

Finding Friends in Tough Times:  
Compatible Partners, Domestic Politics and Alliance Behavior

By

Anessa L. Kimball<sup>◇</sup>

---

<sup>◇</sup> Assistant Professor, L'Université Laval, Département de science politique, Pavillon Charles-De Koninck, bureau 4431, Québec (QC) G1K 7P4, email: [anessa.kimball@pol.ulaval.ca](mailto:anessa.kimball@pol.ulaval.ca) The author would like to thank Dave Clark, Pat Regan, Cliff Morgan, Glenn Palmer, Tom Walker, and Chris Sprecher for helpful commentary. An earlier version of this paper was presented at the 2006 annual meeting of the American Political Science Association.

**Abstract:** This research expands upon a proposed domestic politics based model for alliance behaviour (Author 2006). All leaders must manage policy allocations between guns and butter (Powell 1999) effectively relative to the constraints imposed upon them due to the size of their minimum winning coalition (MWC) (Bueno de Mesquita et al. 1999). Demands for greater butter or guns force leaders who are responsible to large-sized MWCs to search for efficient policy allocations. As Morgan and Palmer (2003; Palmer and Morgan 2006) point out the formation of an alliance increases the efficiency of security allocations. Thus, leaders might form alliances because of either domestic demands for butter or guns. Since different factors might motivate a state's need for alliance partners--not all states are possible potential alliance partners. This occurs as a consequence of the explanation as domestic political factors not only shape why states need alliances but also which states are the "correct" potential partners needed to alleviate the domestic demand. Existing empirical work explicitly treats all cases as if they have equivalent chances of engaging in the outcome of interest--that is dyad  $i$  and  $j$  have the same chances of forming an alliance. My explanation contends this empirical specification is not only undesirable but also fails to account for how potential alliance partners vary in their alliance attractiveness which fundamentally shapes the chances the dyad forms an alliance. I estimate an empirical model accounting for whether an individual dyad are potential alliance partners for one another and, then, conditions the number of alliance commitments exchanges within that dyad on the chances they are potential partners for one another.

*Seeking partner with diverse capabilities to help with domestic needs. Leadership style and regional location important. Interested partners please contact box 99.*

*Looking for partner(s) willing to provide security in an uncertain environment. Only credible partners need apply to box 88.*

The above statements appear similar to personal ads that could have been posted by individuals seeking partnership. However, those ads could alternatively be announcements posted by states seeking partners for potential international cooperation. An examination of those ads should lead to two important inferences, first, not all possible partners will be able to fulfill the characteristics demanded in the announcements and, second, states seek different types of partners depending on what motivates their need for cooperation. An implication of those inferences is the presence of an important amount of heterogeneity across states as potential partners which has remained unexplored in the literature on international cooperation.

This paper will argue the contracting explanation for alliance formation provides novel insights about the alliance process with respect to which states are compatible as potential partners and then provides an empirical test using cases from 1816-2000 to support the claims presented. The contributions of this article include extending the theoretical development regarding the factors motivating alliance formation and with whom states choose to ally. While there is a large and diverse literature on alliance formation based on both realism and liberalism, there is little, if any, effort to develop a deeper understanding of how states are chosen as alliance partners and which states make realistically compatible potential partners for other states. Thus, this project aims at filling that gap in our knowledge.

The article proceeds in several sections. The first section describes the contracting explanation of alliance formation in brief and points out how that explanation provides insight about potential alliance partners. The second section discusses how existing research has failed to adequately consider potential partner compatibility and suggests some of the potential consequences of this failure. A third section details the potential partner compatibility concept and includes some hypothetical expectations based on the contracting explanation for alliance formation. A final section presents an empirical model to capture the concept of potential partner compatibility, provides an analysis of dyadic alliance commitments between 1816 and 2000, and discusses the results.

### **I. The contracting explanation for alliance formation**

This section briefly discusses the contracting explanation of alliance formation which was first presented by the Author (2006). The contracting explanation links the distributional dilemma (Powell 1999) and the political survival (Bueno de Mesquita et al. 1999, 2003) literatures to the study of international cooperation using the insight provided by Morgan and Palmer (2003, 2006) about formed alliances increasing foreign policy efficiency and freeing resources for leaders.

The contracting explanation rests upon three standard assumptions employed frequently in the international relations literature. First, leaders are rational.<sup>1</sup> Second, leaders act to retain power. Third, the resources available to leaders are limited. The

---

<sup>1</sup> In brief, the first assumption suggests, consistent with rational theories for behavior, leaders choose the alternative deriving the greatest expected utility and having the highest probability of success.

survival-seeking assumption suggests leaders will be responsive to the demands of those individuals deciding who receives political power (Bueno de Mesquita et al. 2003). Rational leaders want to please the minimum number of individuals required to retain power because they would like to minimize their chances of removal from office in the next selection cycle. Thus, the institutions which shape the political process act as constraints upon leaders. Since leaders face limitations on resources they are required to balance allocations. “Were resources unlimited, then there would be no trade-off and no need to engage in any sort of internal balancing of resources. Allocating more to the military would not reduce the amount that could be devoted to achieving intrinsically valued ends” (Powell 1999, 45).

Using intuitions drawn from both the political survival literature (Bueno de Mesquita, Smith, Siverson, and Morrow 2003) and the distributional dilemma research program (Powell 1999), I argue leaders face a resource allocation problem where they must provide appropriate allocations towards both guns and butter to retain political office.<sup>2</sup> Since leaders have limited resources, the trade-off between external security and internal wealth/social security is a crucial balancing game. While a leader’s failure to appropriately provide external security may dangerously weaken the security of the state, a leader’s failure to provide social security can lead to his undesired removal from office. Thus, the ‘guns versus butter’ dilemma is an important challenge facing leaders as they try to maximize current and future consumption (Powell 1999, 53).

---

<sup>2</sup> This is consistent with the claim that “leaders have only limited resources to allocate to different policy goals and to help keep them in office” (Bueno de Mesquita et al. 1999, 793).

Leaders are also constrained by the political institutions within states affecting how political power is obtained and retained by leaders. Political institutions requiring the consent of larger numbers of individuals (i.e. democracies) or a larger sized “minimum winning coalition(s)”<sup>3</sup> constrain leaders by encouraging them to be more efficient in their policy allocations “because, as the winning coalition grows the prospects for political survival increasingly hinge on successful policy performance” (Bueno de Mesquita et al. 1999, 804).<sup>4</sup> The need for efficient policies encourages leaders to seek out the policy instruments that “produce the maximum amount of the desired good given the resources available and the environmental constraints...the policies that we observe empirically are efficient” (Morgan & Palmer 2003, 185).

One overlooked path leaders can pursue to make security policy allocations more efficient is to form international security contracts (i.e. create interstate alliances). Morgan and Palmer<sup>5</sup> (2003), for instance, claim, “if an alliance is formed, each signatory must be able to produce the same foreign policy goods it was producing before the alliance with fewer resources, freeing those resources for use in other policies” (187). In essence, those observed alliance contracts allow states to ‘out-source’ some portion of their security burden. The crucial claim here is that observed alliances: 1) increase

---

<sup>3</sup> “The subset of the selectorate of sufficient size such that the subset’s support endows the leadership with political power over the remainder of the selectorate” (Bueno de Mesquita et al. 2003, 51).

<sup>4</sup> Though these authors are referring to how democratic leaders will allocate resources during a conflict, there is reason to believe these same constraints operate constantly, even in the absence of war, as democratic leaders almost always face the pressures and uncertainty of reselection.

<sup>5</sup> Their argument is discussed in more detail in Palmer and Morgan (2006).

foreign (or security) policy efficiency and 2) free resources for allocation towards other demands. Thus, as leaders may have reasonable expected beliefs about the future benefits of forming alliances, they should seek alliances when challenged by demands. A key element of this argument is leaders form alliances due to efficiency concerns over policy allocations or the need to maximize allocations between national security and domestic/social security. Morgan and Palmer argue for an alliance to form “at least one state must have experienced a change in circumstances that would make it prefer an alliance that it previously did not desire” (2003, 187). In this project, the “change in circumstances” (i.e. the causal mechanism) is an increased demand for allocation towards social security (or national security) policies.<sup>6</sup> This is consistent with the second type of change causing alliances to form according to Morgan and Palmer (2003, 188) “the cost to form and maintain an alliance goes down, relative to the costs of other actions.” The alternative action which has become more costly to leaders is to do nothing to address changes in the demand for greater social security policies. Their political inaction increases their risk of losing political power and consequently the leader becomes willing to pay higher costs for an alliance. According to the contracting explanation states form alliance contracts in response to demands for greater policy efficiency since leaders are constrained by, and must respond to, the distributional dilemma.

Since policy efficiency is the major cause of international alliances, the contracting explanation explicitly suggests not all states are equally compatible as potential allies. If states seek alliance partners as a matter of efficiently producing national security, they

---

<sup>6</sup> Most of the emphasis in this paper is placed on social security demands as a causal mechanism to explain alliance formation since this represents a divergence from previous arguments.

may well seek partners differently than if they do so explicitly in the face of threats. Thus, the likelihood any one dyad is potential compatible alliance partners consequentially influences the chances an alliance is formed within a dyad. An important implication of this claim is states will have different sets of compatible potential alliance partners depending upon the factors motivating a state's need for alliance. For example, states under threat ally because they have a common enemy. In contrast, states seeking the efficient production of defense will ally because they can jointly produce defense more efficiently than either state could alone. So the criteria for judging alliance partners are potentially quite different depending upon the motive for forming the alliance.

## **II. The limitations and consequences of misspecifying potential partner compatibility**

Previous analyses of alliance formation (Lai and Reiter 2000; Simon and Gartzke 1996) have implicitly assumed all states in the system can serve as potential alliance partners. In other words, previous models have assumed all dyads are compatible as potential alliance partners. Yet, not all states are compatible as potential partners since characteristics of each state determine which other states would make the most compatible potential partners. Returning to the personal ads written at the beginning of the article, the criteria for compatibility are explicit in each ad since factors such as leadership style, region, and credibility are listed as being important. Thus, not all states are 'serious potential partners' for all other states. That states employ different/multiple criteria in choosing alliance partners is not something the literature at-large considers. In

fact, the literature asserts states seek partners solely on the criterion of who can best lend to defense against a particular threat.<sup>7</sup> Moreover, the literature assumes 1) states *always* have some set of potential alliance partners from which to choose, and 2) that set of partners is both stable and constant. These are unstated assumptions arising from the theoretical structure of most of the alliance literature (Morgenthau 1948; Waltz 1979; Walt 1987). Similarly, the contracting explanation, by its structure, implies states will seek partners based on different criteria (e.g. the efficient production of defense), and the set of compatible potential partners a state might consider varies across states and over time for the very reason that states have different capabilities and needs over time<sup>8</sup>, so what constitutes “efficient” joint production of defense will vary.

Alliance formation in that light is the product of a careful and deliberate process on the part of states. It is the very nature of the domestic demand combined with the existing tension between the need for both social and national security making the efficient production of defense so essential. The search for efficiency leads policy-makers to look abroad for partners with whom the joint production of defense would be efficient, thus freeing some of the state’s resources to meet social demands. Finding partners with who defense production would be efficient requires the state to identify others with complementary resources and similar needs. So—not ALL states will make equally good compatible alliance partners, and in fact, many states cannot even be reasonably considered as compatible potential partners. If this is the case, then consider a generic model of alliance formation characterizing most of the models in the literature:

---

<sup>7</sup> Capability aggregation models of alliance behavior are consistent with those selection criteria (Morrow 1991; Gartzke and Simon 1999).

<sup>8</sup> Leaders need to respond to domestic demands over time.

$$E(y_i|\mathbf{x}_i) = \mathbf{x}_i'\boldsymbol{\beta}$$

where the expected value of alliance formation is conditional ONLY on the effects of the covariates,  $\mathbf{x}$ , for each individual case (state or dyad) in the sample. The assumption implicit in that formulation is that the individual characteristics (of the state or dyad) do not necessarily have a systematic effect on whether there is any probability other than zero of forming an alliance. In other words, the  $\mathbf{x}$  variables unconditionally shape the expected value of  $y$ . So for ALL cases in the sample, the ex ante chances of alliance formation are equal.<sup>9</sup>

If, however, some states choose partners (or are chosen as partners) on the basis of efficient defense production, then some states will be attractive partners and others will not. For example, relatively weak states are unlikely to be attractive partners if a state is seeking efficient joint security production. So the ex ante chance of alliance formation for any particular state is not necessarily equal to that of any other state, as a matter of the argument. The domestic impetus for contracting is the pursuit of economically efficient production of defense and not ALL states are equally endowed with the capacity to produce defense (either jointly or alone) in an efficient manner. Moreover, the production needs of any particular state may not be served efficiently by all other states, so not all other states will be compatible alliance partners. That being the case, the generic model above restricts the compatibility of state  $i$  to be equal to that of state  $j, k, \dots$  and that compatibility is non-zero.

---

<sup>9</sup> Research adopting this approach includes Lai and Reiter 2000; Simon and Gartzke 1996; Siverson and Emmons 1990; and Maoz 1996, 1997.

The pursuit of efficiency via contract formation suggests this restriction is not only undesirable, but is actually, as a matter of the argument, incorrect. Suppose instead the following model--

$$E(y_i|x_i) = \mathbf{x}_i'\boldsymbol{\beta} - \mathbf{x}_i'\boldsymbol{\beta}(\psi_i)$$

where  $\psi_i$  is an individual weight accounting for the extent to which a dyad is (or a state has) potential compatible partners (with whom to ally). Such a construction explicitly relaxes the restriction of the generic model above. It also has the virtue of suggesting a test: if all states are the same, then the second term will be a constant (and not vary across the units of analysis); if states always have potential partners, then  $\psi_i$  will be zero, so the second term will drop out altogether (see Long 1997, 243; Greene 2003). The expectation of  $y$  is now conditional on the  $\mathbf{x}$  variables AND on the availability of compatible alliance partners, just as the contracting explanation suggests it should be. Finally, we can easily parameterize this model so we can estimate  $\psi_i$  as a function of variables the contracting explanation suggests should be important in determining what states are compatible alliance partners.

Compatibility is crucial and pairs of states sharing no compatible characteristics are simply unlikely to see each other as 'serious potential partners' and the result is likely to be no alliance between them. However, among pairs of states who ARE 'serious potential partners' some of these dyads will form alliances and some will not---but these dyads are different from the dyads which are not compatible for each other. Thus, there are two different types of dyads that do not form alliances—those that do not form an alliance because the states are not compatible with each other and those that are compatible with each other but for some unknown reason do not ally. Therefore,

defining a set of characteristics which shape ‘partner compatibility’ would be helpful for understanding actual alliance contract creation since compatible partners are much more likely to ally than non-compatible states.<sup>10</sup>

### **III. Some hypotheses on potential partner compatibility**

In the next paragraphs, I identify and discuss the four dimensions shaping alliance partner compatibility. Moreover, I also suggest hypotheses relevant to each dimension with respect to the chances a pair of states are compatible as potential alliance partners.

- A. Military Capacity (Power)
- B. Regime Structure
- C. Shared Interests
- D. Location

Dimensions A and B of partner compatibility can more broadly be labeled the informational or strategic dimensions of compatibility. Power capacity and regime structure are crucial pieces of information states use to develop beliefs about each other as potential alliance partners.

#### **A. Power and partner compatibility**

A greater understanding the relationship between power and partner compatibility is a key contribution of this paper. Military capacity influences dyadic beliefs about the viability of a potential alliance between states and whether there is a security benefit to be attained from allying with a potential partner. The contracting explanation suggests

---

<sup>10</sup> That being said it is possible for incompatible states to form alliances, however the occurrence of these alliances should be very rare relative to alliances between compatible states.

states form alliances as a consequence of two types of demands: national security demands and social security demands. Alliances formed as a result of social security demands suggest states use a potentially different selection mechanism for identifying compatible partners. Since increasing social security demands compels leaders to engage in foreign policies which increase the efficiency of their existing policy allocations, we should expect social security policy demands to lead to alliances with partner states that have efficient existing military policy allocations. Because leaders are looking for states with whom the joint provision of security is efficient relative to the unilateral provision of security, they should select partners with military strength. Thus, states with weak existing military capacity (or that lack resources which complement the other actor) are less likely to be compatible potential partners since their weakness not only implies security policy inefficiency but also limited security efficiency gains to be accrued allying with this particular partner.

*Potential Partner Hypothesis 1a: Pairs of states with one state that is militarily weak are less likely to be compatible potential alliance partners.*

While knowledge of weakness shapes alliance partner potential for some pairs of states, there could also be important differences across pairs of states in terms of their alliance partner compatibility. Here I build on the capability aggregation arguments explored by Morrow (1991) as well as Gartzke and Simon (1999)<sup>11</sup> suggesting all states form alliances to increase their military capacity. The findings of Morrow's formal model (1991) suggest alliances ought to be formed most frequently between states with unequal

---

<sup>11</sup> The capability aggregation model of alliance behavior is associated with realist incentives and the balance of power theory. It was explored first by Morgenthau (1948, 1973) and then Waltz (1979).

military capacity because the weaker state receives security related policy benefits, whereas the stronger state receives autonomy benefits because it is able to influence the direction of policy within the weaker state to ensure consistency with its own preferred policies.<sup>12</sup> In an effort to add to the debate regarding who allies with whom, I will specify an econometric model accounting for the following dyad types: jointly weak, jointly powerful, and asymmetric relative power.<sup>13</sup> Considering these dyad types in terms of potential alliance partner compatibility leads me to claim each of those dyad types should be more likely to form alliances with each other relative to the reference group, joint mid-level powers. Dyads of states that are both weak are compatible potential alliance partners because their weakness decreases an individual state's capacity to unilaterally abrogate the alliance, and, moreover, both states in the dyad know each faces this constraint. Furthermore, for weak states allying with any other state, even another weak state, makes the production of security more efficient for each partner. Finally, these jointly weak states should contribute relatively equally to the alliance suggesting security gains are purely cooperative in nature.

*Potential Partner Hypothesis 1b: Pairs of states that are both militarily weak are more likely to be compatible potential alliance partners.*

Previous research has suggested powerful states are among the most likely to engage in alliance behavior (Levy 1981, 1983; Waltz 1979; Lai and Reiter 2000). The forming of alliances to increase capability among states, known as the “capability aggregation”

---

<sup>12</sup> Morrow (1991) builds upon the formal work of Altfeld (1984).

<sup>13</sup> Within these data there are 45,859 cases where both states are weak, 46,312 cases where both states are powerful, and 405,191 cases where power is asymmetrically distributed across the dyad.

model of alliance behavior, is consistent with realist models for interstate behavior. Powerful states are more likely to attain security related gains from other equally powerful states (as opposed to weaker partners) because both states already have relatively effective security production. Even though powerful states do have the capacity to advance their interests unilaterally, it is much more efficient to coordinate with other equally endowed actors sharing similar interests to more effectively advance joint interests. Finally, there is a greater risk of provoking a dispute with an equally powerful state if the alliance is abandoned by one of the partners because powerful states have the capacity to credibly threaten and, perhaps, punish each other for alliance abrogation.

*Potential Partner Hypotheses 1c: Pairs of states that are both powerful are more likely to be compatible potential alliance partners.*

Finally, I examine pairs of states that have asymmetric capabilities where one state is stronger relative to the other state. Morrow (1991) suggests these asymmetrically<sup>14</sup> paired states are the ones who are the most likely to engage in alliance formation according to his formal model because one state (often the weaker one) receives security related benefits while the other state (often the stronger one) receives autonomy related benefits. Further, he assumes there are equal opportunities to form both types of alliances

---

<sup>14</sup> It should be noted that Morrow's conception of symmetry and asymmetry in his 1991 article is in reference to whether both states receive symmetric (the same) benefits from alliance or asymmetric benefits (one ally gains security while the other gains autonomy) from alliance. Whereas here I discuss asymmetry in terms of relative capabilities—where one state is more powerful than the other and power is distributed asymmetrically in the dyad. Moreover, Morrow does state that “asymmetries in capabilities are often found in asymmetric alliances” (1991, 914).

(1991, 915) and that is the question under analyses here --are symmetric pairs or asymmetric pairs of states more likely to be compatible alliance partners for one another. The key claim of the alliance compatibility concept is pairs of states with different mixes of power symmetry will have chances of being compatible potential partners that are unique to that dyad type. Following the logic of both Altfeld (1984) and Morrow (1991) I argue that asymmetric pairs of states are more likely to be compatible alliance partners for one another because each state has a chance to gain something from the alliance they could not gain individually. And while the security gains accrued through alignment among asymmetric states may not be relatively equal, both states will gain in absolute terms thus making the alliance both efficient and rational.

*Potential Partner Hypothesis 1d: Pairs of states that are asymmetrically endowed in terms of military capacity are more likely to be compatible potential alliance partners.*

#### B. Regime structure and partner compatibility

Recent research on the influence of differences within regime groups on interstate behavior includes Reiter and Tillman (2002) as well as Clark and Nordstrom (2005). Indeed, understanding how the rules of the political game shape the subsequent preference-guided actions of leaders is central to the study of the science of politics. Beyond that, international relations is fundamentally concerned with the interactions of leaders (i.e. states) who are simultaneously playing two games—one at the domestic level in which the leader competes/strategizes to maintain domestic political power and another, at the international level, where the leader strategizes to pursue policies benefiting the national interest (Putnam 1989; Milner 1997). A leader's capacity to pursue the national interest is constrained by the domestic political institutions shaping

who control political power within the state. Thus, to the extent that knowledge about the political institutions within states provides information about the challenges facing leaders that knowledge is also informative to our understanding of how leaders might interact with one another and draw conclusions about alliance compatibility.

Moreover, information about regime provides insight to other actors about a state's preferences and strategy. "...[D]ifferent mixes of regime types are likely to affect the extent to which states perceive each others' circumstances, intentions, and signals effectively" (Clark and Regan 2003, 102). And more importantly, information about regime type supplies states with insight as to the credibility of a state's promises which directly relates to beliefs about whether a state is a compatible potential alliance partner.

Previous research on the effects of regime type on shaping beliefs about state behavior suggests the greater the diffusion of political power within a state, the more credible the promises of the leader (Martin 2000; Bueno de Mesquita et al. 2003). One might more generally conceptualize the credible commitment provided by institutional constraints upon the leader as being related to the ability of domestic third parties to check the power of a leader.<sup>15</sup> This is because as political power becomes increasing decentralized within the state, the leader must simultaneously please more potential veto players (Tsebelis 1995a, 1995b, 2003) to pursue his most preferred policies. Moreover, as that number of potential veto players gets increasingly large—the leader is also forced to provide goods that are more public in nature (Bueno de Mesquita et al. 2003) resulting

---

<sup>15</sup> This is consistent with rational choice institutionalist argument put forth by North and Weingast (1989); Root (1989); Drake and McCubbins (1998) and Heller et al. (1998) for the rational development of political institutions which restrain the power of autocratic leaders.

in a necessity for the leader to be both credible and competent as well as extremely efficient in policy allocations. Two main conclusions can be drawn from those broad statements—1) democratic leaders face domestic political institutions which are both credibility inducing for their reputation but also dangerous to their political survival and 2) competing domestic demands require democratic leaders to allocate policy resources efficiently as well.<sup>16</sup> Moreover, if democratic leaders face those large constraints a much more weakened version of that claim is true for autocratic leaders. Autocratic leaders are responsible to far fewer numbers of potential veto players suggesting they have a smaller need to be responsible and credible in terms of promises because the capacity to provide private goods increases as the size of the winning coalition decreases. “Thus, autocracies have institutional structures that promote loyalty to the incumbent leader among the privileged few in the winning coalition” (Bueno de Mesquita et al. 2003, 93). Bueno de Mesquita and his colleagues conceptualize the loyalty norm, or the ratio of the minimum winning coalition size relative to the size of the selectorate, as being the probability that each member of the selectorate has for being a successor in a future winning coalition (2003, 66). These small sized winning coalition to selectorate ratios induce risky behavior on the part of actors because challengers are less likely to need the support of any individual *i* to attain office. Thus, the consequences of defecting from the winning

---

<sup>16</sup> This argument is more generally related to Martin’s (2000) credible commitment concept where the commitments of states with domestic political veto institutions are believed by other states to be more credible than those of states that lack internal institutions of commitment. More commonly, the subfield of cooperation studies linking democracy to alliance formation behavior or alliance reliability also relies on some characteristics of this argument (Gaubatz 1996; Lai and Reiter 2000; Gartzke and Simon 1996; Leeds 2003a, 2003b).

coalition's wishes for an autocrat are minimal relative to those for the democrat suggesting it is less costly for the leaders of states with small loyalty norms for renege on promises and be punished for their lack of credibility. Considering that conclusion relative to the concept of alliance compatibility, dyads with a state with small sized MWC to selectorate ratios (i.e. an autocracy) should be less likely to be potential alliance partners for one another.

*Potential Partner Hypothesis 2: Pairs of states that contain at least one state with a small sized W/S ratio are less likely to be compatible potential partners.*

To this point I have maintained there are individual effects of weak military capacity and autocracy on the chances a pair of states are potential alliance partners for one another, however I also believe there is an interactive effect of military capacity and political regime type on alliance partner compatibility. States that are both autocratic and militarily strong provide information of another type about potential alliance partner compatibility. Powerful states have the capacity to pursue their national policies, for the most part, unilaterally and, moreover, there is a limited need for autocratic leaders to be reliable because of their political power is minimally constrained. Thus, autocratic states are less reliable in terms of alliance commitments. Leeds (2003a, 2003b) finds autocratic states are less likely to fulfill their alliance commitments during war relative to their democratic counterparts, in general. The mechanisms of the contracting explanation also suggest autocratic leaders have a decreased need to respond to domestic demands for social security policies, since they can generally repress the demands of the larger public as long as they keep their small cadre of supporters satisfied. Moreover, autocratic states are unlikely to form security good based alliances with actors outside of other relatively

rare powerful states (with whom they can produce jointly efficient security goods).<sup>17</sup>

Thus, pairs of states in which there is a militarily powerful autocrat should be unlikely to be potential partners because of the how that information is likely to shape the other state's beliefs about the credibility of the autocrat's alliance commitment.

*Potential Partner Hypothesis 3: Pairs of states that contain a powerful autocracy are less likely to be compatible potential alliance partners.*

### C. Shared interests<sup>18</sup> and partner compatibility

While I have approached and discussed this project entirely as if alliance behavior were a product of the interactions of two states alone, the complexities of the world suggest otherwise. Pairs of states interact with each other as well as third parties simultaneously. Similar to nearly all other social scientific research, I have naturally simplified the vision of the world I have presented herein and the dyad is an analytically simple and attractive way to discuss interstate interactions.<sup>19</sup> I do not deny that the behavior of third parties is important to the study of world politics and, indeed, I contend some information about third parties is crucial to dyadic alliance behavior. There is information to be understood from the behavior of any dyad with third parties which

---

<sup>17</sup> According to the data I have compiled of the 751 alliance formations by states that are powerful and autocratic only 76 (10%) of those alliances were formed with weaker partners providing some prime facie support for the claim.

<sup>18</sup> Alternative measures of shared interests include alliance portfolio similarity (Bueno de Mesquita 1975; Signorino and Ritter 1999), UN voting similarity (Garzke and Jo 2002) and status quo satisfaction (Lemke and Reed 1996), all of which have issues limiting their applicability here.

<sup>19</sup> Bremer (1992) discusses the benefits of using the dyad in international relations research.

relates to beliefs about alliance compatibility, specifically information relating to the number of rivals a dyad shares in common. That concept provides the basis for common interests and should increase the chances any one pair of state is potential alliance partners for one another. When states have common enemies it is a signal of common interests among them and forming an alliance may be an efficient way to delineate both the common and divergent interests that any pair of states might have. Moreover, this alliance can provide information about future policy preferences and to that end common enemies should increase the chance any one pair of states are compatible potential alliance partners for one another.

*Potential Partner Hypothesis 4: As the number of common rivals within a dyad increases, the likelihood this pair of states is compatible potential partners is increased.*

#### D. Location and partner compatibility

The final set of hypotheses influencing beliefs about alliance partner compatibility have less to do with strategy and information than with circumstance and situation. There are situational circumstances shaping the efficiency of the benefits to be accrued from alliance by any one pair of states. Neighborhood characteristics of the states in the dyad inform the potential alliance opportunities for the dyad. The location of the states in the dyad relative to one another also shapes alliance compatibility. Geographically marginalized states with few neighbors (i.e. New Zealand) are less likely to find compatible partners than those in more populated regions (e.g. Europe or South America). Moreover, contiguity remains a robust predictor of alliance behaviour in the pre-World War era. States from the same region are more likely to be potential alliance

partners than states outside of the same region because of the increased costs associated with coordinating policy with a distant ally (Sandler 1999).

*Potential Partner Hypothesis 5: Pairs of states from the same geographic region are more likely to be compatible potential alliance partners than states from different geographic regions.*

The final potential alliance partner compatibility expectation related to a dyad's situational circumstances is conditional upon the dyad's level of power. This final hypothesis is analogous to the conclusions of Most and Starr (1989) who suggested that there is an interactive relationship between capabilities and opportunities to interact where increased capabilities lead to increases in interaction possibilities. Therefore, the weakest states have a limited capacity to create opportunities for themselves and should interact with the alliance opportunities that are objectively available to them within their environment. The claim here is the weakest states are more likely to engage in alliance contracting with the states for whom it is the most economical to coordinate; proximate states. Thus, if a pair of states is contiguous and jointly weak, the chances they are compatible potential partners are increased because weak states should try to protect their sovereignty and security in any cost-effective and efficient way. Moreover, these weak but proximate states should be unlikely to act opportunistically within the confines of the alliance because neither state can advance their national interests unilaterally.

*Potential Partner Hypothesis 6: Pairs of states that are jointly militarily weak and contiguous with one another are more likely to be compatible potential alliance partners than alternative dyads of states.*

Hypotheses five and six more generally reflect the neighborhood and the location of the states in the dyad relative to each other. Not only is a state's neighborhood important but

the capability composition of the neighborhood relative to the state itself is crucial as well. States that exist in a neighborhood where they are weak relative to their neighbors face higher levels of insecurity. Weak states surrounded by other more powerful neighbors do not make attractive alliance partners because there is some risk an alliance might appear offensive to the state's more powerful neighbors and increase the risk of conflict. There are also minimal security benefits to be had from allying with a relatively weak state. Thus, as a state gets stronger relative to the other states in its neighborhood, the chances it is a compatible potential partner for the other state in the dyad are increased.

*Potential Partner Hypothesis 7: As state A gets more powerful relative to the states in its political relevant international environment (PRIE), it increases the chances the states in the dyad are compatible potential partners.*

*Potential Partner Hypothesis 8: As state B gets more powerful relative to the states in its PRIE, it increases the chances the states in the dyad are compatible potential partners.*

I also account for the distance between the states. Increasing distance between states ought to decrease the chances they are potential partners for one another because the costs of security coordination are likely to increase with distance (Sandler 1999).

*Potential Partner Hypothesis 9: As the logarithm of the distance between states increases they are less likely to be compatible potential alliance partners.*

The hypotheses outlined above suggest a variety of informational, historical, and situational conditions shaping the chances any individual pair of states are compatible alliance partners. In relation to the methodological discussion presented at the beginning of this paper, the hypotheses outlined above express expectations about differences across the units of analysis in the sample and should help to differentiate between the groups in

the sample. If there are differences across the units shaping the chances that any individual case/unit engages in alliance behavior because of compatibility, then we ought to empirically estimate the differences across those cases using a theoretically driven model and, subsequently, examine actual alliance behavior while accounting for differences across the cases.

The contracting explanation of alliance formation explicitly argues that potential partner compatibility is a crucial aspect of alliance behavior. Moreover, there is a methodological technique allowing the researcher to test this expectation via a split population estimation technique. Split population estimation techniques estimate a parameter allowing the scholar to examine the question of whether or not there is a split in the population and if using the split population estimation technique increases the overall fit of the predictive model of interest via the Vuong  $z$  statistic. A significant Vuong  $z$  statistic allows the researcher to reject the null hypothesis that the potential partner phase of the model does not improve fit of the model over the generic model that does not account for the potential partner concept.

*Alliance Formation Proposition 1: The potential partner compatibility phase of the model should significantly increase the fit of the alliance formation model relative to the unconstrained (Poisson) model.*

The next section will examine the concept of partner compatibility more fully and discuss how it is consistent with the concept of opportunity which has been previously examined in the literature.

#### **IV. Modelling potential partner compatibility and alliance commitments**

The contracting explanation of alliance formation suggests it is important to consider how the factors motivating a state's need to find alliances in an effort to produce efficient security affect which states are compatible as potential partners. In fact, the contracting explanation is explicit in its expectation that states will search for and select different alliance partners depending upon what types of demands motivate their need for alliance. Moreover, failing to account for the whether a single pair of states is a compatible potential partner dyad results in researchers assuming that all states are compatible partners for one another despite the fact intuition suggests otherwise.<sup>20</sup> More abstractly, we might consider how opportunities to engage in alliance formation (i.e. the existence of compatible potential partners) are related to actual alliance behavior since it is unlikely alliance formation will be observed in the absence of compatible potential partners. In fact, we might more generally conceptualize the compatible potential partner concept as being related to the opportunities states have to form alliances.

#### **A. Considering Compatible Potential Partners as Alliance Interaction Possibilities**

Most and Starr (1989) state “the argument that both opportunity and willingness must be taken into account in the study of international phenomena derives in part from the understanding that *all three* parts of the (ecological) triad—(the) entity, (its) environment, (and the) entity-environment relationship—must be studied in order to

---

<sup>20</sup> Indeed some contemporary alliance research uses politically relevant dyads as the cases for analysis (Lai and Reiter 2000, Simon and Gartzke 1996) suggesting scholars tacitly accept the claim not all states are compatible potential alliance partners. However, those same scholars still estimate econometric models which assume all cases in the sample have equivalent chances of obtaining the outcome of interest whereas I claim there are important unit-level differences shaping the chances of observing a new alliance.

cover all the jointly necessary conditions for the explanation of a phenomena” (28-29). The concept of opportunity is related to the “possibility of interaction” (Most and Starr 1989, 30).<sup>21</sup> Those authors, more generally, related the concept of opportunity to environmental possibilism where the actors are still constrained by certain environmental factors themselves. Individuals are constrained by the actual possibilities of the ‘objective’ environment, for example, opportunities for states to engage in cooperation were much more limited in the early 19<sup>th</sup> century due to spatial and geographical obstacles. Therefore, opportunities to engage in cooperation for some cases could be shaped by spatial limitations—and location is one of the dimensions of compatibility. Additionally, the authors argue interactions between states are also shaped by the relationship between capabilities and opportunities—“the existence of capabilities that permit the creation of opportunities” (1989, 31). Thus, interaction opportunities become more numerous as states attain the capacity to interact with one another. Therefore, interaction opportunities for some other cases are conditional upon military capacity—and military capacity is one of the dimensions of compatibility.<sup>22</sup> These authors provide

---

<sup>21</sup> Most and Starr (1989) draw heavily on the arguments put forth by Sprout and Sprout (1969) on environmental possibilism in their discussion of opportunity (See also Lemke and Reed 2001; Clark and Regan 2003 for discussions). Research placing emphasis on the concept of opportunity with respect to conflict studies includes Meernik (1994) and Clark (2003).

<sup>22</sup> Alternatively, this might be thought of in its inverse—pairs of states with limited military capacities (that lack the capacity to find alternative interaction opportunities) are likely to have a high alliance interaction possibility with each other only if they are contiguous or border each other by land. Consistent with my expectation, then, pairs of

direct support for the claims of the contracting explanation about potential partner compatibility by suggesting 1) opportunities are really interaction possibilities that have varied across time as a result of the removal of certain limiting environmental (geographic/spatial) factors **and** 2) opportunities vary as the power capacity A) of the state, itself, has varied across time and B) across states varies. The contracting explanation's expectations about why potential partner compatibility varies across states are consistent with Most and Starr's (1989) description of how both capacity and time have shaped interaction possibilities between states.

Thus, the concept of opportunity, as an organizing principle to examine world politics, though abstract (and unobserved), does suggest the importance of theorizing about the characteristics of states which shape their interaction possibilities or compatibility. In other words, it is important to think about differences across the units/cases of analysis to the extent those differences or types of group heterogeneity affect the outcome of interest, here, alliance formation. However, a key roadblock faced by researchers until the past few years was the fact that the concept of opportunity/compatibility is unobservable (it is a form of what econometricians call unobserved group heterogeneity [Long 1997]). Thus, it cannot be measured empirically and accounted for in the traditional methods of quantitative research where indicators representing the concept are identified, operationalized in a meaningful way and, then, used in predictive models.<sup>23</sup>

---

states that are both militarily weak and contiguous are more likely to be compatible potential alliance partners.

<sup>23</sup> However, contemporary advances in statistical methodology using computers have allowed researchers to estimate increasing complex econometric models that can estimate

In contrast to the previous empirical difficulties encountered by researchers when exploring the concept of opportunity, the concept of willingness is more easily described and measured. Willingness is related to the “dynamics of choice” according to Most and Starr (1989, 34). The theories we use are tools that provide information to guide us through the ‘dynamics of choice’ for leaders by positing a series of conditional relations that are consistent with the assumptions and implications of the theory. Thus, until recently, scholars were dealt the challenge of having the capacity to identify and measure many characteristics of willingness based upon theory and past research, but only had imprecise<sup>24</sup> methods for measuring the concept of opportunity before the statistical computing revolution of the past several decades. In conclusion, the contracting explanation of alliance formation provides an explanation as to why and under what circumstances states might engage in alliance formation suggesting this explanation can account for willingness aspect of alliance contract formation and the structure of the explanation, itself, suggests differences across the cases which provides guidance as to the opportunity concept.

One of the main problems faced by any researcher wishing to understand the relationship between interaction opportunities and outcomes of interest is the fact that the concept of an interaction opportunity itself is something that is unobservable (Clark and Regan 2003, 97). We only know opportunity must have existed if we observe our outcome of interest, though intuitively opportunities might have existed for some cases

---

multiple equations simultaneously on increasingly large samples (really, these are populations in world politics).

<sup>24</sup> The imprecision of these methods were due to their dichotomous nature (i.e. measures of contiguity) or their endogenous-based case selection.

even though we did not observe our outcome of interest. Clark (2003) and Clark and Regan (2003) suggest we might conceptualize the opportunities states have to engage in conflictual behavior as representing an unobservable split within any one sample of cases that would like to engage in conflict behavior. This split in the population suggests “a treatment effect, a difference between groups of dyads,” (Clark and Regan 2003, 96) where some states have no opportunity to engage in conflict because they lack targets for their conflict aspirations, whereas some other states have targets but, for some reason or another that is unknown to the researcher, those states also fail to engage in conflict. The result is a preponderance of zeros for the dependent variable arising from those two different processes, where some states had potential targets and *choose not to* engage in conflict, but other states had no targets and thus *cannot* engage in conflict. In fact, since there are different processes at work here Clark (2003; with Regan 2003) suggests modeling the probability of obtaining a zero (i.e. in conflict research terms --the probability there is no target) and condition the estimates of the outcome of interest on the probability states have potential targets (i.e.  $1-P(\text{no target})$ ).<sup>25</sup> In the language of the current project, this suggests I model the probability a pair of states is compatible potential alliance partners and, then, condition a model estimating the number of alliance commitments exchanged by a pair of states on the chances they are not compatible potential partners.

---

<sup>25</sup> Their remarks are in reference to the Cox split population model, where the dependent variable of interest is binary. However, their comments can be more generally applied to all split-population models even when the dependent variable is a count (similar to what will be used here).

Using zero-inflation techniques similar to those outlined above have several benefits. First, it treats the concept of opportunity as if it were a continuous variable (it is a probability) which more closely approximates reality as “the population of dyads includes pairs of states that have a substantial opportunity to interact and those for whom the opportunity to interact is vanishingly small” (Clark and Regan 2003, 98). Moreover, alternative methods used for determining opportunity such as political relevance rely on dichotomous measures of contiguity or power preponderance (see Clark and Regan 2003 for a review) and result in researchers selecting a subsample of all of the possible cases in the population.<sup>26</sup> Separating out these two types of dyads with different interaction opportunities within our population of states is methodologically crucial since these dyads might be “fundamentally different in how an independent variable  $x$  influences the dependent variable  $y$ , then the slope coefficients are biased by the correlation between  $x$  and the excluded variable  $z$  that indicates the difference between dyads with and without opportunity” (Clark and Regan 2003, 98). Thus, zero-inflated estimation techniques allow the researcher to methodologically account for the unobserved heterogeneity (or differences in compatibility) across groups within the sample allowing more leverage over the question of interest. Second, it allows the researcher to include all possible cases within the sample instead of selecting some subsample of cases to examine because it empirically separates out the cases with potential partners/targets from those without

---

<sup>26</sup> While selecting subsamples of cases is not detrimental if the researcher’s question only relates or is relevant to a select sample of states, however, for questions that are applied to the universe of possible cases researchers ought not rely upon methodologically unsatisfying selection mechanisms which place cases inside or outside of the sample as a result of some subjective assessment about capacity or relative location.

opportunities. Finally, zero-inflation methodological techniques estimate a parameter accounting for the relationship between the opportunity concept and our outcome behavior of interest allowing the researcher to understand the extent to which potential partner compatibility is correlated with actual alliance formation behavior and it provides an empirical test of this relationship. If potential partner compatibility is inconsequential the Vuong  $z$  statistic will be insignificant suggesting that accounting for potential partner compatibility does not substantively add to the fit of the empirical model.

The zero inflation techniques are consistent with the revised theoretical model presented above:  $E(y_i|x_i) = \mathbf{x}_i'\boldsymbol{\beta} - \mathbf{x}_i'\boldsymbol{\beta}(\psi_i)$ , where the weight of  $\psi_i$  will be determined by the expectations of the contracting explanation of alliance formation that suggest differences across dyads regarding alliance partner compatibility. Thus, I am weighting the expected value of  $y$  given the independent variables by the chances a dyad is compatible potential partners. Econometrically this weight enters through the joint probability distribution and shapes the conditional mean by lowering the expected zero count by  $\mathbf{x}_i'\boldsymbol{\beta}(\psi_i)$  (Long 1997). This is analogous to the theoretical story above, where the chances a pair of states are compatible potential partners conditions the expected number of commitments they might exchange in a given year.

## **B. Research Design**

### *i. Data*

Exploring the data used to examine the Compatible Potential Partner concept

The data used for these analyses come from a variety of different sources. I detail the data I use in the potential partner phase of the model here since the data used in the Alliance Commitment phase come from the Author (2006). Below I will describe the

coding of variables for military capacity, regime type, location and third-party rivals as well as their original source.

### *Independent Variables of Interest*

Military capacity is coded using the Correlates of War Composite Index of Military Capabilities (CINC) (Singer, Bremer, and Stuckey 1972). I create two primary measures from these data which are used to construct several interaction terms. First, I create a measure accounting for military weakness that is equal to 1 in a given year if an individual state's capability score falls below the 25<sup>th</sup> percentile (for the entire system across all years) and 0 otherwise. Second, I create a measure accounting for high levels of military capacity that equals 1 if an individual state's military capacity is above the 75<sup>th</sup> percentile (for the entire system across all years) in a given year and 0 otherwise. Finally, I create two interaction terms to account for dyads in which both states are either powerful or weak. I also create an interaction term that accounts for pairs of states where power is asymmetrically distributed which equals 1 for dyads with one powerful state and one weak state.

Additional military capacity data comes from Maoz's work on Politically Relevant International Environments (1996, 1997). I utilize his measure of a state's capacity relative to the capacities of the states in its PRIE. This measure is the CINC score of the state divided by the sum of the CINC scores for the states in its PRIE. This variable ranges from near zero (the state is weak relative to its PRIE) to .6 the state is stronger than the states in its PRIE.

Minimum winning coalition data come from the work of Bueno de Mesquita and colleagues (2003).<sup>27</sup> They created a variety of measures to examine the selectorate theory and herein I use their ratio measure of the Minimum Winning Coalition (MWC) to the size of the selectorate (a.k.a. the loyalty norm) which ranges between 0 and 1 with scores closer to one representing states with large loyalty norms (or democracies). I create a dichotomous variable to use in the analyses. I create a measure equal to one if either state in the dyad has a small sized W to S ratio ( $<.26$ ) or zero otherwise. I also create an interaction term equaling 1 for dyads in which at least one state is powerful and has a small sized W.

Rivalry data is from Stinnett and Diehl's (2000) work on rivalry behavior. I will include the number of rivals in common for the dyad using these data.<sup>28</sup>

I will also account for how the neighborhood of a state and its location relative to the other state in the dyad should influence potential alliance behavior. The variable for regional neighbors will be computed using EUGene (v. 3.03, Bennett and Stam 2000) by coding states in the same region equal to 1 as defined by the Correlates of War project. Additionally, EUGene also provides the intercapital distance between states, and I use the natural logarithm of it here. Finally, I interact military weakness with dyadic contiguity to create a measure equaling one for dyads in which both states are militarily weak and

---

<sup>27</sup> The authors discuss their institutional measures consistent with the selectorate theory at length in chapter 4 of their book.

<sup>28</sup> This variable was created by creating dyad-rival pairwise combinations for all rival dyads and then counting common rivals between states and collapsing those rival counts and summing them for an individual dyad year. That data was then merged into the existing dyad-year dataset. For more information about reconstructing dyadic rivalry data to account for shared rivals contact the author.

contiguous to one another. Since contiguity and the log of distance are both products of the spatial relation between states I omit the log of distance from the model accounting for weak and contiguous dyads.

*Revisiting the data used in earlier Analyses of the Contracting Theory*

Each of the components of the contracting theory of alliance formation was operationalized in an earlier presentation (Author 2006). It included the Bueno de Mesquita and colleagues (2003) measures of large minimum winning coalitions and small MWCs based on the belief that states of different regime types have different propensities to engage in alliance formation. It also included a measure of social demands measuring current demands relative to expected demands with the use of the infant mortality rate (Abouharb and Kimball 2007). I expect the social demand variable to be positively related to the number of alliance commitments exchanged based on the contracting explanation. Finally, it also included two measures of external threats to state security: 1) the sum of the number of shared rivals in the dyad (Stinnett and Diehl 2001) and 2) the lower dyadic sum of MIDS in a state's PRIE not involving the state (Maoz 1996, 1997). I expect both of those external threat variables to be positively related to the number of alliance commitments exchanged. I also control for the relative capabilities between states by creating a ratio of the stronger state in the dyad to the combined capabilities of the two.

*A Different Dependent Variable: the Sum of a Dyad's Alliance Commitments in a Year*

The "with zeros" category of econometric models mix an unobservable binary response model with a Poisson count model process. The resulting dependent variable which is analyzed is actually a count of the number of times the outcome of interest

occurred during a given year. Thus, I operationalized a new dependent variable which sums the number of alliance commitments exchanged within a dyad when alliances are formed. Thus, if an alliance is created in a dyad where State A gives defense and neutrality commitments ( $N$  of commitments<sub>State A</sub> = 2) and State B gives only a neutrality commitment ( $N$  of commitments<sub>State B</sub> = 1), then the sum of the commitments exchanged in the dyad is equal to 3. The data on alliance commitment is from the Alliance Treaty Obligations and Provisions project (Leeds et al. 2002). The distribution of the dependent variable across all possible dyad years between 1816 and 2000 in the analyses used herein is shown in Table 1.<sup>29</sup>

[Insert Table 1 about here]

## *ii. Method*

As mentioned above, the contracting explanation suggests there are variations across different pairs of states or dyads affecting the chances any individual dyad engages in alliance formation. This suggested differential subsets of dyads where some pairs of states have alliance interaction potential because they are compatible as potential partners and other dyads lack that potential are among the pairs of states which do not engage in alliance formation, thus we should empirically try to identify the states having alliance interaction potential from those that did not. In zero-inflated models, those two groups are labeled  $\psi$  for the dyads that will almost never form alliances and  $1 - \psi$  for the dyads that could have formed alliances because they were potential partners for one another but for some reason did not. “Thus, the distinction between the two groups is a form of discrete, unobserved heterogeneity” (Long 1997, 242). And in the zero-inflated model  $\psi$

---

<sup>29</sup> Cases will drop out of the analyses due to missing data.

is a function of the characteristics of the individual case/unit. Prima facie evidence of zero-inflation within the dependent variable is shown in Table 1 above where about 99% of the observations are equal to 0. This suggests a simultaneous equation model where the first equation uses a binary model process to estimate an unobserved probability any individual dyad is compatible potential partners as a function of some characteristics that I hypothesized upon above. And the second equation uses a Poisson process to examine the number of alliance commitments exchanged within the dyad as a function of the important covariates outlined in the contracting theory of alliance formation conditional upon the dyad being compatible potential alliance partners. Thus, the model estimated herein is the zero-inflated Poisson Model (ZIP)<sup>30</sup> (See Long 1997 and Greene 2003 for more discussion of this model). The units of analysis are all possible dyad-years from 1816 until 2000. The Alliance Commitment Phase structural equation estimated appears below and is the same in every model estimated:

**Number of Alliance Commitments Phase**

$$E(\text{Number of Alliance Commitments Exchanged} \mid \text{States are Compatible Potential Alliance Partners}) = \alpha + \beta_1 \text{ Changes in IMR Relative to 3 Year Average} + \beta_2 \text{ Lower Level of IMR} + \beta_3 \text{ Lower Sum of Environmental MIDS} + \beta_4 \text{ Large MWC} + \beta_5 \text{ Small MWC} - \beta_6 \text{ Relative Capabilities} + \beta_7 \text{ Sum of Shared Rivals} (-\beta_8 \text{ Log of Distance})^{31} + \epsilon_i$$

The compatible potential partner phase of the model will be subjected to various specifications that are outlined in Table 2 under the appropriate model with their

---

<sup>30</sup> This model is estimated in STATA 8.2.

<sup>31</sup> The Log of Distance will only be included in the Poisson model that is used for comparison purposes only. In all of the ZIP models, the log of distance will be included in the compatible potential partner phase only.

expected effect on the dyadic sum of alliance commitments as well as the hypothesis number to which each variable belongs.<sup>32</sup> The opportunity phase is estimating the following expectation: P (Dyad is not a Compatible Potential Partner Dyad).<sup>33</sup>

[Table 2 about here]

### **C. Evidence of the Affect of Partner Compatibility on Alliance Contracting Behavior**

[Table 3 about here]

Table 3 presents results for both a Poisson and a series of ZIP models.<sup>34</sup> The Poisson model estimated is consistent with the models estimated and reported by the Author (2006). ZIP model 1 examines hypotheses 1a, 2, 4, 5, and 9. Results provide support for the hypotheses. The presence of one weak state within the dyad increases the chances the pair of states is not compatible partners. Additionally, the presence of one state within the dyad with a small sized W/S ratio increases the chances the dyad is not a compatible partner dyad. Increasing distance between states in the dyad increases the chances the dyad is not a compatible potential partner dyad. As the number of rivals a dyad shares increases, the chances the dyad is not a compatible potential partner dyad are decreased suggesting the presence of common interests increases the chances a pair of

---

<sup>32</sup> If “NA” appears in the column then that variable is not included in this particular model.

<sup>33</sup> Hypotheses articulated above were framed in terms of increases the chances a pair of states ARE compatible potential partners for one another so they will be inverted consistent with the expectations on Table 2.

<sup>34</sup> Standard errors for the coefficient estimates in Commitment Count phase are available from the author upon request.

states are likely compatible alliance partners. Finally, if the states in the dyad are from the same region, it decreases the risk that the pair of states is not compatible potential partners. However, the log of distance also taps into the relationship between location and compatibility. Thus, the remaining models exclude regional neighbors and include only the log of distance.

ZIP model 2 examines hypotheses seven and eight which explore how a state's military capacity relative to the sum of the capacities of the states in its politically relevant international environment influence alliance partner compatibility. Hypothetical expectations are supported as a state becomes increasingly preponderant relative to the states in its PRIE, it decreases the chances the dyad is not a compatible potential partner dyad. All other variables perform consistently and in their expected directions.

ZIP model 3 replicates ZIP model 1 excluding the effect of regional neighbors to ensure consistency across specifications. Consistency remains across all of the other variables in the model relative to previous specifications. Continuing the exploration of the effects of power on alliance partner compatibility, ZIP model 4 examines some conditional relationships believed to influence beliefs about whether a pair of states is compatible potential partners. Specifically it examines hypotheses 3 and 6. The presence of a strong autocratic state within the dyad has no discernable effect on the chances the states in the dyad are not potential partners. Pairs of states that are both weak and contiguous to one another are less likely to not be compatible potential alliance partners providing support for hypothesis 6.

ZIP model 5 examines symmetry in power distribution might affect alliance partner eligibility. The results suggest both symmetry and asymmetry appear to increase

the chances a pair of states are compatible potential alliance partners (in other words they decreases the chances a pair of states are not potential alliance partners) but at different levels. Examining purely the magnitudes of the coefficients suggests jointly powerful states are the most likely to be potential partners for one another followed by pairs of states where power is asymmetrically distributed and then pairs of states that are both weak. ZIP models 2 through 5 provide important insight as to how military capacity both between the pair of states in the dyad and relative to the states in an individual state's PRIE might affect the chances a pair of states is compatible potential partners and the number of commitments exchanged.

Across all of the ZIP models the Vuong  $z$  statistics are significant providing support the proposition that accounting for potential partner compatibility improves the fit of the alliance commitment exchange model relative to the regular Poisson model. Across the Poisson and the ZIP models the variables specified in the commitment count model perform consistently though the coefficients do change in magnitude in the ZIP models relative to the Poisson. This provides support for alliance formation proposition 1. Thus, the inferences drawn from the Poisson model may overestimate the influence of some factors (such as large-sized MWC and the number of shared rivals). While the coefficients are informative to our understanding of the differences between these models, an alternative method for interpreting results is through the use of predicted probabilities.

[Figure 1 about here]

Figure 1 compares predicted probabilities that  $Y$  is equal to one or two for the Poisson model and ZIP model 3. The figure suggests the Poisson model dramatically

under-predicts the probability of the number of alliance commitments exchanged relative to the ZIP model. The ZIP model suggests when alliance compatibility is accounted for between states the probability of commitments exchanged equal to 1 when states are at parity is almost 97%, whereas the Poisson model places those chances much lower at 3 in 100. At preponderance the under-predictions by the Poisson model are also large as the Poisson suggests the chances of one commitment being exchanged are 2 in 100 while the ZIP suggests those chances are closer to 9.7 out of 10. The predicted probability that two commitments are exchanged in the ZIP model remains at about 7 in 10 as the distribution of capabilities in the dyad ranges from parity to preponderance. The Poisson model under-predicts the chances of two commitments being exchanged to a larger extent than the ZIP model as it places the range on that likelihood between 2 in 1,000 at parity and 1 in 1,000 at preponderance. Thus, there are differences in orders of magnitude between the predictions of the Poisson and the ZIP model. The predicted probabilities point to the substantive differences in expectations when potential partner compatibility is accounted for in models of commitment exchange.

In closing, the results of the analyses and figures suggest nearly all of the hypothetical expectations were met. The singular expectation that was not met was hypothesis 3 as the results do not conclusively suggest there is a relationship between being powerful and autocratic and alliance partner compatibility. Additionally, these analyses add further insight to how the relationship between the distribution of military capabilities within the dyad and within each state's politically relevant international environment shapes both partner eligibility and alliance commitment behavior. In the Poisson model the effect of democracy (or a large MWC) is positive, as expected,

however once alliance compatibility is accounted for democracy has a negative effect on the number of commitments exchanged which counters my expectations. Yet, the magnitude of the coefficient on autocracy is larger than the magnitude of the coefficient democracy suggesting the effect is larger for autocracies. Moreover, the partner compatibility phase of the model actually captures some characteristics of states that are correlated with democracy such as military capacity and, thus, I expect the main effects to be somewhat different. Further analysis of the predicted probabilities (based on ZIP model 3) suggests that democracies are about 2 in 1,000 time more likely to exchange one commitment at parity than autocracies, thus democracies are more likely to commit relative to their autocratic counterparts. Finally, these results also provide support for the most basic mechanisms of the contracting explanation of alliance formation as both security demands (as measured by shared rivals and MIDS in a state's environment) and domestic demands (as measured by the level of the IMR) appear to increase the number of commitments exchanged within the dyad.

#### **D. Conclusions**

The findings from these analyses suggest failing to account for whether a dyad is serious potential partners leads to dramatic under-predictions of the likelihood any number of alliance commitments is exchanged. Additionally, failing to account for partner compatibility may lead to incorrect inferences about the magnitude of the influence of some key variables. Those two findings point to the substantive importance of compatible potential partners in empirical models of alliance commitment exchange.

Further, these findings suggest thinking about "interaction possibilism" is theoretically important as well. The contracting explanation suggested a variety of

factors that influence potential partner compatibility on both a monadic and a dyadic level, as well as regional level. This implies that characteristics across the levels of analysis shape interstate behavior and scholars ought to think about the complexity of the factors shaping the opportunities states have to interact with one another. Moreover, the contracting explanation itself implied that different pairs of states have different chances of exchanging alliance commitments and the empirical evidence supports that claim. That past research fails to conceptualize and analyze how differences in compatibility across the units of analysis (or differences across groups) shape our outcome of interest consequentially suggests another reason why the contracting explanation improves upon on existing explanations of alliance behavior. Future extensions of this research would broaden the concept of contracting outside the alliance literature to include international trade commitments and, perhaps, even informal agreements as well as exploring asymmetric alliances more closely in an attempt to understand the systematic nature of these agreements. Finally, the major mechanisms that the contracting explanation suggests shape the willingness of states to ally (security demands and social demands) do retain importance after accounting for whether a pair of states is compatible potential partners highlighting the robustness of the contracting explanation of alliance formation.

## References

- Abouharb, M.R. and Anessa L. Kimball. 2007. "A New Dataset on Infant Mortality, 1816-2000" *Journal of Peace Research*. 44(6): TBA.
- Altfeld, Michael. 1984. "The Decision to Ally: A Theory and Test." *The Western Political Quarterly*. 37(4): 523-544.
- Bennett, D. Scott, and Allan Stam. 2000. "EUGene: A Conceptual Manual." *International Interactions*. 26:179-204. (<http://eugenesoftware.org>) [v.3.03]
- Bremer, Stuart. 1992. "Dangerous Dyads: Conditions Affecting the Likelihood of Interstate War, 1816-1965." *Journal of Conflict Resolution*. 36(2): 309-341.
- Bueno de Mesquita, Bruce. 1975. "Measuring Systemic Polarity." *Journal of Conflict Resolution*. 19(2): 187-216.
- Bueno de Mesquita, Bruce; James D. Morrow; Randolph M. Siverson, and Alastair Smith. 1999. "An Institutional Explanation of the Democratic Peace." *American Political Science Review*. 93(4): 791-807.
- Bueno de Mesquita, Bruce; Alastair Smith; Randolph M. Siverson and James D. Morrow. 2003. *The Logic of Political Survival*. Cambridge MA: The MIT Press.
- Clark, David H. 2003. "Can Strategic Interaction Divert Diversionary Behavior? A Model of US Conflict Propensity." *Journal of Politics*. 65(4): 1013-1039.
- Clark, David H. and Timothy Nordstrom. 2005. "Democratic Variants and Democratic Variance: How Domestic Constraints Shape Interstate Conflict." *Journal of Politics*. 67(1): 250-270.
- Clark, David H. and Patrick M. Regan. 2003. "Opportunities to Fight: A Statistical Technique for Modeling Unobservable Phenomena." *Journal of Conflict Resolution*. 47(1): 94-115.
- Drake, Paul and Mathew D. McCubbins. 1999. *The Origins of Liberty*. Princeton, NJ: Princeton University Press.
- Gartzke, Erik and Dong-Joon Jo. 2002. *UN General Assembly Voting*. V.3.0. URL: (<http://www.columbia.edu/~eg589/datasets.htm>)
- Gartzke, Erik and Michael Simon. 1999. "A General Test of Alliance Theory." Paper presented at the 1998 Annual Meeting of the International Studies Association, Minneapolis, MN.

Gaubatz, Kurt T. 1996. "Democratic States and Commitment in International Relations." *International Organization*. 50(1): 109-139.

Greene, William H. 2003. *Econometric Analysis*. 5th ed. New Jersey: Prentice Hall.

Heller, William; Philip Keefer and Mathew D. McCubbins. 1998. "Political Structure and Economic Liberalization: Cases from the Developing World." in Paul Drake and Mathew McCubbins (eds.) *The Origins of Liberty*. Princeton, NJ: Princeton University Press.

Lai, Brian and Dan Reiter. 2000. "Democracy, Political Similarity, and International Alliances." *Journal of Conflict Resolution*. 44(2): 203-227.

Leeds, Brett Ashley. 2003a. "Alliance Reliability in Times of War: Explaining State Decisions to Violate Treaties." *International Organization*. 57: 801-827.

Leeds, Brett Ashley. 2003b. "Do Alliances Deter Aggression? The Influence of Military Alliances on the Initiation of Militarized Interstate Disputes." *American Journal of Political Science*. 47: 427-439.

Leeds, Brett Ashley, Jeffrey M. Ritter, Sara McLaughlin Mitchell, and Andrew G. Long. 2002. "Alliance Treaty Obligations and Provisions, 1815-1944." *International Interactions*. 28: 237-260.

Lemke, Douglas and William Reed. 2001. "The Relevance of Politically Relevant Dyads." *Journal of Conflict Resolution*. 45(1): 126-144.

Lemke, Douglas and William Reed. 1996. "Regime Types and Status Quo Evaluations." *International Interactions*. 22: 143-164.

Levy, Jack. 1983. *War in the Modern Great Power System, 1495-1975*. Lexington: University of Kentucky Press.

Levy, Jack. 1981. "Alliance Formation and War Behavior: An Analysis of the Great Powers, 1495-1975." *Journal of Conflict Resolution*. 25(4): 581-613.

Long, J. Scott, 1997. *Regression Models for Categorical and Limited Dependent Variables*. Thousand Oaks, CA: Sage.

Maoz, Zeev. 1996. *Domestic Sources of Global Change*. Ann Arbor, MI: University of Michigan Press.

Maoz, Zeev. 1997. "The Strategic Behavior of Nations, 1816-1986." Unpublished manuscript, Jaffee Center for Strategic Studies, Tel-Aviv University.

Martin, Lisa. 2000. *Credible Commitments: Legislatures and International Cooperation*. Princeton, NJ: Princeton University Press.

- Meernik, James. 1994. "Presidential Decision Making and the Political Use of Military Force." *International Studies Quarterly*. 38: 121–138.
- Milner, Helen V. 1997. *Interests, Institutions, and Information*. Princeton, NJ: Princeton University Press.
- Morgan, T. Clifton and Glenn Palmer. 2003. "To Protect and Serve: Alliance and Foreign Policy Portfolios." *Journal of Conflict Resolution*. 47(2): 180-203.
- Morgenthau, Hans J. 1948. "Alliances." in Friedman, Julian R., Christopher Bladen and Steven Rosen (eds.) 1970. *Alliance in International Politics*. Boston: Allyn and Bacon Inc.
- Morgenthau, Hans J. 1973. *Politics Among Nations: The Struggle for Power and Peace*. New York: Knopf.
- Most, Benjamin A. and Harvey Starr. 1989. *Inquiry, Logic, and International Politics*. Columbia, SC: University South Carolina Press.
- Morrow, James D. 1991. "Alliances and Asymmetry: An Alternative to the Capability Aggregation Model of Alliances." *American Journal of Political Science*. 35(4): 904-933.
- North, Douglass C. and Barry Weingast. 1989. "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in 17th Century England." *Journal of Economic History*. 49: 803-832.
- Palmer, Glenn and T. Clifton Morgan. 2006. *A Theory of Foreign Policy*. Princeton, NJ: Princeton University Press.
- Powell, Robert. 1999. *In the Shadow of Power: States and Strategies in International Politics*. Princeton, NJ: Princeton University Press.
- Putnam, Robert D. 1988. "Diplomacy and Domestic Politics: The Logic of Two-Level Games." *International Organization*. 42(3): 427–461.
- Root, Hilton. 1989. "Tying the King's Hands: Credible Commitments and Royal Fiscal Policy During the Old Regime." *Rationality and Society*. 1(2): 240-258.
- Sandler, Todd. 1999. "Alliance Formation, Alliance Expansion, and the Core." *Journal of Conflict Resolution*. 43(6): 727-747.
- Signorino, Curtis and Jeffrey Ritter. 1999. "Tau-b or Not Tau-b: Measuring the Similarity of Foreign Policy Positions." *International Studies Quarterly*. 43(1): 115-144.

Simon, Michael W. and Erik Gartzke. 1996. "Political System Similarity and the Choice of Allies: Do Democracies Flock Together or Do Opposites Attract?" *Journal of Conflict Resolution*. 40(4): 617-635.

Singer, J. David; Stuart Bremer and John Stuckey. 1972. "Capability, Uncertainty, and Major Power War, 1820-1965." In Russett, Bruce (ed.) *Peace, War, and Numbers*. New York: Sage Publications.

Siverson, Randolph M. and Juliann Emmons. 1991. "Birds of a Feather: Democratic Political Systems and Alliance Choices in the Twentieth Century." *Journal of Conflict Resolution*. 35(2): 285-306.

Sprout, Harold and Margaret Sprout. 1969. "Environmental Factors in the Study of International Politics." in James N. Rosenau (ed.) *International Politics and Foreign Policy*. New York: Free Press.

Stinnett, Douglas and Paul F. Diehl. 2001. "The Path(s) to Rivalry: Behavioral and Structural Explanations of Rivalry Development." *Journal of Politics*. 63(3): 717-740.

Tsebelis, George. 1995a. "Veto Players and Law Production in Parliamentary Democracies." in Herbert Doring (Ed.) *Parliaments and Majority Rule in Western Europe*. New York: St. Martin's Press.

Tsebelis, George. 1995b. "Decision Making in Political Systems: Veto Players in Presidentialism, Parliamentarism, Multicameralism and Multipartyism." *British Journal of Political Science*. 25(3): 289-325.

Tsebelis, George. 2003. *Veto Players: How Political Institutions Work*. Princeton, NJ: Princeton University Press.

Walt, Stephen M. 1987. *The Origins of Alliances*. Ithaca: Cornell University Press.

Waltz, Kenneth N. 1979. *Theory of International Politics*. New York: McGraw Hill Inc.

**Table 1: The Distribution of the Dependent Variable**

<b>DV</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>#</b>	<b>657,536</b>	<b>8</b>	<b>126</b>	<b>163</b>	<b>815</b>	<b>358</b>	<b>1257</b>	<b>482</b>	<b>204</b>	<b>49</b>	<b>11</b>

**Table 2: Variables and Expected Direction in the Potential Partner Compatibility Phase**

<b>Variable</b>	<b>Hyp#</b>	<b>ZIP M1</b>	<b>ZIP M2</b>	<b>ZIP M3</b>	<b>ZIP M4</b>	<b>ZIP M5</b>	<b>Supported?</b>
One State Weak	1a	+	+	+	+	+	Yes
Both Weak	1b	NA	NA	NA	NA	-	Yes
Both Strong	1c	NA	NA	NA	NA	-	Yes
Asymmetric Power	1d	NA	NA	NA	NA	-	Yes
Small W/S	2	+	+	+	+	+	Yes
Strong & Small W/S	3	NA	NA	NA	+	NA	No
Shared Rivals	4	-	-	-	-	-	Yes
In Same Region	5	-	NA	NA	NA	NA	Yes
Weak & Contiguous	6	NA	NA	NA	-	NA	Yes
Capability Ratio (State A / PRIE)	7	NA	-	NA	NA	NA	Yes
Capability Ratio (State B / PRIE)	8	NA	-	NA	NA	NA	Yes
Log of Distance	9	+	+	+	NA	+	Yes

**Table 3: Poisson and Zero-Inflated Poisson Results of Partner Compatibility and the Number of Commitments**

	H#	Poisson	ZIP 1	ZIP 2	ZIP 3	ZIP 4	ZIP 5	
<i>Potential Partner Compatibility</i>								
One weak state (S.E.)	H1a	NA	0.0902* (.016)	0.0642* (.016)	0.1006* (.016)	0.1741* (.015)	0.1240* (.019)	
Both Weak	H1b	NA	---	---	---	---	-0.1037* (.031)	
Both Strong	H1c	NA	---	---	---	---	-0.2583* (.025)	
Power Asymmetrically distributed	H1d	NA	---	---	---	---	-0.1279* (.021)	
Small-sized W/S	H2	NA	0.2273* (.023)	0.1790* (.022)	0.1972* (.022)	0.1456* (.021)	0.1826* (.022)	
Strong & Small-sized MWC State	H3	NA	---	---	---	-0.0258 (.032)	---	
Number of shared rivals	H4	NA	-0.4882* (.020)	-0.5735* (.044)	-0.6917* (.032)	-0.5710* (.020)	-0.6461* (.036)	
Regional Neighbors	H5		-0.7806* (.018)	---	---	---	---	
Both Weak & Contiguous	H6	NA	---	---	---	-0.9867* (.078)	---	
Capability Ratio (State A/PRIE)	H7	NA	---	-1.4412* (.103)	---	---	---	
Capability Ratio (State B/PRIE)	H8	NA	---	-0.4234* (.201)	---	---	---	
Log of Distance	H9	NA	0.0527* (.003)	0.1184* (.003)	0.1208* (.002)	---	0.1172* (.003)	
Constant	NA		2.4849* (.029)	1.6688* (.020)	1.6022* (.019)	2.4789* (.009)	1.734* (.024)	
<i>Commitment Count Phase</i>								
Relative Capabilities			-0.6680*	-0.0799	-0.1041*	-0.0739	-0.0776	-0.0759
Large-sized MWC			0.0940*	-0.0353*	-0.0301	-0.0344*	-0.0363*	-0.0341*
Small-sized MWC			-0.3680*	-0.0568*	-0.0513*	-0.0471*	-0.0587*	-0.0473*
Change in IMR relative to 3yr Ave.			0.0090*	-0.0018	-0.00003	0.0006	-0.0017	-0.0004
Lower Level of IMR			0.0066*	0.0003*	0.0002	0.0003*	0.0003*	0.0003*
Lower sum of Environment MIDS			0.0228*	-0.0002	0.0003	0.0006*	-0.0002	0.0005*
Number of shared rivals			0.2518*	0.0024	-0.0713*	-0.0959*	0.0017	-0.0899*
Log of Distance			-0.2470*	NA	NA	NA	NA	NA
Constant			-1.8725*	1.7885*	1.8064*	1.7662*	1.7858*	1.7684*
Number of Observations			477,519	477,519	465,312	477,519	477,519	477,159
Non-zero Observations			NA	2,763	2,717	2,763	2,763	2,763
Chi-square			7059.53*	15.78*	26.46*	38.42*	16.74*	30.69*
Log-Likelihood			-73220.75	-19735	-20287.49	-20742.63	-21658.62	-20690.22
Vuong Statistic			NA	58.71*	58.30*	58.82*	58.99*	58.77*

**Figure 1: Comparison of Poisson vs. Zero-Inflated Poisson Predicted Probabilities (Y=1) & (Y=2)**

