Economic interdependence has been shown to reduce the occurrence of conflict within a dyad. This leads us to ask, “Does this dampening effect due to economic ties occur in a setting of increased animosity that we see between rivals?” The literature has demonstrated that democracy has a pacifying effect on rivalries; however, the effect of interdependence has been almost completely ignored. This paper addresses this gap in the literature by testing the effect of interdependence in the rivalry context. We seek to demonstrate that economic interdependence reduces the severity of the conflict that takes place within the rivalry. This is an important extension of both the liberal peace and rivalry literatures. To test our hypotheses we examine two measures of rivalry severity: we implement an unconstrained partial proportions ordinal logit model of the hostility level of the rivalry and we implement a negative binomial model of the battle deaths experienced in the rivalry. Our results offer support to our hypothesis that interdependence reduces the severity of conflict within the rivalry.

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Enduring conflict between states has been a basic characteristic of the state system since it emerged in Europe at the end of the Thirty Years War. The contest of power between polities has been a basic characteristic of human interaction at least since humans invented the art of living in cities and writing about their experiences. It is no surprise that this sort of militarized competition has been a major focus of research in the study of international conflict. The rivalry literature that has emerged from the study of enduring conflict relationships between states has contributed greatly to our understanding of how these conflict processes progress (or regress) over time as well as how the rivalry dynamic contributes to the likelihood of war between states.

Since the end of the Second World War, a second area of scholarship has focused on the degree to which economic interdependence has reduced the likelihood of conflict in the international system. The resurgence of complex interdependence in the postwar period has seen the emergence of a major effort to understand its effects on many aspects of international relations. A subset of this research has sought to understand the relationship between trade relations and conflict between states. The trade and conflict literature has framed a vibrant debate over the role of trade in the promotion or reduction of the occurrence of conflict.

While these two areas of study have contributed greatly to our understanding of international conflict, they have largely done so separate from each other. Most research involving trade and conflict in the rivalry context has focused on rivalry termination. To this point, no study has sought to examine the impact of interdependence on the severity of the rivalry: can interdependence lower the severity of rivalry relationships? In the pages that follow, we seek to bring these two research programs together to answer this question. We explore the role of trade in reducing the severity of an ongoing rivalry. In doing so, we seek to add to both the rivalry and trade and conflict research programs by demonstrating that trade has an ongoing effect on the behavior of states even once they have become embroiled in a rivalry. Even once states have shifted their relations to a state in which violent military competition is an expected part of the relationship trade still has a dampening effect on the severity of the conflicts within the rivalry.

**Rivals: Unlikely Trading Partners**

Rivalries are a special type of relationship in international relations. They represent a particular framework of interaction between states. This relationship is characterized by the following features. Rivalries are dyadic. Rivalries are reciprocal: each state perceives the other as a rival. Rivalries experience recurring militarized conflict between the states in the dyad. Rivals have an expectation that military action will be a normal feature of the relationship. These characteristics form the foundation of the rivalry relationship and are the context in which we seek to test our theory regarding the pacific effects of trade.

Rivalry is generally treated as a dyadic phenomenon, exiting between two states in competition with each other (Goertz and Diehl 1993). While it is possible for rivalries to exist between multiple states, these circumstances are historically relatively rare. In the modern state system there has been great power competition, but it has generally not be characterized by all states seeing all others as rivals. Rivalry has tended to follow a dyadic pattern. As a result, the bulk of the literature on rivalry treats the relationship as a dyadic one (Goertz and Diehl 2000).
The pressure of competition between the two states drives them into a relationship of increased hostility which fuels even more competition.

Rivalries are reciprocal in nature. Each state sees the other as a rival and acts accordingly. The rivalry process does not include “one-sided” rivalries; rivalries in which one state sees the other as a threat, but the other state does not see the first state in the same light. Venezuela under Hugo Chavez may rail constantly against the US and speak of its own role as a rival to the US in Latin America, even to the point of occasional threats of military action. The United States, for its part, largely ignores President Chavez and does not take the actions expected of a state that feels threatened.

The central defining character of the rivalry relationship is a state of recurring military conflict. Two states experience competition in their mutual relations over time with these relations becoming militarized over the course of this competition. Militarization of the relationship need not mean outright war, or that the process will inexorably lead to major war and the destruction of one or both of the parties (Goertz and Diehl 1993). Not every Rome has a Carthage. Rivalries are relationships are dominated by the recourse to military force, but they can end in any number of ways short of war. The end of the Cold War demonstrates that one side can pick up the ball and go home. Some exist for protracted periods of low level conflict. This variation in the severity of the militarized relationship is an important element in this study.

Goertz and Diehl (1993) set forth the basic standards for what constitutes a rivalry: a relationship in which both sides routinely resort to military means as a way to resolve conflicts of interest or to affect the status quo between states. This is most often operationalized using the Correlates of War Project’s Militarized Interstate Dispute (MID) Dataset (Jones, Bremer et al. 1996) by examining the number of MID’s taking place between two states in a limited period of time (Goertz and Diehl 1995). The frequent occurrence of MID’s characterizes the rivalry relationship; marking it as one in which military action is expected by both parties.

The dyadic and reciprocal nature of rivalries is thus important. This implies that each side is evaluating the other, focusing on the relationship between the two states. In short, both sides pay attention to the other and place their mutual relations among the important elements of national policy. This suggests that states are likely to be more focused on and aware of their relations with rivals than with other states. Relationships with a rival will have policy salience in the minds of political leaders.

Rivalries reflect a tendency of states to engage in acts of violence or threats of violence as a defining characteristic of the relationship. In this sense, the rivalry relationship is a fundamentally military one. Each state sees the other as more than a simple competitor. Each state sees the other as a threat. This threat perception creates the condition in which the recourse to violence is not just a matter of past relations, but it is also the expected form that future relations will take as well (Goertz and Diehl 1993). The expectation of military force is important. When each side perceives the other as threatening, this breeds mistrust and fear between the parties.

The rivalry relationship is they one that is characterized by mutual fear, mistrust, and violence. At first glance, this would suggest that trade relations will be far down the agenda of rival states. It is possible that such states may be concerned if they depend on a rival for a key strategic resource, but in most cases one would expect rivals focused on military competition to place mutual trade on the back burner. But is this necessarily so? Rivalry relationships have an expectation of present and future conflict. This conflict will be military in nature, but how we
define military in this context has an influence on how we see the range of policies that states may pursue.

The concept of rivalry is based on the presence of conflict between states, based primarily on the data from the MID dataset. The MID data records a range of hostile actions directed by one state at another, but not all such actions are equal. Not all MID’s involve the use of force, and even when a MID does involve the use of force, this does not mean open war. This data includes a range of actions from the threat of force to open warfare between the states. This leaves rivals significant room to maneuver within the context of this relationship.

Using the MID data to determine rivalry is a useful mechanism, but this wide range of events offers the potential for diverse rivalry relationships. The repeated threat of force is not the same outcome as repeated use of military force. Repeated border skirmishes are not the same as major war between states. Rivalry relationships can thus cover a wide range of actual behaviors within the definition of “military” action. This wide range of action opens up the potential for trade to have an impact on the relationship between states. If rivalry reflects such a diverse range of behaviors, does interdependence affect which behaviors are selected?

The diversity of rivalry relationships may make rivals especially interesting precisely because you would expect to see only a limited role of trade in the relationship. If trade has a significant role in reducing conflict between states that expect to engage in repeated military actions against each other, this is an important addition to our understanding of conflict processes. Rivals may make unlikely trading partners, but they do trade. If this affects how the rivalry plays out, this is powerful evidence of the pacific effects of trade relations.

The complexity of the rivalry relationship has led to a wide ranging research program seeking to understand it. This literature seeks to explain many aspects of the rivalry relationship to shed light on how the rivalry process proceeds and how it can be managed. The literature has explored the appropriate games to apply to the rivalry relationship (Maoz and Mor 1998), the role and effect of domestic regime type (Hensel 1999; Hensel, Goertz et al. 2000; Reed and Clark 2002), and the role of mediation in the termination of rivalries (Bercovitch and Diehl 1997; Greig 2001).

Goertz and Diehl (2000) offer a comprehensive survey of the rivalry literature. The authors focus on a range of approaches to rivalry and the future direction of rivalry research. Space prevents a systematic review of this complex literature, but among the key areas of future research they identify is the variation between rivalries. The variation between rivalries is an important part of an attempt to understand how the rivalry process functions in practice.

Significant work in this regard has been done in the area of rivalry termination (Bennett 1998). The explorations of the elements that contribute to the end of the rivalry are an important part of understanding the process. Understanding why some rivalries seem to just fizzle out while others explode and end in war remains an important area of rivalry research. Bennett (1998) attempts to integrate a number of theories of rivalry termination in order to consolidate them into a broad approach to the question of duration and in doing so he points out the importance of domestic political elements in the rivalry process.

Hensel, et al. (2000) explores the role of democracy in the rivalry process. They demonstrate that democratic domestic government reduces the duration of the rivalry. Joint democracy hastens the end of the rivalry (Hensel, Goertz et al. 2000). In the context of the democratic peace we see that some of the variation across rivalries can be explained by factors that have been observed to have an impact in the wider conflict literature. The extension of the
democratic peace to rivalries implies that other factors that reduce the overall level of conflict may translate similarly into the rivalry context.

The rivalry literature has thus explored a wide range of impacts on the rivalry process, but oddly a key area has been overlooked in past research: The impact of economic interdependence on the severity of rivalries. Past research has examined the role of various factors in rivalry termination, and explored the impact of domestic political institutions on the duration of rivalries, but the influence of economics on the intensity of the rivalry has not been given much attention.

Theory

Exploring the severity of the rivalry is an important addition to the existing body of rivalry research, furthering our understanding of how variation between rivalries can be explained. Rivalry behavior includes a wide range of activity that leaves room for significant variation. Exploring the impact of economic interdependence on this variation will expand out knowledge of the factors contributing to the diversity of rivalry relationships. The rivalry context also allows us to examine how economic relationships influence relationships that we might expect to be relatively immune to the influence of interdependence. At first glance rivalry relationships, dominated by the present and expected future military conflict should be among the least likely contexts in which economic factors would have a significant impact. Upon further exploration, however, it is apparent that the rivalry context is subject to the same basic influences regarding the cost of lost trade that affect other conflict relationships.

Since the end of the Second World War interdependence has bound states together in an increasingly dense web of economic relationships. In a world of growing economic ties, the cost of conflict between interdependent states has risen significantly. The costs of conflict to both states are higher when each state is dependent on the other. This has led many to argue that economic interdependence has a pacific effect on military conflict between states (Oneal and Russett 1999; Hegre 2000; Anderton and Carter 2001; Gartzke and Li 2003). Others argue that the combination of democracy and interdependence is responsible (Oneal and Russett 1999). Still others argue that the relationship is more complex than it appears and that it is possible for trade to increase the likelihood of conflict (Barbieri 2002). In general these arguments link the increased cost (economic and otherwise) of conflict to the desire on the part of political leaders to avoid conflict.

As states become dependent on other states for economic success, this increases the likelihood that national economies will be disrupted by international events, especially militarized conflict. Even low level conflict can create significant disruptions of national economies if the conflict takes place in strategically important areas. We observe this frequently as the oil price spikes at the mere threat of violence in key oil producing regions. As the density of these trade and economic networks increases, more and more states find themselves dependent on other states, including those who may be rivals or potential rivals. In the context of rivalry, states remain dependent on trade to promote their national economies, but the trade relations with a rival will create a serious risk to the security interests of a state engaged in a rivalry.

The logic of the liberal peace implies that the costs of conflict deter interdependent states from engaging in militarized conflict. States pay a cost in lost trade. Domestic interest groups will punish leaders that harm the economy. Factors such as these discourage violent conflict
with trading partners under normal circumstances. In examining rivalries, however, we are not looking at normal circumstances. Rivals already assume that military means will be used and thus expect disruptions of their economic relationships. The question facing rivals is one of which military means will be used. A central question for this paper is whether or not the cost of lost trade influences this decision.

Little research has been done to examine the impact of interdependence on the relations between states that already are engaged in a militarized relationship. In principle, the basic logic of economic loss still applies even after a first recourse to force or the threat of force has been taken. Trade does not entirely cease once conflicts begin. Further, the expectation of future trade remains even in the face of current conflict. Economic interdependence can be lessened or disrupted in conflict, but it does not cease to exist. If states are economically linked, they should still be deterred from actions that will impose higher costs on the state. This included the losses of trade due to conflict. This is of particular interest as the rivalry relationship is one that has already come to accept violence as a normal part of relations, but in many cases economic relations continue in spite of this expectation.

Can economic interconnectedness lower the cost in blood of relationships that have already become militarized? The logic of the liberal peace can be applied in the rivalry context to the level of intensity of the violence used by the two states. Higher levels of violence lead to greater disruptions of the economic relationship, generating higher costs. A threat of force creates uncertainty and may increase the cost of doing business by generating a risk premium, but it does not create significant physical disruption of the trade network. Threats also create fewer ripple effects in the wider network of economic relationships as other partners may hedge against risk, but will be reluctant to abandon economic relationships entirely unless absolutely necessary due to the high costs associated with such changes. Thus the economic costs of a threat are relatively low when compared to the costs of attacks on the military forces or territory of another state.

The rivalry framework is founded on the MID data and thus includes a wide range of behaviors. The cost of conflict to the rivals should follow the same logic as the broader liberal peace: greater trade leads to a greater cost of conflict. As costs rise, the incentives to escalate to higher levels of severity decrease. This creates a powerful incentive to keep the intensity of the rivalry low, leading to lower levels of conflict within rivalries in which the parties have large trade relationships.

The trade relationships examined in the liberal peace are generally measured two ways. The first is to look at the total volume of trade. This suggests that it is the volume of trade that affects decisions of political leaders through the absolute level of loss. As trade volume increases, more domestic interests will feel the disruptions caused by conflict and the greater the domestic opposition to such conflict will be. The alternative argument is that it is not the actual volume of trade, but the degree of dependence of the economy as a whole. In this latter logic, it is the percentage of the economy dependent on trade that matters. There is some empirical evidence for both approaches in the context of the liberal peace and the same logic should apply in the context of rivalry.

This logic suggests two potential hypotheses that can be tested from existing data in the rivalry context.

- Hypothesis 1: As trade volume increases, the intensity of rivalries will decrease.
Hypothesis 2: As the dependence of the state’s economy on the trade relationship increases the intensity of rivalry will decrease.

Data and Methods

To test our hypothesis we construct a dataset of all rivalries in the post World War Two period based on the Goertz and Diehl rivalry data. This data is merged with data relating to the interstate disputes that take place in the context of the rivalry. The resulting dataset includes information regarding the militarized interstate dispute occurrences for all the rivalries in the period. We include data from the Militarized Interstate Dispute dataset (version 3) regarding hostility level and battle deaths to measure the severity of the rivalry (Ghosn and Bennett 2003). Trade data for each dyad comes from Kristian Gleditch’s Expanded Trade and GDP database.1 Data on democracy is taken from the Polity Project. Data for contiguity, capability, and other related controls comes from the relevant Correlates of War Project datasets.2 The resulting dataset contains 9,468 dyad pairs representing militarized interstate disputes taking place within framework of 533 rivalries. Summary statistics for the variables in the dataset can be found in Table 1.

We include a number of control variables in our models in order to account for alternative explanations for dispute severity within the rivalry. We include democracy to account for the potential pacifying effect of democratic domestic institutions as has been repeatedly demonstrated in the democratic peace literature. Democracy data is taken from the Polity Project, version IV (Marshall and Jaggers 2000). Democracy data uses the standard scaling of -10 as most autocratic and +10 as most democratic. We score the democracy of the dyad by taking the weakest link approach and using the lower of the two democracy scores in the dyad to reflect dyadic democracy.

We control for the relative power of the rivals by using the COW Project’s National Material Capabilities Dataset (version 3) to generate a capability ratio (Singer, Bremer et al. 1972). This is calculated by taking the absolute value of the difference of the two states capability divided by the sum of their capability scores. We include contiguity data from the COW Project Direct Contiguity Dataset (Stinnett, Tir et al. 2002) and a dummy variable for Major Power status.3 These account for the power relations between the two states. Major Powers are more capable of both making credible threats and in carrying them out. Further familiarity often breeds contempt and contiguity is a frequent predictor of conflict. These values are included in order to account for the effects of these typical factors in the conflict data.

Our economic data comes from Kristian Gleditsch’s Expanded Trade and GDP dataset (Gleditsch 2002). This data provides data on imports and exports for a wide range of countries in the period covered in our analysis. From this data we calculate two measures of trade relations that will be used in our analysis of interdependence. The first is simply a total trade

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1 Recently some questions have arisen regarding the use of various trade datasets in analyses such as this. At the time of writing we have only preliminary results from using the COW Trade dataset and Penn World Tables GDP data, but these results suggest that there is no substantive difference in the results.

2 Actual dataset construction was done using EUGene to generate a skeleton dataset that included the relevant available data from within the package. The remaining data was merged onto this core dataset.

3 The dataset was constructed using EUGene (Bennett and Stam 2000). Variables for contiguity, major power, and CINC scores were included from the software in the construction of the dataset.
volume measure that is the sum of the trade between the two states. We assume that states care more about what comes into a state than what goes out and thus the import data may be marginally more accurate than export data. As such we use reported imports by each state from the other as the source of our summed numbers. In the models reported we use logged measure of the total trade as the impact of each additional dollar of trade will likely diminish as trade volume rises. We also calculate a trade dependence variable giving the total trade as a percentage of the countries’ GDP. In this case, we take the higher of the two states level of dependence as the dyadic dependence value. Dyadic dependence thus has a possible range of values from zero to one and represents the dependence level of the most dependent state.

The goal of the project is to test the role of interdependence on the severity of the military conflict within the rivalry, and this presents some potential issues in terms of measurement. The first is that the available data on severity that is included in the relevant datasets is not without its problems. In this paper we offer two analyses using separate measures of hostility: 1) A generalized ordered logit model of the hostility level of the MID’s in the dyad and 2) A negative binomial model of the number of battle deaths in the MID’s. Each represents a different means of measuring the relative severity of the conflict that takes place within the rivalry. Each reflects a different mechanism for data collection and if the findings from both models confirm our hypothesis, we can have greater confidence in the results.

Hostility level is determined by taking the higher of the dyadic hostility levels reported in the MID dataset. Hostility level is a categorical variable that represents the highest level of force used in the dispute. The levels are coded to represent a core set of possible actions within the context of the use or threat of force. The categories are as follows:

1) No militarized action. This represents a relationship where no action was taken at all. Due to the nature of the rivalry data, this value does not appear in our dataset. Some force or threat of force is necessary to enter into our analysis

2) Threat to use force. This is a threat by one state to use force against another if the threatened state does not comply with the demands of the threatening state.

3) Display use of force. This is a “show of force” in which military forces are moved or mobilized, but do not take action against the forces or territory of the other state.

4) Use of force. This is the use of force short of war. This can be a wide range of actions, but the key is that these actions do not result in sufficiently large numbers of battle deaths to be considered a war.

5) War. This is the highest level of force and represents the use of violence in which at least one thousand battle deaths take place (Jones, Bremer et al. 1996; Ghosn and Bennett 2003).

Hostility is thus an ordered categorical variable where higher values represent escalations to higher levels of force and is thus suited to the ordinal logit model. One drawback with such data is that standard ordinal logit models impose the assumption of proportional odds

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1 The authors have run comparable models with other measures such as fatality level and have found that the results are similar across a range of specifications. This paper examines these two measures in the interest of brevity.
across categories.\(^5\) This imposes a limit on the model that is often not realistic as it is likely that the impact of variables may vary across categories. To account for this we estimate an unconstrained partial proportions (UPP) version of the model to account for potential violations of the proportional odds assumption in standard ordered logit models.\(^6\)

Interpretation of the UPP model can be somewhat confusing at first glance for those who are unfamiliar with it. The UPP model is essentially a series of binary logit models estimated simultaneously calculating the log odds of a response greater than each category. In our data this results in the simultaneous estimation of models that compare the likelihood that an event will occur at hostility level 2 compared with levels greater than 2, the likelihood that an event will occur at hostility level 2 or 3 as compared with levels greater than 3 and so on. The resulting coefficients are thus interpreted as expressing the impact of a change in the value of the variable on the likelihood that the observed category will be higher or lower than the category for which the estimates are calculated. (Williams 2006; Powers and Xie 2008)

Not all coefficients vary across the values of hostility level. Our UPP estimates found that the proportional odds assumption is only violated for some of the variables. In the cases of the indicated variables the coefficients vary across values of hostility. For the other variables, the coefficients remain constant across the values of hostility.

The models focused on battle deaths take their data from the Goertz and Diehl Rivalry data (Klein, Goertz et al. 2006). This includes the number of deaths suffered by both sides in the rivalry. To test the effect of interdependence on battle deaths we use a negative binomial regression model with clustering on rivalry.\(^7\)

Results

Overall the results support our hypothesis that greater trade volume reduces the severity of the rivalry. This result is consistent across both of our measures of severity. The results of the UPP model of interdependence on hostility level are found in Table 2. The volume of trade within the dyad lowers the likelihood of higher category scores and is statistically significant across all values of hostility level. This result is consistent and does not vary across the values of hostility level.\(^8\)

Dyadic dependence is somewhat more complex. The statistical significance and the impact of dependence both vary across values of hostility level. At the lowest level of hostility, dyadic dependence is statistically significant and positive indicating that rising levels of dependence increase the likelihood that the dyad would fall in a category above 2. At higher

\(^5\) The proportional odds assumption is alternatively labeled the parallel regression or parallel lines assumption. In any case it assumes that the impacts of the explanatory variables are the same across the categories. This is often not the case and can result in biased outcomes.

\(^6\) Specifically this was implemented using the gologit2 command in STATA (Williams, 2006). The authors applied a Brant test to comparable models using the ologit command and confirmed that the models do include variables for which the proportional odds assumption is not appropriate. This finding was confirmed with the equivalent procedures under the gologit2 models. In the case of our data the proportional odds assumption does not hold and the unconstrained partial proportions approach is the appropriate solution.

\(^7\) We elected to use the negative binomial model due to the overdispersion of the count data on battle deaths. The overdispersion of the data makes the poisson model biased in these cases.

\(^8\) As mentioned earlier, we tested the proportional odds assumption for all of our variables. Trade volume does not violate proportional odds and thus has a consistent impact across the levels of hostility.
levels of hostility, however, the dependence effect ceases to be significant. The effect of dependence appears to matter only in shifting out of the lowest category of hostility into a higher category.

Table 3 displays the marginal effects of these variables. Like the coefficients, the marginal effects are slightly unusual in the UPP model. The marginal effects indicate the change in probability that a dyad will be in each category for each unit change in the variable in questions. This reflects a change from the baseline probability that a dyad will be in each category. To help clarify these values, we list the baseline probabilities that a dyad will be in each category followed by the marginal effects of each variable at each category of hostility.9

Examining predicted probabilities demonstrates the substantive impact of our key variables. The probability that a dyad will appear in the lowest two categories of severity rises with each additional unit of trade. The likelihood that a dyad will appear in the highest two categories of severity decreases as the value of trade rises, showing that higher trade volume is associated with a reduced likelihood of appearing in the most severe categories. Dyadic dependence is only significant at the lowest level of severity, but in this case, the likelihood that a state with high dependence will appear in this category is reduced. This implies that trade dependence increases the likelihood that a dyad will appear in a category other than 2, but after that, the impact is not statistically significant.

The control variables largely yield the expected results. Democracy reduces the likelihood of conflict and is statistically significant. The proportional odds assumption also holds in the case of democracy, implying that its impact is consistent across all levels of hostility. Major power status and the capability ratios performed as expected with higher levels increasing the likelihood that dyads will appear in higher categories of severity. Interestingly they are only statistically significant at the lowest two categories. Contiguity did not perform as expected in that it is not statistically significant at the lower levels of conflict. In the final escalation from violence short of war to war, however, contiguity increases the likelihood that states will take the plunge into the most severe level of conflict.

The UPP model thus largely supports our hypothesis that increased trade volume will lead to reduced severity, but it undermines the hypothesis that trade dependence will reduce conflict overall.

Hostility level is a useful mechanism for categorizing MID’S, but it could be argued that it an imperfect mechanism for testing severity. To strengthen the veracity of our results, we also subject our hypotheses to a second test, using a different measure of severity: battle deaths.

We estimate a negative binomial regression model using battle deaths (in thousands) as the dependent variable. These results provide strong support for both of our hypotheses. The coefficient for overall trade volume is statistically significant and negative, providing support for our first hypothesis. The coefficient for trade dependence is also statistically significant and negative in this model. This provides support for our second hypothesis. When taking battle deaths as the measure of severity, both overall trade volume and trade dependence reduce the severity of the rivalry.

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9 As points of clarification, the model results in Table 2 reflect the series of estimates comparing the category with categories of “higher” value and thus hostility level 5 does not appear (there is no higher value to compare it to). In the marginal effects displayed in Table 3, the marginal effects indicate the change in the likelihood that a dyad will be found in each category based on values of each of the variables. Therefore a column appears for hostility level 5.
Figure 1 represents the substantive effects of the impact of trade. The figure is a scatter plot of the predicted number of battle deaths in each dyad. The number of predicted deaths falls off as trade increases.

Our control variables generally yield interesting results. Democracy performs as expected, with a statistically significant and negative result. Higher levels of democracy reduce the number of expected battle deaths. Major power status increases the number of battle deaths, and expected result given that the major powers are capable both of deploying more troops and inflicting greater damage on opponents. Interestingly capability ratio and contiguity were not statistically significant in this model.\(^{10}\)

Overall the results support our hypothesis that greater trade volume reduces the severity of the rivalry. This result is consistent across both of our measures of severity. The results regarding dependence are mixed. The UPP results show that dependence increases the probability of escalation beyond the lowest hostility level. The negative binomial results show a negative and significant impact on the predicted number of battle deaths as dependence rises. The models consistently show support for the effect of trade volume, but further research is needed to explore the role of dependence.

**Conclusions**

This paper set out to solve a relatively simple puzzle: Does economic interdependence reduce the severity of conflict between rivals? Our analysis shows strong support for the pacific effect of trade volume and more limited support for the effect of trade dependence. Interdependent rivals are less likely to engage in the most severe forms of militarized competition. This paper adds to several strands of existing research. Foremost we add to the understanding of the rivalry process by demonstrating that economic interdependence, a previously ignored aspect of rivalry, does have an effect on how the rivalry unfolds in practice. This is important as it shows that even in the context of relationships where both states assume a militarized dimension to their relations; trade still reduces the damage that is done in the process.

This article also contributes indirectly to the literature on trade and conflict. We clearly demonstrate that increased trade flows reduce how far states will escalate conflict, but our findings with regards to the effect of trade dependence on hostility level suggest that trade can escalate low level conflict. This suggests the possibility that the trade-conflict relationship may vary based on both dependence and volume at different rates in the context of different relationships between states. Rivals may be more prone to escalation due to conflicts arising from trade, but they are less likely to “go all the way” to open war.

This paper also offers a hopeful thought about the role of globalization and economic interdependence. Growing networks of trade will further increase the volume of trade between states. If this has the effect of reducing the tendency of states so escalate conflicts, then this is further evidence that states embracing global markets can reduce the levels of violent conflict, even in cases where states are rivals. While optimistic overall, the findings regarding trade dependence do offer a more mixed picture.

This article points the way to a range of future research both in and out of the rivalry context. The pacific effect of trade volume demonstrated here can add to existing research on

\(^{10}\) For those who are wondering about overall population size, the model was estimated with population as a control and population was consistently not significant in contributing to the number of battle deaths.
the rivalry process, notably the literature on rivalry termination. Further, it adds an additional
dimension to existing research to expand rivalry beyond the military realm. The inconsistencies
in the findings on dependence also point to the potential of further exploration of the complex
interactions of economic forces at the international and at the domestic level.
### Table 1: Summary Statistics

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<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
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<th>Max</th>
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<td>.7181717</td>
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<td>5</td>
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<td>Battle Deaths (thousands)</td>
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<td>1867.208</td>
<td>.2</td>
<td>11000</td>
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<td>-10</td>
<td>10</td>
</tr>
<tr>
<td>Capability Ratio</td>
<td>9468</td>
<td>1.957672</td>
<td>1.598016</td>
<td>.0003666</td>
<td>9.546325</td>
</tr>
<tr>
<td>Contiguity</td>
<td>9468</td>
<td>3.495458</td>
<td>2.36736</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>

### Table 2: Unconstrained Partial Proportions Ordinal Logit Coefficients for the Influence of Interdependence on Hostility Level

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hostility &gt; 2</th>
<th></th>
<th>Hostility &gt; 3</th>
<th></th>
<th>Hostility &gt; 4</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>Robust SE</td>
<td>Coefficient</td>
<td>Robust SE</td>
<td>Coefficient</td>
<td>Robust SE</td>
</tr>
<tr>
<td>Dyadic Trade (logged value)</td>
<td>-.201**</td>
<td>.031</td>
<td>-.201**</td>
<td>.031</td>
<td>-.201**</td>
<td>.031</td>
</tr>
<tr>
<td>Dyadic Dependence†</td>
<td>258.149**</td>
<td>92.544</td>
<td>41.926</td>
<td>41.330</td>
<td>-309.869</td>
<td>188.667</td>
</tr>
<tr>
<td>Dyadic Democracy</td>
<td>-.061**</td>
<td>.013</td>
<td>-.061**</td>
<td>.013</td>
<td>-.061**</td>
<td>.013</td>
</tr>
<tr>
<td>Dyad Major Power†</td>
<td>2.129**</td>
<td>.543</td>
<td>.461*</td>
<td>.213</td>
<td>-.003</td>
<td>.309</td>
</tr>
<tr>
<td>Capability Ratio (logged value) †</td>
<td>.231**</td>
<td>.085</td>
<td>.122*</td>
<td>.052</td>
<td>-.088</td>
<td>.077</td>
</tr>
<tr>
<td>Contiguity†</td>
<td>.027</td>
<td>.053</td>
<td>.031</td>
<td>.029</td>
<td>.307**</td>
<td>.047</td>
</tr>
<tr>
<td>Constant</td>
<td>3.509</td>
<td>1.414</td>
<td>2.537</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Log Pseudolikelihood: -2864.826
N: 3272
Model $\chi^2$: 130.02**

Results are generalized ordered logit coefficients with robust standard errors clustered on rivalry.
* significant at the .05 level  ** significant at the .01 level  † unconstrained proportional odds estimate
Table 3: Estimated Marginal Effects on Baseline Hostility Level Probabilities

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hostility Level = 2</th>
<th>Hostility Level = 3</th>
<th>Hostility Level = 4</th>
<th>Hostility Level = 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline probability dyad will experience a MID at this level</td>
<td>.015</td>
<td>.149</td>
<td>.715</td>
<td>.121</td>
</tr>
<tr>
<td>Dyadic Trade (logged value)</td>
<td>.003</td>
<td>.025</td>
<td>-.006</td>
<td>-.021</td>
</tr>
<tr>
<td>Dyadic Dependence †</td>
<td>-.3922</td>
<td>-1.836</td>
<td>38.616</td>
<td>-32.857</td>
</tr>
<tr>
<td>Dyadic Democracy</td>
<td>.0009</td>
<td>.007</td>
<td>-.002</td>
<td>-.006</td>
</tr>
<tr>
<td>Dyad Major Power †</td>
<td>-.016</td>
<td>-.039</td>
<td>.056</td>
<td>-.0003</td>
</tr>
<tr>
<td>Capability Ratio (logged value) †</td>
<td>-.004</td>
<td>-.013</td>
<td>.026</td>
<td>-.009</td>
</tr>
<tr>
<td>Contiguity †</td>
<td>-.0004</td>
<td>-.004</td>
<td>-.028</td>
<td>.033</td>
</tr>
</tbody>
</table>

Results are the change in probability that a dyad will fall into this category for each one unit change in the variable listed.
Table 4: Negative Binomial Coefficient Estimates for the Impact of Trade on Conflict Deaths in Rivalry

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Robust Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyadic Trade (logged value)</td>
<td>-.319**</td>
<td>.068</td>
</tr>
<tr>
<td>Dyadic Dependence</td>
<td>-540.273*</td>
<td>227.593</td>
</tr>
<tr>
<td>Dyadic Democracy</td>
<td>-.232**</td>
<td>.089</td>
</tr>
<tr>
<td>Dyad Major Power</td>
<td>.856**</td>
<td>.285</td>
</tr>
<tr>
<td>Capability Ratio (logged value)</td>
<td>-.069</td>
<td>.074</td>
</tr>
<tr>
<td>Contiguity</td>
<td>.115</td>
<td>.089</td>
</tr>
<tr>
<td>Constant</td>
<td>3.897</td>
<td></td>
</tr>
<tr>
<td>Log Pseudolikelihood</td>
<td>-1986.077</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>291</td>
<td></td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>84.51**</td>
<td></td>
</tr>
</tbody>
</table>

Results are negative binomial regression coefficients clustered on rivalry with robust standard errors
* significant at the .05 level  ** significant at the .01 level

Figure 1: Predicted Battle Deaths
Works Cited


