88. Note also that the difference between the sign and significance level of IGO_{ij} in Table 3 and in Russett, Oneal, and Davis's study is not simply an outgrowth of the fact that we include PTA_{ij} and its interaction with trade in our model of MIDs, whereas they do not. Nor is it an outgrowth of our focus on the onset of MIDs and their focus on the existence of MIDs. Further analysis reveals that this difference is primarily due to our decision to follow Beck, Katz, and Tucker in accounting for any temporal dependence in military disputes by including a natural spline function of the length of time since a MID last occurred between i and j . In contrast, Russett, Oneal, and Davis do not include this function in their model of MIDs. See Beck and Katz 1997; Beck, Katz, and Tucker 1998; and Beck and Tucker 1996.

89. Nonetheless, a multilateral institution like GATT differs in important respects from PTAs, so it is appropriate to consider these types of commercial institutions separately rather than in combination. On this issue, see Bhagwati 1993; Fernández and Portes 1998; and Yarbrough and Yarbrough 1992.

90. Data on GATT membership are taken from selected issues of its *Basic Instruments and Selected Documents* (Geneva) and *International Trade* (Geneva).

less likely to form, then the underlying extent of cooperation and discord between i and j might account for the effects of trade and PTAs on military disputes reported earlier.

To address the influence of preference similarity, we rely on a measure of the correspondence between i 's and j 's UN General Assembly roll-call votes in year $t - 1$. This variable—which Gartzke developed and labeled *AFFINITY_{ij}*—has been used as a measure of preference similarity in various studies extending Oneal and Russett's initial analysis.⁹¹ Consistent with Gartzke, we find that *AFFINITY_{ij}* has an inverse and statistically significant impact on military disputes and that the estimates of *DEM_L* and *DEM_H* are no longer significant when this variable is included.⁹² Otherwise, the findings derived after introducing *AFFINITY_{ij}* in the model—including those pertaining to PTAs and trade flows—correspond very closely to our earlier results.

Addressing the effects of underlying tension, however, is far less straightforward, since reliable data on patterns of interstate cooperation and discord are in very short supply. Equally, the existing data on such patterns cover only a fraction of the years and country-pairs included in our sample. Nonetheless, we can conduct a rough analysis of this issue by using the Conflict and Peace Data Bank (COPDAB), which furnishes daily information on conflict and cooperation for various pairs of states during the period from 1948 to 1978.⁹³ Previous studies have combined these daily data to create an annual measure of the extent of conflict and cooperation between each pair.⁹⁴ It is important to recognize that the data used to construct this measure are available for far fewer than half of the observations considered in our previous analyses. Thus, the estimates derived after including this measure of conflict and cooperation in equation (1) should be treated with considerable caution and are not directly comparable to the results in Tables 1 and 3.

Not surprisingly, these estimates indicate that MIDs are more likely to occur as the level of underlying discord rises. Furthermore, there is weak evidence that, outside of PTAs, heightened trade contributes to a mild increase in the likelihood of conflict. Consistent with our argument and our earlier results, however, these findings also indicate that PTA membership reduces the prospect of interstate hostilities and that the tendency for preferential groupings to inhibit disputes becomes more pronounced as trade flows increase between participants.⁹⁵ In sum, the analyses conducted in this

91. Gartzke 1998 and 2000.

92. Gartzke 2000.

93. The COPDAB data were compiled by Azar 1993. In addition to COPDAB, the World Event Interaction Survey (WEIS) measures patterns of cooperation and discord. But since it covers a much shorter period of time than COPDAB, we do not use it here. It should be noted that Rafael Reuveny and Heejoon Kang have shown that it is possible to splice together the COPDAB and WEIS data on a dyad-by-dyad basis, creating a time series from 1948 to 1991. Reuveny and Kang 1996. However, we do not splice these data sets in the present analysis because of the inherent differences between them regarding what types of events are included and because Reuveny and Kang's method requires more data than are available for most dyads in our sample.

94. See, for example, Gasiorowski and Polachek 1982; and Polachek 1980.

95. Like before, the estimates of *PTA_{ij}* and *TRADE_{ij} × PTA_{ij}* are negative and the latter estimate is statistically significant, whereas the former estimate is not. In addition, these estimates continue to be relatively large. Unlike our earlier findings, the estimate of *TRADE_{ij}* is positive, although it is not statisti-

section provide ample evidence that our results are robust with respect to the inclusion of various factors that are omitted from equation (1).

Do Military Disputes Influence Trade Flows and PTAs?

Besides assessing the robustness of our results, we also need to ensure that they are not undermined by any simultaneity bias that might arise if MIDs affect either trade flows or the likelihood that a pair of states belongs to the same preferential grouping. Antagonism among states, for example, could reduce their willingness to enter the same PTA, although it is also possible that states might choose to join such an arrangement to help improve hostile political relations. Similarly, whereas we argue that over time the escalation of disputes can disrupt trade, MIDs could have a sudden and substantial impact on commercial flows regardless of whether they escalate.

To address these issues, we have lagged the effects of PTA membership and trade and have included variables pertaining to the length of time since a dispute last began (the spline function) in equation (1). Here, we further address them by analyzing the effects of MIDs on both preferential commercial arrangements and trade flows. To begin, we estimate a bivariate logit model, in which PTA_{ij} is regressed on MID_{ij} and both variables are measured in year t . The estimate of MID_{ij} is negative, indicating that combatants are less likely than other states to participate in the same PTA. Consistent with previous findings, however, this estimate is not statistically significant.⁹⁶ We then supplement this model by including DEM_L , DEM_H , $GROWTH_L$, $ALLIES_{ij}$, $CONTIG_{ij}$, $CAPRATIO_{ij}$, $TRADE_{ij}$, GDP_L , GDP_H , $HEGEMONY$, and a variable measuring the length of time since a MID last occurred between i and j . We also include a natural spline function (with three knots) of the number of years since i and j last participated in the same PTA to account for any temporal dependence in the data. Again, there is no statistically significant evidence that military disputes affect PTA membership. Nor does the strength of this relationship change when we add a series of variables that are not in equation (1) and that have been linked to the formation of preferential groupings.⁹⁷ Thus, while disputes that become drawn out and increasingly violent may weaken PTAs over time, disputes generally do not have a strong, short-term influence on whether states belong to the same arrangement.

There is also little evidence that MIDs have an immediate effect on bilateral trade flows. Initially, we estimate a least-squares regression of $TRADE_{ij}$ on MID_{ij} , where both variables are measured in year t . Next, we include in this model DEM_L , DEM_H , $GROWTH_L$, $ALLIES_{ij}$, $CONTIG_{ij}$, $CAPRATIO_{ij}$, PTA_{ij} , GDP_L , GDP_H , $HEGEMONY$, the length of time since a conflict last occurred between i and j , and the value of $TRADE_{ij}$ in year $t - 1$ (to account for any temporal dependence in commerce).

cally significant. Moreover, this estimate is quite small and, therefore, so is the quantitative effect of heightened trade on disputes between states that do not belong to the same PTA. In fact, holding constant the remaining variables in our model, a change from the lowest observed value of $TRADE_{ij}$ to its mean value yields less than a 5 percent increase in the predicted probability of a MID. In sum, then, these results provide additional support for our argument that PTA membership inhibits military disputes and that the likelihood of conflict declines as the flow of trade rises between members of a preferential grouping.

96. Mansfield, Milner, and Rosendorff 1998.

97. For a discussion and analyses of these additional variables, see *ibid.*

Finally, we include some other factors that have been considered in empirical studies of bilateral trade flows.⁹⁸ In each case, the estimate of MID_{ij} is negative, but it is not statistically significant. Hence, while military disputes that persist and escalate may dampen trade and while governments and private traders involved in PTAs may attempt to avoid disputes for fear that such escalation could occur, MIDs do not seem to have a sudden impact on trade flows.⁹⁹ A related possibility is that private traders anticipate MIDs and bear the costs of adjusting trade in advance of conflict, rather than risking the potentially larger costs associated with the escalation of disputes.¹⁰⁰ Regardless, these analyses yield no evidence that our earlier results are threatened by a simultaneity bias.

The Effects of Variations Across PTAs on Interstate Conflict

Our findings indicate that PTAs have conditioned the effects of trade flows on military disputes. The tendency for heightened trade to dampen conflict is much larger and stronger between PTA members than between other states; and preferential arrangements are increasingly likely to inhibit hostilities as the flow of commerce rises. However, we need to ensure that these results do not stem from some factor (or set of factors) that is omitted from our model and that both promotes trade and dampens conflict within PTAs. In this section, we address a number of factors that vary across preferential groupings and that might have such an impact.

For over three decades, scholars have debated whether the size of members' economies affects the extent of integration within PTAs. One view is that preferential arrangements having a highly skewed size distribution tend to foster greater integration than those with a more symmetric size distribution.¹⁰¹ In preferential groupings marked by a very asymmetric size distribution, it is easier to overcome collective action problems and distributional conflicts that can hamper efforts at regional integration. Moreover, in these types of arrangements, the largest members may be better able to deter military disputes between smaller members and to resolve conflicts that arise before open hostilities break out than in arrangements where members are roughly the same size. Another view, however, is that a highly skewed size distribution among parties to a PTA leads industry to cluster in the economically larger members, stimulating "backwash" effects that retard integration and foster conflict.¹⁰²

Although this debate remains unresolved, both positions suggest that the size distribution within a PTA may affect the density of trade flows among members, since the extent of integration is likely to be closely associated with the volume of commerce. And there is ample reason to expect that the size distribution of PTA members will also influence the likelihood of military conflict among them. We therefore ex-

98. These variables are discussed and analyzed in Mansfield and Bronson 1997.

99. These findings accord with those of Morrow, Siverson, and Tabares 1998.

100. Ibid.

101. See Deutsch et al. 1957; and Russett 1967.

102. See Barrera and Haas 1969; and Schmitter 1969.

amine the effects of two variables pertaining to the size distribution within PTAs. The first, $CONCEN_k$, measures the concentration of GDP among the members of each PTA in year $t - 1$. Widely used in previous studies to measure the distribution of capabilities among the major powers,¹⁰³ this variable takes on values ranging from zero to 1 and is calculated as follows:

$$CONCEN_k = \sqrt{\frac{\sum_{i=1}^{N_k} (S_{ik}^2) - \frac{1}{N_k}}{1 - \frac{1}{N_k}}}. \quad (2)$$

In equation (2), N_k is the number of parties to the k th PTA in year $t - 1$, and S_{ik} is the proportion of the k th PTA's total GDP in year $t - 1$ generated by the i th member.¹⁰⁴ We use GDP to measure the size distribution within preferential arrangements, since doing so is consistent with previous studies of regional integration and since national income is an important indicator of both economic and political-military power.¹⁰⁵ Our second measure of the size distribution of PTA members is $MAJPOW_k$. This variable equals 1 if the k th PTA includes a major power (as defined by the COW Project), and zero otherwise.

We also analyze the economic development of PTA members. It is widely recognized that many arrangements composed of less developed countries have yielded few economic gains because of the lack of complementarities among members' economies.¹⁰⁶ Frequently, such arrangements also have been hampered by attempts to negotiate the allocation of industries prior to their establishment and by efforts to tie trade to these allocations.¹⁰⁷ As Jagdish Bhagwati points out, attempts of this sort typically "kill[ed] the forward motion" of integration, thereby dampening trade and fostering antagonism between participants.¹⁰⁸

In the same vein, the distribution of benefits and costs among PTA members stemming from economic integration often is quite skewed. For some participants, the benefits accrue slowly (if at all) and are outstripped by the costs of integration, which include the relocation of production, the loss of jobs, and the loss of market share.¹⁰⁹ States bearing these costs typically press for compensation from other members. But devising and implementing ways to meet their demands have proven difficult, raising tensions within these PTAs and hindering efforts to promote integration.¹¹⁰

Since the economic development of PTA members may affect both trade flows and the likelihood of hostilities between them, we assess the influence of $PERCAP_L$ and $PERCAP_H$. For each pair of countries, the former variable is the real per capita GDP

103. See Mansfield 1994; and Singer, Bremer, and Stuckey 1972.

104. In those rare cases where a pair of countries belongs to more than one PTA in the same year, the pair is assigned the highest value of concentration among the PTAs in which the countries participate.

105. See Nye 1971; Organski and Kugler 1980; Russett 1967; and Schmitter 1969.

106. See, for example, Foroutan 1993; Nogués and Quintanilla 1993; and Saxonhouse 1993, 411.

107. See Bhagwati 1993; and Foroutan 1993.

108. Bhagwati 1993, 28.

109. Balassa 1961, 201.

110. See de Melo and Panagariya 1993; Foroutan 1993; Mytelka 1973; and Nye 1971, 228.

of the state having the smaller per capita national income in year $t - 1$, and the latter variable is the real per capita GDP of the state having the larger per capita national income in year $t - 1$.¹¹¹

The factors discussed in this section pertain to variations across PTAs, so the following analysis is restricted to those pairs of states that belong to the same preferential grouping in year $t - 1$. The estimates presented in Table 4 confirm that the concentration of GDP within a PTA has a strong impact on the likelihood of a military dispute between members. The estimate of *CONCEN_k* is negative and statistically significant, indicating that the likelihood of conflict declines as the distribution of national income among parties to the same preferential arrangement becomes increasingly skewed. In contrast, there is no evidence that the existence of a major-power participant affects the prospect of hostilities within a PTA, since the estimate of *MAJPOW_k* is not statistically significant. The extent of economic development also has little influence on the likelihood of conflict between PTA members: neither *PERCAP_L* nor *PERCAP_H* has a significant bearing on military disputes.

While evaluating the effects of these factors on military conflict is important in its own right, doing so is also useful because they could account for the strong, inverse relationship between trade flows and disputes within PTAs that we observed earlier. These factors, however, do not account for this relationship. Consistent with our earlier findings, there is considerable evidence that heightened commerce inhibits conflict between PTA members. The estimate of *TRADE_{ij}* is negative and statistically significant.¹¹² Equally, the quantitative effects of trade flows on MIDs are much the same as those reported earlier. Hence, there is no evidence that either the size distribution or the economic development of PTA members accounts for the strong, inverse relationship between trade flows and military disputes within preferential groupings.

Conclusions

In recent years, various efforts have been made to resolve longstanding debates about the effects of foreign trade on military disputes. These studies have focused primarily on the influence of trade flows and place little emphasis on the institutions designed to shape commerce. We argue that this tack is inadequate. Preferential trading arrangements dampen military disputes and have a strong bearing on the relationship between trade flows and conflict.

Preferential groupings help to mute military tensions by generating the expectation of future economic gains by members. Since the outbreak of hostilities threatens to scuttle these gains, participants in the same PTA have reason to avoid involvement

111. Data on real per capita GDP are expressed in 1985 U.S. dollars and are taken from Summers and Heston 1991.

112. Note that because our sample contains only PTA members, *TRADE_{ij}* in Table 4 is directly comparable to *TRADE_{ij} × PTA_{ij}* (rather than *TRADE_{ij}*) in Tables 1 and 3.

TABLE 4. *Logit estimates of the effects of trade flows, GDP, regime type, alliances, contiguity, the distribution of capabilities, growth, hegemony, concentration, a major power member, and per capita GDP on MIDs within PTAs, 1950–85*

Variable	Model	
	(4.1)	(4.2)
<i>Intercept</i>	0.390 (0.26)	0.378 (0.29)
<i>DEM_L</i>	−0.005 (−0.22)	0.001 (0.03)
<i>DEM_H</i>	0.025 (1.06)	0.024 (1.00)
<i>GROWTH_L</i>	−0.057** (−3.05)	−0.058** (−3.05)
<i>ALLIES_{ij}</i>	0.466 (1.42)	0.524 (1.55)
<i>CONTIG_{ij}</i>	1.868** (3.02)	2.180** (3.55)
<i>CAPRATIO_{ij}</i>	0.0029 (1.41)	0.0034 (1.53)
<i>TRADE_{ij}</i>	-4.31×10^{-7} ** (−3.60)	-4.14×10^{-7} ** (−3.79)
<i>GDP_L</i>	8.76×10^{-9} ** (3.81)	8.93×10^{-9} ** (3.75)
<i>GDP_H</i>	6.22×10^{-10} (1.39)	4.66×10^{-10} (1.12)
<i>HEGEMONY</i>	−14.787** (−2.83)	−15.624** (−3.42)
<i>CONCEN_k</i>	−2.201* (−2.15)	−2.331* (−2.46)
<i>MAJPOW_k</i>	−0.293 (−0.52)	—
<i>PERCAP_L</i>	0.00008 (1.25)	—
<i>PERCAP_H</i>	−0.00002 (−0.37)	—
χ^2	187.62**	146.99**
Log likelihood	−340.98	−341.50
<i>N</i>	3,947	3,947

Note: Each model is estimated after including a natural spline function with three knots. Numbers in parentheses are asymptotic *z*-statistics computed using Huber standard errors.

***p* ≤ .01; two-tailed tests are conducted for all estimates.

**p* ≤ .05; two-tailed tests are conducted for all estimates.

in military conflicts. In addition, many preferential groupings create a forum for bargaining and negotiation that reduces tensions among participants, helps to resolve conflicts that do occur, and promotes the establishment of focal points that shape states' expectations and facilitate the identification of deviations from accepted norms.

Moreover, the tendency for preferential arrangements to inhibit disputes is likely to become more pronounced as trade flows rise. For PTA members that trade extensively, the future stream of gains from membership is likely to seem particularly large, thereby creating an especially potent deterrent to military disputes; and institutional mechanisms exist for resolving tensions that do emerge before open hostilities break out.

Our findings accord with these arguments. For states that do not belong to the same PTA, the flow of trade has only a weak impact on hostilities. For PTA members, however, rising commerce strongly reduces the likelihood of military conflict. Furthermore, parties to the same PTA are less prone to engage in military disputes than other states, an influence that grows increasingly large as the flow of trade expands. These results are at odds with the view that international trade has little systematic impact on hostilities¹¹³ and with the unqualified claim that increased trade reduces the prospect of military disputes.¹¹⁴ Instead, the results indicate that whether unfettered commerce promotes peace hinges largely on the institutional setting (or lack thereof) in which trade is conducted.¹¹⁵ As such, our findings indicate that the relationship between commerce and conflict is much more complex than most existing studies suggest.

Lately, the field of international relations has been marked by heated disagreement over whether international institutions dampen interstate conflict. Various observers have lamented the lack of systematic, empirical research bearing on this topic.¹¹⁶ Our results clearly pertain to only a small set of such institutions during the Cold War, an era that differed in important respects from other periods. Nonetheless, these findings shed doubt on the argument that international institutions have no effect on conflict.¹¹⁷ At the same time, however, the extent to which preferential commercial institutions inhibit military disputes varies considerably, depending on the extent of economic intercourse among participants, the size distribution of members, and other factors.

A remarkable rise in the number of PTAs has occurred during the last fifty years. At present, virtually all parties to the World Trade Organization are members of a preferential arrangement, and the Clinton administration has made their establishment and growth a foreign policy priority.¹¹⁸ The economic implications of these developments have been widely studied and fiercely debated, but analyses of their political implications have been lacking. Our results indicate that, especially if contemporary PTAs are characterized by extensive commercial ties among members, the current wave of regionalism is likely to augur well for promoting cooperation and inhibiting political disputes.

113. See, for example, Beck, Katz, and Tucker 1998; and Buzan 1984.

114. For example, Oneal and Russett 1997.

115. On this point, see Keohane 1990; and Stein 1993.

116. See Jervis 1998, 975; Keohane and Martin 1995, 46; and Mearsheimer 1994, 26.

117. Mearsheimer 1994.

118. WTO 1995.

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