

Political Shocks, Evolution, and the Origins of Interstate Rivalry

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Abstract: There are two general conceptions of the development of interstate rivalry. The "basic rivalry level" (BRL) or "punctuated equilibrium" approach postulates that adversaries "lock in" to rivalries quickly, generally on the basis of political shocks or other preexisting factors in the international environment. The alternative "evolutionary" approach argues that rivalries develop more gradually over time, with two adversaries moving toward or away from rivalry in response to their previous interactions. Research attempting to compare these two models has focused on their implications for the severity of militarized conflict, but the most appropriate test involves the initial origins of rivalries. We examine factors that each model suggests as sources of rivalry, both in aggregated analyses and in split analyses attempting to identify multiple patterns. Our results suggest that different type of dyads do follow different patterns of development. Major power status and the presence of political shocks significantly impact how rivalries progress within dyads, with the punctuated equilibrium model being more useful in such situations and the evolutionary model in other situations where each factor is absent. We conclude by discussing implications for future research.

Political Shocks, Evolution, and the Origins of Interstate Rivalry

Two theoretical perspectives have been proposed to account for the development of militarized interstate rivalries. Goertz and Diehl's "Basic Rivalry Level" (BRL) approach is an essentially static approach that treats an enduring rivalry as an enduring rivalry from the first conflictual interaction between two eventual rival states. This means that the conflict behavior of rival states should remain relatively stable for the duration of the rivalry. In contrast, Hensel's evolutionary approach treats rivalries as evolving and moving through stages, with events in earlier phases of a rivalry affecting the later development of the rivalry.

A reasonable case can be made for each approach. In some cases, rivalries appear to have emerged very quickly, with the rival states behaving like advanced or enduring rivals from the beginning of their relationship. An example is the rivalry between India and Pakistan, which began shortly after independence and does not appear to have been accompanied by reasonable expectations of peaceful accommodation short of full-fledged militarized rivalry. Other rivalries appear to come into being over time, with initial distrust being replaced by growing hostility and finally feelings of long-term rivalry. An example is the rivalry between the United States and the Soviet Union, which grew out of years of distrust after the Russian Revolution (and the associated allied intervention), and featured increasing feelings of rivalry from 1945-1950 as successive crises emerged over Iran, Turkey, Berlin, and other issues. The plausibility of both explanations for rivalry raises the question of why different rivalries exhibit different patterns of development.

This paper attempts to determine which explanation for rivalry does a better job of accounting for the origins of rivalry. We begin by discussing each model's expectations about the origins of rivalry, developing general hypotheses from each model separately and then focusing on the possibility of multiple patterns holding for different situations. Our empirical analyses suggest that factors from each model help to explain patterns of rivalry emergence, which is consistent with past research on each model separately. Importantly, though, the relative value of each model varies significantly across situations. The BRL model is most accurate for major power dyads and when there are political shocks, while the evolutionary model is much more useful in cases that develop in the absence of political shock and between minor powers and mixed dyads. We conclude by discussing the implications of our work for

future research.

Accounting for the Origins of Interstate Rivalry

A growing body of research suggests the importance of enduring rivalries, or pairs of states engaged in protracted militarized competition, as sources of interstate conflict. Existing research has highlighted the propensity of rival states to become involved in militarized disputes, crises, and wars, and has shown that rivals account for the majority of all interstate conflict (e.g., Goertz and Diehl 1998, 2000; Hensel 1998, 1999). Given the observed empirical importance of rivalry, it is perhaps surprising that little effort has been devoted to the question of how rivalries come into being. The underlying process that creates rivalries is one of the most interesting questions. Without understanding which factors contribute to the development of a rivalry, the true importance of the concept cannot be appreciated.

Two basic models have been suggested in the academic literature on rivalries: Goertz and Diehl's "punctuated equilibrium" or "basic rivalry level" model and Hensel's "evolutionary" model. Surprisingly, though, these two models have never been compared head-to-head with regard to the development of rivalry. The goal of this paper is to determine the extent to which each model increases our understanding of the origins of rivalries.

Three groups of hypotheses are developed. First, hypotheses are drawn from Goertz and Diehl's "punctuated equilibrium" model, focusing on structural factors that promote rivalry regardless of the early interactions between two states. Second, hypotheses are drawn from Hensel's "evolutionary" model, focusing on the impact of interactions between two states regardless of the background conditions that might be thought to generate rivalry. Finally, hypotheses are generated on the possibility of multiple patterns of rivalry, attempting to determine whether both the BRL and evolutionary models are useful in specific situations. There is little reason to believe that either model will account for the origin of all rivalries, and there may be theoretically interesting situations in which one or the other model is likely to be most useful.

The Basic Rivalry Level (BRL) or Punctuated Equilibrium Model

Goertz and Diehl's (1998, 2000) "Basic Rivalry Level" (BRL) approach is a largely static approach that sees enduring rivalry as largely determined by structural or other factors. Under

this approach, rivalry is seen as a major disruption of normal day-to-day relations between states, and requires a dramatic change in the environment -- a "political shock" -- to begin or to end. This description is similar to the biological concept of punctuated equilibrium, where the evolution of species is characterized by long periods with little or no change followed by dramatic change following a "shock" or change in the environment.

Under Goertz and Diehl's punctuated equilibrium or BRL approach, any given dyadic relationship has a "basic rivalry level," essentially an average level of hostility or "normal relations range" for the relationship. Rival adversaries are said to "lock in" to their basic rivalry level early in their relationship, setting the tone for the level of conflict in their overall relationship; their subsequent relations will then fluctuate randomly around that level. The differences between enduring rivals and other dyads, then, should be apparent from the very beginning of a rivalry relationship. The factors that separate enduring rivals from other adversaries should be apparent at the onset of the rivalry relationship, and should primarily result from already-existing factors such as the political shock(s) that set the rivalry in motion or structural conditions characterizing the dyad or the international system.

Specific Hypotheses

While Goertz and Diehl's (1995, Diehl and Goertz 2000) empirical analyses focus on political shocks as sources of rivalry under their model, a case could also be made for major power status being a structural source of rivalry, which is much more consistent with their basic rivalry level approach than with the more behavioral focus of the evolutionary approach. A sizable literature asserts that relations among major powers are qualitatively different from relations among minor powers in the interstate system, or relations between major and minor powers. Waltz (1979: 72-73), for example, argues that the story and the theory of international politics is written in terms of the great powers, and that the fate of the minor powers in the international system is largely tied to actions of the great powers. Indeed, Waltz (1979: 73) goes so far as to argue that a general theory of international politics -- based as it is (and must be) on the great powers -- only applies to interactions among minor powers "insofar as their interactions are insulated from the intervention of the great powers of the system."

Major powers are said to differ from minor powers in many ways, ranging from goals or interests and capability levels to the acceptability and expectations concerning state behavior and

the impact of state behavior on other actors (Singer, Bremer, and Stuckey 1972; Bremer 1980; Gochman and Maoz 1984). For these reasons, almost all international relations theorists argue that major powers are more than just minor powers writ large (Gochman and Maoz 1984). As a result of these differences -- for example, because great powers typically possess the capabilities to interact with distant states and because the great powers have traditionally played the role of custodians of international order -- Gochman and Maoz suggest that major powers should be more conflict-prone overall than other types of states. Similarly, Thompson (1995: 202) argues that rivalries will be more likely to occur between major powers, and that rivalries between minor powers should be expected to be less frequent and less intense.

The results of past empirical analyses on the differences between major and minor power adversaries are somewhat mixed. Bremer (1992) finds that dyads including at least one major power are much more war-prone than minor power dyads, echoing an earlier state-level finding that major powers are more conflict-prone than minor powers (Bremer 1980; Gochman and Maoz 1984). Yet Leng (1993) finds that crises between minor powers and major-minor power crises are much more war-prone than crises between major powers, apparently because major powers are more skilled or more experienced at conflict management.

With regard to rivalry more specifically, Wayman and Jones (1991) and Bennett (1996) note that major-major and minor-minor power relationships account for the majority of all rivalries. The twenty-eight rivalries identified by Wayman and Jones include seven rivalries between two major powers, fifteen between two minor powers, and only six between a major power and a minor power. Similarly, Bennett's thirty-four rivalries include nine rivalries between two major powers, eighteen rivalries between two minor powers, and only seven between a major power and a minor power. Although this observation does not allow us to compare the overall conflict propensities of states, because these studies do not include conflictual relationships below the level of enduring rivalry, it does suggest that states of highly unequal power status are unlikely to become rivals. And given the much smaller number of major powers than minor powers in the international system at any point in time, the relatively large proportion of enduring rivalries in these studies involving only major powers suggests that any given major power dyad may be much more rivalry-prone than any given minor power dyad.

Beyond major power status, the centerpiece of the punctuated equilibrium model as described by Goertz and Diehl is the impact of political shocks, so we must consider the impact

of several such shocks as possible sources of rivalry. One particularly interesting shock is the political independence of one or both states in a dyad. The emergence of new states should be expected to increase the likelihood of a rivalry developing. Newly independent states may make (or be the target of) territorial claims or upset the local status quo in other ways, possibly triggering disputes between the new states and their neighbors -- potentially leading to the development of rivalries. Maoz (1989), for example, demonstrated that states that come into existence through violent conflict are more likely to be involved in future interstate conflict, which Goertz and Diehl would regard as starting down the path to rivalry. These are the types of shocks that Goertz and Diehl's BRL model suggest should provide the opportunity for the emergence of international conflict; Goertz and Diehl (1995) note that 45.5 percent of all enduring rivalries in their study began within a decade of an independence shock in one or both states in the dyad..

Another political shock worth considering involves a shock to the entire international system, rather than to an individual state or dyad. Diehl and Goertz (2000; Goertz and Diehl 1995) argue that some shocks such as world wars transform the international system. This system transformation can wipe away existing rivalry patterns and create opportunities for new rivalries to emerge. Goertz and Diehl point to the end of World War II as providing the opportunity for the U.S.-U.S.S.R. rivalry, as well as for the numerous rivalries among states that emerged as newly independent in the first postwar decade; Goertz and Diehl (1995) find that 28.9 percent of all enduring rivalries began within ten years of one of the world wars. We thus consider world wars as a potential system-wide political shock, in addition to the more dyadic focus of studying the shock of recent independence (as discussed above).

Hypothesis 1 (BRL Approach): *Rivalries develop primarily in response to conditions in the international environment, rather than through changes in the relationships among potential adversary nation-states.*

Hypothesis 1A: *Enduring rivalries are more likely to develop between two major powers than between two minor powers or a major and a minor power.*

Hypothesis 1B: *Enduring rivalries are more likely to develop from conflictual relationships that involve at least one newly independent state.*

Hypothesis 1C: *Enduring rivalries are more likely to develop from conflictual relationships that begin in the aftermath of world wars.*

The Evolutionary Model

An alternative to the punctuated equilibrium model is Hensel's (1996a, 1999, 2001b) "evolutionary approach," which treats rivalries as evolving and moving through stages rather than being predetermined by political shocks or structural conditions. Hensel's evolutionary model of rivalry grows out of research on recurrent interstate conflict (e.g., Hensel 1994; Maoz 1984), which focuses on relationships between militarized disputes between the same adversaries. The evolutionary explanation for the origins of rivalry begins with two states contending over one or more conflicts of interest, or contentious issues (e.g., Hensel 1996a: 84ff).¹ These states may employ militarized conflict to pursue their goals over the issues, or they may attempt to pursue them through non-militarized means. Once militarized conflict has been threatened or used, the history of past conflict is seen as an important influence on subsequent decisions and interactions. The evolutionary approach includes two separate effects of past interactions between two countries, involving both the general impact of past relations and the impact of specific details of past interactions between them.²

¹ This closely resembles theoretical arguments by other scholars who do not explicitly advocate an evolutionary approach (e.g., Bennett 1998; Vasquez 1993, 1996; Thompson 1995). Under Bennett's (1998) model, rivalry is likely to begin over issues that are important enough that the perceived costs and risks of protracted military competition outweigh the satisfaction that could be obtained by settling the issue peacefully. Similarly, Vasquez (1996: 532-533) suggests that issues are "the foundation upon which rivalry rests," and Thompson discusses how both positional and spatial issues can lead to rivalry.

² Hensel (2001b) develops a more generalized version of this evolutionary model that explicitly incorporates the impact of non-militarized forms of past interaction and that explicitly allows for non-militarized methods of pursuing issue-related goals. Beyond militarized means, states may attempt to pursue their goals through bilateral negotiations with the adversary or with the (binding or non-binding) assistance of third parties. Additionally, beyond the number and characteristics of past militarized conflict, adversaries' decisions are influenced by the number and effectiveness of past attempts to resolve their issues peacefully through any of these means.

The general impact of past relations involves the expectation that "conflict begets conflict," or that -- all else being equal -- a longer history of past militarized conflict should increase the probability that military means will be employed again in the future. The theoretical logic involves both the accumulation of grievances and hostility from past confrontations and changing expectations about the adversary's likely actions or intentions (e.g., Hensel 1996a: 65-66). Specific characteristics of past confrontations are also seen as relevant, particularly involving the outcome of past disputes. Renewed militarized conflict is thought to be more likely after confrontations that end with stalemated outcomes than after decisive outcomes or negotiated compromises, because neither side was able to achieve its goals through force or through a mutually acceptable settlement (e.g., Hensel 1996a: 87-88).

Beyond past dispute outcomes, the evolutionary approach suggests that other details may play an important role (e.g., Hensel 1996a: 88-91).³ In particular, the evolutionary approach suggests that not only the manner in which past disputes are resolved but also the intensity of past disputes impacts the likelihood of the development of interstate rivalry. The intensity of a dispute should alter a state's willingness to engage in further disputes. Overall, both these general and specific components of the evolutionary approach use past information to predict future dyadic behavior, producing the following hypotheses.

Hypothesis 2 (Evolutionary Approach): *Rivalries develop primarily in response to changes in the relationship among potential adversary nation-states, rather than to conditions in the international environment.*

Hypothesis 2A: *The more militarized conflict two states have engaged in recently, the more likely they will be to engage in additional conflict.*

Hypothesis 2B: *The manner in which past militarized disputes are resolved will impact the likelihood of the dyad reaching the advanced phase of rivalry. Specifically,*

³ A similar evolutionary approach is developed by Maoz and Mor (1996, 1998a, 1998b). Under Maoz and Mor's evolutionary approach, the outcomes of past interactions between states (such as militarized confrontations) can produce changes in each adversary's satisfaction with the status quo and perceived ability to change this status quo if desired, as well as in each side's perceptions of the other's satisfaction and capability. These resulting changes can then increase or decrease the probability of reaching enduring rivalry.

movement toward rivalry will be more likely after stalemated dispute outcomes than after compromise outcomes or after decisive victories for one side over the other.

Hypothesis 2C: *The severity of past militarized disputes will impact the likelihood of the dyad reaching the advanced phase of rivalry. Specifically, the greater the severity of the most recent dispute, the less likely two adversaries will be to engage in recurrent militarized conflict.*

Multiple Patterns of Rivalry

Major power dyads might be expected to behave differently for reasons previously discussed. We expect that major power dyads are more likely to follow the BRL model. It would appear more probable that BRL factors, particularly shocks to the international system such as world wars, will be more likely to shape major power relations rather than minor power relations. Minor power dyads, on the other hand, would appear more likely to develop consistent with the evolutionary approach.

When political shocks are coterminous with the outbreak of a rivalry relationship -- whether shocks at the state or dyadic level, such as recent political independence, or at the systemic level as with a world war -- it should be expected that the rivalries will fit best with a BRL pattern of development. The states will be involved in a level of conflict that is roughly consistent across time until the issue is resolved, and there should be a reduced impact of evolutionary factors. In the absence of such factors, though, we argue that evolutionary factors should be the predominant influence on the development of rivalry.

Hypothesis 3: *Not all rivalries follow the same path of development. Certain specified conditions are likely to lead to rivalries regardless of early interactions between the adversaries, consistent with the punctuated equilibrium model, while other specified conditions are only likely to lead to rivalries as suggested by the evolutionary model.*

Hypothesis 3A: *Major-major power dyads will tend to follow the BRL model of rivalry development, while minor power dyads will tend to follow the evolutionary model.*

Hypothesis 3B: *Rivalries including at least one newly independent state will tend to fit the BRL pattern of development, while others will follow the evolutionary approach to rivalry.*

Hypothesis 3C: *Rivalries that emerge directly after a shock to the international system will tend to follow the BRL pattern of development. Rivalries that emerge in a more stable international system should follow the evolutionary approach.*

The Stochastic Model of Rivalry

Gartzke and Simon (1999) offer an alternative explanation for the observed temporal and spatial clusters of militarized conflict that other scholars have termed "rivalries." They suggest that conflict clusters or series are produced by a stochastic process in which episodes of conflict are not causally related to each other in any way. Gartzke and Simon (1999: 789) attempt to model the frequency of apparent rivalries in "a world in which there is a certain probability of dyadic conflict every year, year after year." In such a world, all dyads have an equal probability of engaging in militarized conflict or rivalries in any given year, and the occurrence of one militarized dispute has no causal impact on the occurrence or non-occurrence of subsequent conflict. In other words, the model argues that there should be nothing that distinguishes one dyad (or type of dyad) from another; every dyad-year across the entire history of the interstate system should have exactly the same probability of seeing militarized conflict.⁴

Such an approach differs substantially from past research on rivalry. Each of the theoretical approaches discussed above assumes that the context of rivalry is very different from other types of international contexts. This is most obvious in the evolutionary approach, which is explicitly based on the existence of specific causal relationships between conflict; both the general history of conflict and specific details of recent conflicts are hypothesized to affect future conflict propensities in systematic ways. Research using the BRL or issues approaches also assumes that the context of rivalry differs from non-rivalry contexts, although most research on these approaches has addressed questions besides the recurrence of militarized conflict.

We do not explicitly include any variables related to the stochastic model of rivalry in this paper's analyses, and indeed it is hard to imagine what such a variable might look like. Our analyses will be directly relevant to evaluating Gartzke and Simon's model against the BRL and evolutionary models, though. Evidence favoring the factors suggested by either of these models would suggest that there are systematic factors that influence the development of enduring

rivalries among some adversaries, which would be consistent with either the BRL or evolutionary model's theoretical expectations and inconsistent with the stochastic alternative.

Research Design

Spatial-Temporal Domain

Our empirical analyses include all conflictual dyads in the international system from 1816-1992, as defined by the Correlates of War (COW) project. Consistent with past research on the evolutionary approach (e.g., Hensel 1996a, 1999), each dyad enters our study with the outbreak of its first militarized dispute (Jones, Bremer, and Singer, 1996). This allows us to study the probability of enduring rivalry among all potential adversaries that have engaged in at least one militarized confrontation⁵. We employ models at both the rivalry-level and the dyad-year level in the analysis. This allows for more leverage on the comparison of the BRL model and the evolutionary model.

Dependent Variables

Interstate Rivalry

Rivalries will be measured following Hensel's (1996a, 1999) evolutionary approach, which identifies three distinct phases of rivalry that must be experienced before two adversaries can reach what most scholars would consider "enduring rivalry." The early phase, reflecting a period when adversaries are only beginning to confront each other and have not yet begun to view each other as fundamental, long-term rivals, includes the first two disputes between two adversaries without a fifteen-year gap that would signify the end of a given conflictual sequence. The intermediate phase reflects a time when the adversaries have begun to see each other as potentially serious long-term threats, analogous to Goertz and Diehl's "proto-rivalry" category, and includes the third through fifth disputes in a given relationship. Finally, all disputes that occur after the fifth dispute are considered to occur in the advanced phase of rivalry, at which point Goertz and Diehl would consider the adversaries to be full-fledged enduring rivals. Dyads

⁴ Of course, as Gartzke and Simon note, having an identical probability does not imply an identical distribution of observed conflict behavior.

⁵ It might reasonably be noted that this focus on dyads that have engaged in at least one militarized interstate dispute leaves our study unable to account for the first dispute between two adversaries.

that reach this category have a fairly long history of militarized confrontations, which is usually seen as setting these enduring rival dyads apart from all other dyads. Indeed, much of the empirical literature on enduring rivalries focuses exclusively on cases of enduring rivalry (e.g., Huth and Russett 1993; Geller 1993), suggesting that dyads that qualify as enduring rivals (or that reach the advanced phase of rivalry) are qualitatively different from other dyads -- and implying that it would be worthwhile to identify the factors that lead such dyads to such an advanced state of enmity.

Our dyad-level analyses of the punctuated equilibrium model's predictions will attempt to determine which conflictual relationships will advance from the early phase of rivalry (beginning with the first militarized dispute between the adversaries) to what an evolutionary approach would call the advanced phase of rivalry (beginning with the sixth dispute in the sequence), or what a BRL approach would call the time that the entire relationship can be called an "enduring rivalry" rather than a case of isolated conflict or proto-rivalry. In our dyad-year-level analyses that compare the predictions of both the BRL and evolutionary models, we simply measure the past conflict history by the number of militarized disputes in the conflict sequence up to that point in time. This number can range from one militarized dispute (the time at which a dyad first qualifies for inclusion in this table) to five (through the time in which the sixth dispute occurs, reaching the advanced phase of rivalry or qualifying for enduring rivalry status). All interactions after the outbreak of the sixth dispute in a sequence are excluded from analysis because the adversaries are considered by both approaches to be enduring rivals, and any additional interactions are considered to reflect the management or ending of rivalry rather than its origins.

Independent Variables

Punctuated Equilibrium / BRL Factors

Major power classification is taken from the COW project's list of major powers in the international system since 1816. For our present purposes, we treat a given dyad's major power status dichotomously, based on whether or not neither, one, or both members of the dyad are major powers. We measure recent independence shocks with a dummy variable that indicates whether one or both of two dyadic adversaries became independent within one decade before the beginning of the rivalry, as revealed in the COW interstate system membership list. World war

shocks are measured with a dummy variable indicating whether or not a given rivalry sequence began within a decade of either of the world wars (1919-29 or 1945-55).

Recent Conflict Outcomes and Severity

Dispute outcomes are taken from the COW militarized dispute data, and are included herein as two dummy variables indicating whether or not the past dispute ended in a compromise outcome or a "decisive" outcome (which merges the COW categories of "victory" and "yield"). Dispute severity is measured using three different elements taken from the COW dispute data: the two rivals' respective levels of hostility, the duration of the dyadic dispute, and the two rivals' fatality levels. Z-scores are taken to standardize the impact of each of these three elements, with the three z-scores for each dispute being added together for the overall dispute severity index.

Control Variables

In various analyses we control for factors that have been suggested by past research to be quite important. Although these factors are not considered to be part of either of the theoretical models being compared, we consider it important to control for their effects, lest the results be distorted by the exclusion of factors that are driving the relationship despite being unrelated to either model. Geographic contiguity has been seen as an extremely important structural factor leading to -- or at least facilitating -- militarized conflict (e.g., Bremer 1992). Contiguity is measured as a dummy variable, indicating whether or not two adversaries share a common land or river border; this is determined from the COW contiguity data set.

We also control for rough military parity using capability data from the COW National Material Capabilities data set. We construct a continuous index of two adversaries' military capabilities, based on the average of their military personnel and military expenditures.⁶ We consider two adversaries to be characterized by rough military parity when the stronger possesses less than three times the capabilities of the weaker; see also Hensel (1996a). For rivalry-level analyses we measure capabilities at the origin of the rivalry sequence; for dyad-year-level analyses we measure capabilities annually.

⁶ Previous research (e.g., Hensel 1996) has found no meaningful difference between using the two COW military indicators and a full composite based on all six military, industrial, and demographic indicators in the data set.

We control for joint democracy, using a dummy variable that follows Dixon's (1994) measure of a dyad as jointly democratic if both states have a value of six or greater on the Polity index of institutionalized democracy. We expect that overall, democratic adversaries will be less likely to advance toward more advanced phases of rivalry than will other adversaries. Finally, in the dyad-year level analyses we control for the presence of territorial issues in the most recent militarized dispute between two adversaries, expecting conflict to be more likely when territorial issues were present (see also Hensel 1996b, 2001b).

Empirical Analyses

The empirical results in this section were obtained through a series of OLS regression and logistic regression analyses. The first three tables examine the impact of factors drawn from the BRL or punctuated equilibrium model, attempting to account for differences among dyadic militarized relationships. The next two tables introduce factors drawn from the evolutionary model as well, attempting to account for year-to-year variations in patterns of militarized conflict recurrence. The final three tables disaggregate these head-to-head comparisons of the BRL and evolutionary models, attempting to determine whether each model is more successful at accounting for the origins of rivalry under specific conditions.

[Tables 1 to 3 about here]

Basic Rivalry Levels and the Origins of Rivalry

Hypothesis 1a suggests that major power dyads should be more likely than mixed dyads or minor power dyads to reach the level of full-fledged enduring rivalry (i.e., the "advanced phase" of rivalry). Hypotheses 1b and 1c suggests that conflictual relationships begun within ten years of a political shock (either a world war or the independence of one or both states) to reach the advanced phase of rivalry. Table 1 presents a logistic regression analysis of the probability that a given conflictual relationship will reach the advanced phase of rivalry, or in other words qualify as a full enduring rivalry

The model presented in Table 1 produces a statistically significant improvement over the null model ($p < .001$), and supports all three expectations of the BRL model. Major power dyads are more likely to reach the advanced stage of rivalry. Likewise both types of shocks increases the likelihood of dyads reaching the advanced stage of rivalry. In addition, the control variable

measuring contiguity also increases the likelihood of states reaching the advanced stage of rivalry.

Table 2 supplements Table 1 by using traditional OLS regression to examine the impact of the same explanatory factors on the number of militarized disputes in a given relationship and on the overall duration of the relationship. The results are statistically significant for both militarized disputes ($F = 24.47$, $p < .001$, $R^2 = .11$) and rivalry duration ($F = 25.61$, $p < .001$, $R^2 = .12$). The BRL variables are all significant and in the expected direction. Major power dyads average four more militarized disputes per rivalry and last 10 years longer than other rivalries. Recent independence has a marginal, although statistically significant, impact on the number of disputes, and increases the duration of a rivalry by about three years. Finally, rivalry that emerged after a world war shock tended to have both more disputes (1.58) and last longer (1.95 years). Overall, major power status seems to have the greatest impact in explaining the characteristics of rivalries. The control variable measuring contiguity was once again significant increasing the number of disputes within a rivalry by 1.72 disputes and increasing the length of the rivalry by 4.97 years. Parity did not significantly impact the number of disputes or the lengths of the rivalry.

Table 3 examines the substantive significance of the analyses from Tables 1 and 2 by presenting the predicted probability of reaching the advanced phase of rivalry as well as the predicted number of militarized disputes and predicted duration of each rivalry relationship. Examining the predicated probability shows that major power status has the greater impact of the three BRL related variables. Major power dyads are 22.9% more likely to reach the advanced phase of rivalry. Recent independence only increases the likelihood by 6.6% and world wars only increased the likelihood by 5.4%. Table 3 also illustrate the expected values for the OLS models in Table 2. Major power status again had the greatest impact on the number of disputes and the duration of the rivalries.

The results presented in Tables 1 to 3 suggest that major power status and political shocks all have the hypothesized effect of making enduring rivalry more likely, even after controlling for the effect of several other relevant variables. This is consistent with the punctuated equilibrium model and its notion of the basic rivalry level, which suggest that factors such as these should be involved in most enduring rivalries. These first three tables, though, have only focused on factors identified by one theoretical explanation for rivalry. The

evolutionary explanation depends on the impact of changing relations between adversaries over time, and thus can not be tested in a single analysis such as that presented in Table 1. In order to test the two models head to head, the next analyses examine patterns of dyadic conflict recurrence.

Beyond supporting our hypotheses, the results from our first tables suggest a great deal of support for the BRL explanation of rivalry. That is, strong results are obtained by focusing simply on attributes that pre-date the rivalry itself, such as contiguity, major power status, or recent independence in a dyad. If such pre-existing attributes exert such a strong influence on rivalry behavior without even considering interactions during the rivalry, we might conclude that these factors help to establish a dyad's basic rivalry level, setting the stage for the conflict behavior that is likely to result. A fair test, though, requires that the evolutionary model be allowed to contribute its own independent variables, which require a disaggregated analysis of conflict behavior within rivalry. Tables 4 and 5 examine individual militarized disputes and individual rivalry-years, in order to compare the effect of BRL and evolutionary variables on conflict escalation and recurrence.

[Tables 4 and 5 about here]

Evolution and the Origins of Rivalry

The analysis in Table 4 include is disaggregated to the rival-year level and includes dyads until they have had six militarized disputes, at which point the dyad has reached the advanced stage of rivalry and is considered an enduring rivalry. In the logistic regression (Table 4) both BRL variables and evolutionary variables are used to explain dispute recurrence. This allows for the testing of both the BRL and evolutionary approach within the context of the same model. The overall model performs very well, whether measured against the null model (as reported in the table) or against a more limited model including only control variables and variables from one of the two theoretical models presented in this paper. This model performs much better than a model leaving out either the evolutionary factors ($\chi^2 = 199.9$) or the BRL factors ($\chi^2 = 99.5$), indicating the value of including both sets of factors in the same model.

The BRL variables are all significant and in mostly in the expected direction. Major power dyads are 9.1% more likely to have an additional militarized dispute. World war shocks actually has a negative impact on militarized dispute recurrence. Recent independence increases

the likelihood of militarized dispute recurrence by 7.6%, as indicated in Table 5. The evolutionary variables also perform very well. As the number of past militarized disputes increases the likelihood of another dispute increases. Another important evolutionary variable is the outcome of past disputes. Decisive outcomes and compromises both significantly decrease the likelihood of the recurrence of a militarized dispute as compared to the referent category of stalemated outcomes.

Finally the majority of the control variables perform well. Contiguity and the presence of a territorial dispute both increases the likelihood of militarized dispute recurrence. Dyads that are jointly democratic have a lower likelihood of militarized dispute recurrence. Parity is not significant and does not impact the dispute recurrence.

Overall, the results from Tables 4 and 5 support both the evolutionary and BRL approaches. The BRL factors that were examined in the earlier rivalry-level analyses continue to produce strong results in these disaggregated analyses of individual disputes or rivalry-years. Tables 4 and 5 also indicate some support for variables drawn from the evolutionary approach. In each of these tables, at least several evolutionary variables produce significant effects. The general effects of rivalry phase produce no systematic effect on the probability of fatalities, a significant negative effect on the probability of dispute escalation to war, and a significant positive effect on the probability of recurrent conflict. The more specific effects of past dispute outcomes and escalation levels also have a significant impact in all three tables. As a result, even if pre-existing factors appear to have a strong influence on rivalry behavior -- particularly in Tables 1 through 3 -- evolutionary factors based on the history of past conflict also appear to produce strong and systematic effects.

[Tables 6 to 8 about here]

Multiple Patterns of Rivalry

One useful way to test for differences between the BRL model and the evolutionary model is to see how rivalries develop in different subsets of rivals. We divide dyads by major power status, recent independence and world war shocks. The BRL model should perform best in the major-major model, the recent independence model and the world war shock model, whereas the evolutionary model should perform better in the other models.

Table 6 splits the analysis from Table 4 based on the major power status of the adversaries. The results from this table indicate both similarities and differences in the relationship between major power status and rivalry. All three dyad types (major-major, major-minor, and minor-minor) are significantly more likely to experience recurrent militarized conflict after a world war shock. For major-major power dyads a compromise on their previous dispute reduces the likelihood of militarized dispute. Joint democracy decreases the likelihood of recurrence, whereas the presence of a territorial issue between the states increases the likelihood of recurrence. Minor-minor power dyads tend to strongly support the evolutionary model. All of the evolutionary variables are significant and in the expected direction. The BRL model variables also perform well in this model. Major-minor power dyads provide some support for the BRL model and the evolutionary model. The number of past disputes increases the likelihood of recurrence and a decisive outcome decreases the likelihood of militarized dispute recurrence. Interestingly world war shocks increase major power likelihood of dispute recurrence, while decreasing the likelihood for minor power dyads and mixed dyads. All of the other variables' signs are consistent across the models.

Table 7 splits the analysis based on whether or not two adversaries' militarized relationship began within a decade of the independence of one or both, which makes up one of Goertz and Diehl's hypothesized political shocks. The evolutionary model performs best in cases not directly following independence. All of the variables are significant and in the expected direction. In the post-independence model the BRL model and the evolutionary model both do not perform as well. In this model the BRL model is expected to do well. World war shocks are significant, but minor power status is not. Once again the difference in the two model points out alternative development patterns for rivalries. The evolutionary approach tends to do much better in cases in which there has not been a recent shock.

Table 8 splits the analysis based on whether or not two adversaries' militarized relationship began within a decade of a world war, another of Goertz and Diehl's hypothesized political shocks. The BRL performs best in both models. Major power status and recent independence both have a positive impact on the likelihood of militarized dispute recurrence in both models. The evolutionary model does not perform consistently in both models. Following world wars past disputes increase the likelihood of recurrences and compromises and past dispute severity both decrease the likelihood of recurrence. When not immediately following a

world war past dispute severity no longer is significant and decisive outcome is significant and negative.

Taken together, the results of Tables 6 through 8 suggest that different types of dyads follow different paths to rivalry. Overall the BRL model performs well. Shocks to the system do seem to impact the pattern of development. The evolutionary model tends to provide additional explanatory power in the absence of political shocks. Another interesting point is the different impact that world war shocks had on dyads depending on the power status of the dyad. In the evolutionary model the signs were consistent across models, though the statistical significance does vary.

Conclusions

Taken together, the results of this paper's empirical analyses offer a great deal of support for our central hypotheses. Major power status and political shocks tends to produce rivalry in a way that is consistent with the punctuated equilibrium or BRL model. Major-major power dyads are more likely than major-minor or minor-minor power dyads to become involved in enduring rivalry, and enduring rivalry is much more likely after the political shock of nation-state independence than otherwise. Even after considering the impact of major power status and of political shocks, though, factors suggested by the evolutionary model play an important role. The number, outcomes, and severity levels of past conflicts exert a strong influence on states' propensities to engage in additional conflict along the road to rivalry or to end their militarized conflict short of rivalry. This evidence is consistent with both the BRL and evolutionary models, and as suggested earlier, inconsistent with Gartzke and Simon's alternative stochastic explanation for rivalry.

Beyond these general patterns of rivalry development, we have also examined the possibility of multiple paths to rivalry. Although the variables associated with the BRL model perform consistently across models, the variance in the impact of the evolutionary variables would imply that there are significantly different paths to rivalry. Past behavior is much more important in the absence of major political shocks. In addition, the evolutionary approach seems to add a great deal to the development of rivalries between minor power and in mixed dyads.

These results offer a number of important contributions to the scholarly literature on rivalry. First, they offer preliminary insight into several factors that are strongly associated with

the outbreak and severity of rivalry. While several scholars have shown the importance of rivalry in terms of the proportion of militarized conflict occurring between rivals (e.g., Goertz and Diehl 1992; Hensel 1998), this paper has endeavored to account for this conflict rather than simply identifying it. Also, while past studies have focused on the individual role of political shocks or of evolutionary factors in producing rivalry (Goertz and Diehl 1995, 2000) or in ending rivalry once established (Goertz and Diehl 1995, 2000; Bennett 1998), this has been the first study to examine these factors head-to-head as sources of rivalry and to consider the possibility of specific situations in which each is likely to be most relevant.

Furthermore, our analyses are directly relevant to the claim (by Vasquez, Thompson, Waltz, and others) that major power dyads are fundamentally different from other dyads. Although there are some differences, in terms of factors that are statistically significant for one group of cases but not for another, there are also many similarities. For example, the role of territorial issues remains consistent in every single analysis, and there are no situations where the effect of a variable reverses direction (and stays significant) for two different groups of cases.

We conclude with several suggestions for future improvements of this paper, as well as more general future research directions. One factor that we have limited to the role of control variable, contention over territory, is potentially quite important to both the punctuated equilibrium and evolutionary models. There is substantial evidence -- both in this paper and elsewhere -- that interactions between states over territory are fundamentally different from non-territorial interactions. Unfortunately, the only data related to territorial issues that covers this study's entire spatial-temporal domain takes the form of data on the issues involved in militarized conflict, such as the MID data used in this study. Data sets on territorial claims are being collected, but are currently limited either temporally (Huth's data covers whole world but only for the 1950-1990 period, and is being extended to 1919-1995) or spatially (Hensel's ICOW data covers the 1816-2000 period but only the Western Hemisphere is completed, although the rest of the world is currently being collected). The inclusion of all territorial claims, not just those that become militarized, is quite important, as Hensel (2001a) notes that less than half of all territorial claims in the Western Hemisphere have led to militarized action. As sufficient data become available, we plan to study the origins of rivalry based contention over territorial issues, beginning with the list of all territorial claims. This will allow us to study the initial militarized dispute in a given rivalry sequence as well as the recurrence of later disputes, and will allow us

to examine the impact of territorial claims regardless of whether they have previously led to at least on militarized dispute. The ICOW data on territorial claims will also allow us to distinguish between individual territorial claims by the salience or importance of the claimed territory. Hensel (2001) notes that only one-fourth of all territorial claims involving low-salience territory lead to militarized conflict, compared to four-fifths of claims over high-salience territory, leading us to expect that claim salience will also be a central factor in the origins of rivalry.

Future research on this topic could also benefit from alternative conceptions of these measures, as well as from the inclusion of additional factors. Hensel's evolutionary approach -- as tested herein -- focuses on the role of interactions within a developing rivalry as sources of subsequent conflict behavior. Stinnett and Diehl (2001) focus primarily on characteristics of the initial confrontation in a potential rivalry relationship as sources of later conflict behavior and rivalry. The present analyses could be supplemented by including such factors along with major power status, political shocks, and the evolutionary variables tested herein; there may be important differences between the dispute-to-dispute evolutionary factors examined in this paper and the effect of the initial confrontation in a rivalry sequence.

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Table 1: Probability of Advanced Phase of Rivalry

Variable	Est. (S.E)	Odds Ratio
Intercept	- 3.42 (0.22)***	---
<i>Basic Rivalry Level Variables</i>		
Minor-Minor Power Dyad	- 0.10 (0.26)	0.90
Major-Major Power Dyad	1.88 (0.36)***	6.54
Recent Independence	0.91 (0.25)***	2.48
World War Shock	0.72 (0.27)***	2.06
<i>Control Variables</i>		
Contiguity	1.26 (0.24)***	3.54
Military Parity	- 0.11 (0.35)	0.90
LL (full model):	- 303.21	
Improvement:	83.95	
Significance:	p < .001 (6 d.f.)	
N:	1184	

* p ≤ .10; ** p ≤ .05; *** p ≤ .01

Table 2: Accounting for Rivalry Details

	Model I	Model II
	Militarized Disputes in Rivalry	Rivalry Duration in Rivalry
Variable	Est. (S.E)	Est. (S.E)
Intercept	1.55 (0.19)***	3.88 (.47)***
<i>Basic Rivalry Level Variables</i>		
Minor-Minor Power Dyad	- 0.13 (0.25)	- 1.25 (.065)*
Major-Major Power Dyad	4.13 (0.53)***	10.60 (1.35)***
Recent Independence	0.84 (0.29)***	3.17 (.74)***
World War Shock	1.58 (0.36)***	1.95 (.90)**
<i>Control Variables</i>		
Contiguity	1.72 (0.27)***	4.97 (.69)***
Military Parity	- 0.24 (0.35)	- 0.05 (.90)
	F = 24.47 p < .001 R ² = .11 N: 1184	F = 25.61 p < .001 R ² = .12 N: 1184

* p ≤ .10; ** p ≤ .05; *** p ≤ .01

Table 3: Predicted Probabilities

Variable / Value	Enduring Rivalry Prob. (Change)	# MIDs Mean (Change)	Duration in Years Mean (Change)
<i>Dyad type</i>			
Minor-minor	.055	2.28	5.03
Major-minor	.060 (+.005)	2.36 (+0.08)	6.14 (+1.11)
Major-major	.290 (+.229)	6.53 (+4.17)	16.81 (+10.67)
<i>Recent Independence</i>			
No	.051	2.37	5.51
Yes	.116 (+.066)	3.21 (+0.84)	8.68 (+3.17)
<i>World War Shock</i>			
No	.057	2.36	6.01
Yes	.110 (+.054)	3.94 (+1.58)	7.95 (+1.94)

Note: some changes may not appear to add to 1.0 due to rounding.

Table 4: Logistic Regression Analysis of Dispute Recurrence

Variable	Est. (S.E)	Odds Ratio
Intercept	- 3.33 (0.10)***	---
<i>Basic Rivalry Level Variables</i>		
Minor-Minor	- 0.18 (0.09)**	0.84
Major-Major	0.61 (0.14)***	1.84
Recent Indep.	0.98 (0.11)***	2.66
World War Shock	- 0.44 (0.11)***	0.65
<i>Evolutionary Variables</i>		
Recent MIDs	0.30 (.03)***	1.35
Decisive outcome	- 0.66 (0.13)***	0.52
Compromise	- 0.55 (0.15)***	0.58
Past MID severity	- 0.05 (0.02)**	0.95
<i>Control Variables</i>		
Contiguity	0.55 (0.09)***	1.73
Military Parity	0.15 (0.13)	1.16
Joint Democracy	- 0.42 (0.14)***	0.66
Terr. Issues	0.37 (0.09)***	1.45

LL (full model): - 2899.22
Improvement: 433.30
Significance: p<.001 (12 d.f.)
N: 12,841

* $p \leq .10$; ** $p \leq .05$; *** $p \leq .01$

Table 5: Predicted Probability of Militarized Dispute Recurrence

Variable / Value	Prob. (Change)
BRL Model	
<i>Major Power Status</i>	
Minor-minor	.049
Major-minor	.055 (+.007)
Major-major	.091 (+.035)
<i>Political Shocks*</i>	
Neither	.048
World War Only	.037 (- .011)
World War + Independence	.083 (+ .035)
Independence Only	.126 (+.076)
Evolutionary Model	
<i>Past MIDs in Relationship</i>	
1	.042
5	.129 (+.087)
<i>Past MID Outcome*</i>	
Stalemate	.064
Decisive victory	.033 (- .031)
Compromise	.033 (- .031)
<i>Past MID Severity</i>	
Minimum	.064
Mean	.053 (- .010)
Maximum	.040 (- .013)

*For political shocks and dispute outcomes, all values' probabilities are measured against the default category (neither shock, stalemate outcome). For all other variables in this table, probabilities are measured against the previous value listed in the table.

Table 6: Major Power Status and Patterns of Militarized Dispute Recurrence

Variable	Model I (Minor-Minor)	Model II (Major-Minor)	Model III (Major-Major)
	Est. (S.E)	Est. (S.E)	Est. (S.E)
Intercept	- 3.75 (0.13)***	- 3.19 (0.13)***	- 2.22 (0.29)***
<i>Basic Rivalry Level Variables</i>			
Recent Indep.	1.11 (0.13)***	0.86 (0.20)***	(Collinear)
World War Shock	- 0.58 (0.16)***	- 0.41 (0.18)**	0.83 (0.40)*
<i>Evolutionary Variables</i>			
Recent MIDs	0.37 (0.04)***	0.25 (0.05)***	0.05 (0.10)
Decisive outcome	- 0.75 (0.20)***	- 0.63 (0.21)***	- 0.04 (0.44)
Compromise	- 0.40 (0.19)**	- 0.31 (0.27)	- 1.45 (0.46)***
Past MID severity	- 0.07 (0.03)**	- 0.04 (0.03)	- 0.05 (0.06)
<i>Control Variables</i>			
Contiguity	0.69 (0.11)***	0.34 (0.17)**	0.18 (0.35)
Military Parity	- 0.09 (0.17)	0.98 (0.28)***	0.48 (0.31)
Joint Democracy	0.09 (0.20)	- 0.60 (0.21)***	- 1.27 (0.58)**
Terr. Issues	0.36 (0.12)***	0.32 (0.17)*	0.63 (0.33)*
LL (full model)	- 1458.35	- 1185.82	- 223.02
Improvement:	327.23	109.00	32.16
Significance:	p<.001 (10 d.f.)	p<.001 (10 d.f.)	p<.001 (9 d.f.)
N:	6527	5643	671

* $p \leq .10$; ** $p \leq .05$; *** $p \leq .01$

Table 7: Recent Independence and Patterns of Militarized Dispute Recurrence

	Model I (No indep. shock)	Model II (First decade after independence)
Variable	Est. (S.E)	Est. (S.E)
Intercept	- 3.31 (0.10)	- 2.45 (0.28)**
<i>Basic Rivalry Level Variables</i>		
Minor-Minor	- 0.18 (0.09)**	- 0.20 (0.25)
Major-Major	0.58 (0.14)***	(Collinear)
World War Shock	- 0.41 (0.13)***	- 0.49 (.22)**
<i>Evolutionary Variables</i>		
Recent MIDs	0.30 (.03)***	0.33 (0.10)***
Decisive outcome	- 0.66 (0.15)***	- 0.84 (0.34)**
Compromise	- 0.52 (0.16)***	- 0.67 (0.46)
Past MID severity	- 0.05 (0.02)**	- 0.05 (0.05)
<i>Control Variables</i>		
Contiguity	0.47 (0.09)***	1.03 (0.23)***
Military Parity	0.27 (0.14)*	- 0.60 (0.38)
Joint Democracy	- 0.45 (0.14)***	- 0.33 (0.49)
Terr. Issues	0.41 (0.10)***	0.17 (0.22)
LL (full model)	- 2507.95	- 384.90
Improvement:	302.17	75.77
Significance	p<.001 (11 d.f.)	p<.001 (10 d.f.)
N:	11,757	1084

* $p \leq .10$; ** $p \leq .05$; *** $p \leq .01$

Table 8: World War Shocks and Patterns of Militarized Dispute Recurrence

	Model I (No world war)	Model II (After world war)
Variable	Est. (S.E)	Est. (S.E)
Intercept	- 3.25 (0.10)***	- 4.00 (0.28)***
<i>Basic Rivalry Level Variables</i>		
Minor-Minor	- 0.16 (0.09)*	- 0.34 (0.25)
Major-Major	0.51 (0.15)***	1.53 (0.42)***
Recent Indep.	0.98 (0.12)***	1.02 (0.23)***
<i>Evolutionary Variables</i>		
Recent MIDs	0.30 (0.03)***	0.28 (0.10)***
Decisive outcome	- 0.83 (0.15)***	- 0.28 (0.39)
Compromise	- 0.62 (0.16)***	- 0.90 (0.49)*
Past MID severity	- 0.01 (0.02)	- 0.18 (0.05)***
<i>Control Variables</i>		
Contiguity	0.53 (0.09)***	0.67 (0.25)***
Military Parity	0.15 (0.14)	0.12 (0.37)
Joint Democracy	- 0.48 (0.15)***	0.07 (0.39)
Terr. Issues	0.34 (0.10)***	0.91 (0.25)***
LL (full model):	- 2505.24	- 382.71
Improvement	367.91	86.13
Significance:	p<.001 (11 d.f.)	p<.05 (11 d.f.)
N:	10,940	1901

* $p \leq .10$; ** $p \leq .05$; *** $p \leq .01$